APPENDICES

A. SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT – INDIRECT SOURCE REVIEW PERMIT

B. SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT – DUST CONTROL PLAN (BIDDING PURPOSES ONLY)

C. CALIFORNIA ENVIRONMENTAL QUALITY ACT – MITIGATION MONITORING AND REPORTING PROGRAM

D. SAN LUIS DELTA MENDOTA WATER AUTHORITY – ACCESS AGREEMENT

E. CONTRACTOR'S REQUEST FOR CONSTRUCTION STAKING

F. GEOTECHNICAL ENGINEERING INVESTIGATION ENTITLED, PROPOSED NEW RECHARGE BASIN AND SEWER IMPROVEMENT BY BSK ASSOCIATES, DATED JANUARY 15, 2024.

G. STORMWATER POLLUTION PREVENTION PLAN (BIDDING PURPOSES ONLY)

APPENDIX A

SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT
INDIRECT SOURCE REVIEW PERMIT

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

April 17, 2025

Charles Bergson
City of Los Banos
411 Madison Ave
Los Banos, CA 93635

Re: Air Impact Assessment (AIA) Application Approval
ISR Project Number: C-20250124
Land Use Agency: City of Los Banos
Land Use Agency ID Number: Unknown

Dear Mr. Bergson:

The San Joaquin Valley Air Pollution Control District (District) has approved your Air Impact Assessment (AIA) for the Basins and Stormwater Capture Project, located at San Luis Canal and Santa Fe Canal in Los Banos, California. The project consists of a 160-acre detention basin. The District has determined that the mitigated baseline emissions for construction and operation will be less than two tons NOx per year and two tons PM10 per year. Pursuant to District Rule 9510 Section 4.3, this project is exempt from the requirements of Section 6.0 (General Mitigation Requirements) and Section 7.0 (Off-site Emission Reduction Fee Calculations and Fee Schedules) of the rule. As such, the District has determined that this project complies with the emission reduction requirements of District Rule 9510 and is not subject to payment of off-site fees. The determination is based on the project construction details provided with the application. Changes in the construction details may result in increased project related emissions and loss of this exemption.

Pursuant to District Rule 9510, Section 8.4, the District is providing you with the following information:

- A notification of AIA approval (this letter)
- A statement of tentative rule compliance (this letter)
- An approved Monitoring and Reporting Schedule

In addition, to maintain this exemption you must comply with all mitigation measures identified in the enclosed Monitoring and Reporting Schedule. Please notify the District of any changes to the project as identified in the approved Air Impact Assessment for this project.

Samir Sheikh
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: (661) 392-5500 FAX: (661) 392-5585

www.valleyair.org www.healthyairliving.com

Change in Developer Form

If all or a portion of the project changes ownership, a completed Change in Developer form must be submitted to the District within thirty (30) days following the date of transfer.

Additional Requirements

- Dust Control Plan. Please be aware that you may be required to submit a Construction Notification Form or submit and receive approval of a Dust Control Plan prior to commencing any earthmoving activities as described in District Rule 8021 – *Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities.*

- Asbestos Requirements for Demolitions. If demolition is involved, a Certified Asbestos Consultant will need to perform an asbestos survey prior to the demolition of a regulated facility. Following the completion of an asbestos survey; the asbestos survey, Asbestos Notification, Demolition Permit Release, and the proper fees are to be submitted to the District 10 working days prior to the removal of the Regulated Asbestos Containing Material and/or the demolition when no asbestos is present.

To identify other District rules or regulations that apply to this project or to obtain information about District rules and permit requirements, the applicant is strongly encouraged to visit www.valleyair.org or contact the District's Small Business Assistance office nearest you:

Fresno office:	(559) 230-5888
Modesto office:	(209) 557-6446
Bakersfield office:	(661) 392-5665

Thank you for your cooperation in this matter. Please note the District also issued a letter to the land-use agency notifying the agency of this AIA approval. If you have any questions, please contact Mr. Jacob M Torrez by telephone at (559) 230-6558 or by email at jacob.torrez@valleyair.org.

Sincerely,



For: Mark Montelongo
Director of Policy and Government Affairs

Enclosures

cc: Amy Giacomini
Provost & Pritchard Consulting Group
455 W Fir Ave
Clovis, CA 93611
agiacomini@ppeng.com

Indirect Source Review
Complete Project Summary Sheet &
Monitoring and Reporting Schedule

Project Name:	**BASINS AND STORMWATER CAPTURE PROJECT**
Applicant Name:	**CITY OF LOS BANOS**
Project Location:	**SAN LUIS CANAL/SANTA FE CANAL MERCEY SPRINGS ROAD/HENRY MILLER ROAD APN(s): 082-020-024, 424-010-003, 424-010-004, 073-220-014**
Project Description:	**LAND USE: Other - 160 Acres - Other Other - 160 Acres - Other ACREAGE: 184.9**
ISR Project ID Number:	**C-20250124**
Applicant ID Number:	**C-304087**
Permitting Public Agency:	**CITY OF LOS BANOS**
Public Agency Permit No.	**UNKNOWN**

Existing Emission Reduction Measures

Enforcing Agency	Measure	Quantification	Notes

There are no Existing Measures for this project.

Non-District Enforced Emission Reduction Measures

Enforcing Agency	Measure	Specific Implementation	Source Of Requirements

There are no Non-District Enforced Measures for this project.

District Enforced Emission Reduction Measures

Enforcing Agency	Measure	Specific Implementation	Measure For Compliance	District Review
SJVAPCD	**Construction and Operation - Exempt from Off-site Fee**	**For each project phase, within 30-days of issuance of the first certificate of occupancy, if applicable, submit to the District a summary report of the construction start, and end dates, and the date of issuance of the first certificate of occupancy. Otherwise, submit to the District a summary report of the construction start and end dates within 30-days of the end of each phase of construction.**	**(Compliance Dept. Review)**	

(District Enforced Emission Reduction Measures Continued)

Enforcing Agency	Measure	Specific Implementation	Measure For Compliance	District Review
SJVAPCD	Construction and Operation - Recordkeeping	For each project phase, all records shall be maintained on site during construction and for a period of ten years following either the end of construction or the issuance of the first certificate of occupancy, whichever is later. Records shall be made available for District inspection upon request.	(Compliance Dept. Review)	
SJVAPCD	Construction and Operational Dates	For each project phase, maintain records of (1) the construction start and end dates and (2) the date of issuance of the first certificate of occupancy, if applicable.	(Compliance Dept. Review)	

Number of District Enforced Measures: 3

APPENDIX B

SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT
DUST CONTROL PLAN (FOR BIDDING PURPOSES ONLY)

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

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San Joaquin Valley Air Pollution Control District
Regulation VIII – Fugitive PM10 Prohibitions

Construction Notification

Pursuant to section 6.4 of **District Rule 8021 – *Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities***, the owner or operator of a construction project of at least 1.0 acre in size shall provide written notification to the District at least 48 hours prior to his/her intent to commence any earthmoving activities. Use the first two pages of this form to submit a written Construction Notification. There are no fees for filing a construction notification.

Larger construction projects, as outlined below, may be required to submit a full Dust Control Plan. If a Dust Control Plan is required the owner/operator does not need to submit a separate construction notification.

Dust Control Plan

Pursuant to section 6.3 of **Rule 8021 – *Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities***, the owner or operator shall submit a Dust Control Plan to the District for a construction project that will involve any of the following:

- Residential developments that will include ten acres or more of disturbed surface area, or
- Non-residential developments that will include five acres or more of disturbed surface area, or
- Will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days of the project.

A Dust Control Plan identifies the fugitive dust sources at the construction site and describes all of the dust control measures to be implemented before, during, and after any dust generating activity for the duration of the project. The District will review and approve, conditionally approve, or disapprove the Dust Control Plan within 30 days of submittal. **Construction activities shall not commence until the Dust Control Plan has been approved or conditionally approved by the District.** A copy of the approved Dust Control Plan must be retained at the project site and made available upon request by a District inspector.

FOR BIDDING PURPOSES ONLY

At least one key individual representing the owner or operator, or any person who prepares a Dust Control Plan must complete a Dust Control Training Course presented by the District. Please contact the District to find out when courses are being offered.

Pursuant to **District Rule 3135 – *Dust Control Plan Fee***, payment must accompany each Dust Control Plan submitted to the District. A separate fee is charged for any major modification made to an approved plan, such as modifying the size and scope of the project or making significant changes to the types of control or preventative measures. No fees are charged for administrative changes to an approved plan.

Regardless of whether a Construction Notification or Dust Control Plan is required, the owner or operator of any construction project shall comply with all other applicable requirements of Regulation VIII, and other District Rules.

Construction Notifications and Dust Control Plans should be submitted to the District's Compliance Division via mail or email to the applicable District Office:

San Joaquin, Stanislaus, Merced Counties	*Madera, Fresno, Kings Counties*	*Tulare, Kern Counties*
Northern Region Office 4800 Enterprise Way Modesto, CA 95356 (209) 557-6400 Fax: (209) 557-6475 DCP.North@valleyair.org	**Central Region Office** 1990 East Gettysburg Avenue Fresno, CA 93726 (559) 230-5950 Fax: (559) 230-6062 DCP.Central@valleyair.org	**Southern Region Office** 34946 Flyover Court Bakersfield, CA 93308 (661) 392-5500 Fax: (661) 392-5585 DCP.South@valleyair.org

RULE 3135 DUST CONTROL PLAN FEE (Adopted October 20, 2005; Amended January 17, 2008; Amended April 16, 2015; Amended April 19, 2018; Amended May 15, 2025, effective July 1, 2025 through June 30, 2026)

1.0 Purpose

The purpose of this rule is to recover the District's costs for reviewing Dust Control Plans and conducting site inspections to verify compliance with such plans.

2.0 Applicability

This rule applies to each owner/operator subject to the Dust Control Plan requirements of District Rule 8021 (Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities), Section 6.3.1.

3.0 Definitions

The definitions of terms in Rule 8011 (General Requirements) shall apply to this rule.

3.1 Modification: Any change to a Dust Control Plan which will change the size and scope of the project site and/or a significant change in any of the preventative and/or control measures in an approved Dust Control Plan.

4.0 Dust Control Plan Filing Fee

Every person filing a Dust Control Plan subject to the provisions of Rule 8021, Section 6.3.1, shall pay to the District, upon filing, the nonrefundable fee of $456. The $456 is the total fee for any project, including any administrative changes which may be necessary for approval of the plan.

Any person submitting a request to modify an existing approved Dust Control Plan, shall pay to the District, a fee of $94.

5.0 Late Fees

If payment of any charges levied under this rule are not received by the District within 60 days of submittal of the Dust Control Plan to the District, the charges shall be increased in accordance with the schedule provided in Rule 3010, Section 11.0 Late Fees.

FOR BIDDING PURPOSES ONLY

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FOR BIDDING PURPOSES ONLY

Section 1 – General Information – Page 1

☐ **Construction Notification** (Complete section 1) ☒ **Dust Control Plan** (Complete sections 1-7)	Date Received: *(For District Use)*

1-A Project Name and Location

Project Name: Basins and Stormwater Capture Project

Project Address: across canal from WWTP, 17963 Henry Miller Ave, Los Banos, CA 93635

Major X-Streets: Henry Miller Ave & Santa Fe Grade (dirft road)

City: Los Banos County: Merced

GPS Coordinate(s): 37.085017, -120.819628

Expected Construction Start Date: October 1, 2025 End Date: September 30, 2026

1-B Project Details

This project is: ☐ Residential ☒ Non-Residential (commercial, industrial, institutional, public, etc.)

Total project site area: 180 Acres

Total disturbed surface area: 180 Acres

Total disturbed areas that will be left inactive for more than seven days: 175 Acres

Maximum daily volume of earthmoving: 3,000 Cubic Yards

Average daily volume of earthmoving: 1,500 Cubic Yards

FOR BIDDING PURPOSES ONLY

1-C Provide a brief description of the project's operations.

Convert bare land into a series of recharge basins.

1-D Indirect Source Review (ISR) (Rule 9510)

Air impact Assessment (AIA) application submitted to the District? ☒ Yes ☐ No

If yes, ISR Project ID #: 20250124

For more information regarding ISR, please visit https://www.valleyair.org/permitting/indirect-source-review-rule-overview/ or contact the District's Technical Services team at (559) 230-6000.

Section 1 – General Information – Page 2

Project Name: Basins and Stormwater Capture Project

1-E Contacts

Property Owner:	City of Los Banos				
Address:	411 Madison Ave				
City:	Los Banos	State:	CA	Zip:	93635
Phone:	(209) 827-7056	Fax:			
Mobile:		Email:	jelene.demelo@losbanos.org		

Developer:	City of Los Banos				
Address:	411 Madison Ave				
City:	Los Banos	State:	CA	Zip:	93635
Contact Person:	Jelene de Melo				
Phone:	(209) 827-7056	Fax:			
Mobile:		Email:	jelene.demelo@losbanos.org		

General Contractor:					
Address:					
City:		State:		Zip:	
Contact Person:					
Phone:		Fax:			
Mobile:		Email:			

Other Contact:					
Company:					
Address:					
City:		State:		Zip:	
Phone:		Fax:			
Mobile:		Email:			

FOR BIDDING PURPOSES ONLY

STOP HERE FOR CONSTRUCTION NOTIFICATION ONLY

Section 2 – Dust Control Plan Implementation – Page 1

Project Name: Basins and Stormwater Capture Project

2-A This Dust Control Plan was prepared by:

Name: Gretchen Heisdorf Title: Principal Engiener

Company Name: Provost & Pritchard Consulting Group

Address: 455 W Fir Ave

City: Clovis State: CA Zip: 93611

Phone: 559-449-2700 Fax:

Mobile: Email: gheisdorf@ppeng.com

Date training completed: May 14, 2008 ☐ Copy of course certificate attached.

2-B Contractors

Provide the names, addresses, and phone numbers of the contractors involved in dust generating activities **or** performing dust control as part of this project (Rule 8021 Sec. 6.3.6.1). A supplemental list may be attached.

1.

2.

3.

4.

FOR BIDDING PURPOSES ONLY

2-C Who will have the primary responsibility for implementing this Dust Control Plan?

(Rule 8021 Sec 6.3.6.1)

☐ Property Owner ☐ Developer ☒ General / Prime Contractor

☐ Sub-Contractor(s) ☐ Other:

Primary Project Contact:

Title:

Company Name:

Address:

City: State: Zip:

On-Site Phone: Fax:

Mobile: Email:

Date training completed: ☐ Attach a copy of the course certificate

Section 2 – Dust Control Plan Implementation – Page 2

Project Name: Basins and Stormwater Capture Project

2-D Dust Generating Activity Dates

The expected start and completion dates of **dust generating activities and soil disturbance activities** to be performed on site. For phased projects, it may be necessary to report expected start and completion dates separately. (Rule 8021 Sec. 6.3.6.4)

Expected start date: October 1, 2025 Completion Date: September 30, 2026

Phase Project Start – A: _____ Completion – A: _____

Phase Project Start – B: _____ Completion – B: _____

Phase Project Start – C: _____ Completion – C: _____

2-E Other Locations

Identify whether any other locations should be included with this plan that are involved with this project. An example may include listing any site where bulk materials will be imported from or exported to. This does not need to include quarries or retailers of building materials. (Rule 8021 Sec. 6.3.2)

☒ No other locations are included with this project.

Location 1: _____

☐ No Dust Control Plan Required ☐ Included with this plan ☐ Included with another plan

Location 2: _____

☐ No Dust Control Plan Required ☐ Included with this plan ☐ Included with another plan

Location 3: _____

☐ No Dust Control Plan Required ☐ Included with this plan ☐ Included with another plan

FOR BIDDING PURPOSES ONLY

Section 3 – Fugitive PM10 Sources – Page 1

Project Name: Basins and Stormwater Capture Project

3-A Sources of Fugitive Dust

This section describes the minimum requirements for limiting visible dust emissions from activities that cause fugitive dust emissions. (Rule 8021 Sec. 6.3.6.5) **Check at least one box under each category**.

Structural Demolition. (Rule 8021 Sec. 5.1, 6.3.3, & 6.3.6.5)

- ☒ No demolitions are planned for this project.
- ☐ Asbestos NESHAP notification and fees will be submitted to the District. (Rule 3050 and Rule 4002)
  Water will be applied to the following areas for the duration of the demolition activities:
  - Building exterior surfaces;
  - Unpaved surface areas where equipment will operate;
  - Razed building materials; and
  - Water or dust suppressants will be applied to unpaved surface areas within 100 feet of structure during demolition.

Pre-Activity (Rule 8021 Sec. 5.2)

- ☐ Not applicable for this project (Please explain why in Section 3-C).
- ☒ The site will be pre-watered and work will be phased to reduce the amount of disturbed surface area at any one time (Complete Section 4-A).

Active Operations (Rule 8021 Sec. 5.2)

- ☒ Water will be applied to dry areas during leveling, grading, trenching, and earthmoving activities (Complete Section 4-A).
- ☐ Wind barriers will be constructed and maintained, and water or dust suppressants will be applied to the disturbed surface areas (Complete Sections 4-A or 4-B, and 4-C).

Inactive Operations, Including After Work Hours, Weekends, and Holidays (Rule 8021 Sec. 5.2)

- ☐ Not applicable for this project (Please explain why in Section 3-C).
- ☒ Water or dust suppressants will be applied on disturbed surface areas to form a visible crust, and vehicle access will be restricted to maintain the visible crust. (Complete Section 4-A or 4-B, and 4-C)

Temporary stabilization of areas that remain unused for seven or more days (Rule 8021 Sec. 5.2)

- ☐ Not applicable for this project (Please explain why in Section 3-C)
- ☒ Vehicular access will be restricted and water or dust suppressants will be applied and maintained at all un-vegetated areas (Complete Section 4-A or 4-B, and 4-C).
- ☐ Vegetation will be established on all previously disturbed areas (Complete Section 4-C).
- ☐ Gravel will be applied and maintained at all previously disturbed areas (Complete Section 4-C).
- ☐ Previously disturbed areas will be paved (Complete Section 4-C).

Unpaved Access and Haul Roads, Traffic and Equipment Storage Areas (Rule 8021 Sec. 5.2 and 5.3)

- ☐ Not applicable for this project (Please explain why in Section 3-C)
- ☒ Apply water or dust suppressants to unpaved haul and access roads (Complete Section 4-A or 4-B)
- ☐ Post speed limit signs of not more than 15 miles per hour at each entrance, and again every 500 feet. (Complete Section 4-C)
- ☒ Water or dust suppressants will be applied to vehicle traffic and equipment storage areas (Complete Section 4-A or 4-B).

Wind Events (Rule 8021 Sec. 5.4)

- ☒ Water application equipment will apply water to control fugitive dust during wind events, unless unsafe to do so. Outdoor construction activities that disturb the soil will cease whenever visible dust emissions cannot be effectively controlled.

FOR BIDDING PURPOSES ONLY

Section 3 – Fugitive PM10 Sources – Page 2

Project Name: Basins and Stormwater Capture Project

3-B Bulk Materials (Rule 8021 Sec. 6.3.6.6 and Rule 8031)

Outdoor Handling of Bulk Materials (Rule 8031 Sec. 5.0 A)

- ☐ No bulk materials will be handled during this project.
- ☒ Water or dust suppressants will be applied when handling bulk materials.
- ☐ Wind barriers with less than 50 percent porosity will be installed and maintained, and water or dust suppressants will be applied.

Outdoor Storage of Bulk Materials (Rule 8031 Sec. 5.0 B)

- ☐ No bulk materials will be stored during this project.
- ☒ Water or dust suppressants will be applied to storage piles.
- ☐ Storage piles will be covered with tarps, plastic, or other suitable material and anchored in such a manner that prevents the cover from being removed by wind action.
- ☐ Wind barriers with less than 50 percent porosity will be installed and maintained around the storage piles, and water or dust suppressants will be applied.
- ☐ A three-sided structure (< 50% porosity) will be used that is at least as high as the storage piles.

On-Site Transporting of Bulk Materials (Rule 8031 Sec. 5.0 C)

- ☐ No bulk materials will be transported on the project site.
- ☐ Vehicle speed will be limited on the work site.
- ☒ All haul trucks will be loaded such that the freeboard is not less than six inches when transported across any paved public access road.
- ☒ A sufficient amount of water will be applied to the top of the load to limit visible dust emissions.
- ☐ Haul trucks will be covered with a tarp or other suitable cover.

Off-Site Transporting of Bulk Materials (Rule 8031 Sec. 5.0 D)

- ☒ No bulk materials will be transported to or from the project site.
- ☐ Measures in section 5-B will be implemented to prevent haul trucks from becoming a source of visible emissions or carryout onto public roads. (complete Section 5-B)

Outdoor Transport using a Chute or Conveyor (Rule 8031 Sec. 5.0 E)

- ☒ No chutes or conveyors will be used.
- ☐ Chute or conveyor will be fully enclosed.
- ☐ Water spray equipment will be used to sufficiently wet the materials.
- ☐ Transported materials will be washed or screened to remove fines (PM10 or smaller).

FOR BIDDING PURPOSES ONLY

3-C Comments

Soil & Material stockpiles will be used to construct levees/banks/travel pathes, as necessary. The connecting pipelines from the cell interconnections and turnout structure from the existing surface water supply line will be constructed. No new water supplies are included for this project.

Section 4 – Dust Control Methods – Page 1

Project Name: Basins and Stormwater Capture Project

4-A Water Application

Complete this section if water application will be used as a control method for limiting visible dust emissions and stabilizing surface areas. Check and answer everything that applies to this project.
(Rule 8021 Sec. 6.3.6.6)

Water Application Equipment:

☐ Sprinklers: Describe the activities that will utilize sprinklers:

Minimum treated area: _____ ☐ Square Feet ☐ Acres

Maximum treated area: _____ ☐ Square Feet ☐ Acres

Minimum water flow rate: _____ Gallons/minute Duration: _____

☒ Water Truck, ☐ Water Trailer, ☐ Water Wagon, ☐ Other: _____

Describe the activities that will utilize this equipment:
excavations/grading, compation, staging area stabilzation

Number of application equipment available: 1 (minimum)

Application equipment capacity: 2,000 gal (est.)

Application frequency (on a typical dry day): 2 (min; more as necessary to prevent dust

Application rate: ☒ 650 gallons per acre ☐ _____ gallons per acre (Greater than 650)

Hours of operation: 0700 to 1700 ☐ Daily ☒ Mon-Fri ☐ Other: _____

Water application equipment is available to operate after normal working hours, on weekends, and holidays.

After-hours contact: _____ Phone No.: _____

After-hours contact: _____ Phone No.: _____

Water Supply: *Include the relative locations of these sources on the plot plan in Section 6.*

☒ Fire hydrants Number of hydrants available On-Site: _____ Off-Site: 1

☐ Storage tanks Number and capacity: _____

☐ Wells Number and flow rate: _____

☒ Canal, River, Pond, Lake, etc. Describe: Adjacent canal

☐ Other: _____

Approval granted by the owner or public agency to use their water source for this project.

Owner or Agency: City of Los Banos

Contact: Jelene de Melo Phone No.: (209) 827-7056

FOR BIDDING PURPOSES ONLY

Section 4 – Dust Control Methods – Page 2

Project Name: Basins and Stormwater Capture Project

4-B Dust Suppressant Products

Complete this section if a dust suppressant product will be used. These materials include, but are not limited to: hygroscopic suppressants (road salts), adhesives, petroleum emulsions, polymer emulsions, and bituminous materials (road oils). (Rule 8021 Sec. 6.3.6.6)

Copy this page if more than one dust suppressant product will be used.

☒ **Not Applicable.** No dust suppressant products will be used. **Skip to 4-C.**

Application Area: _____

Product Name: _____

Contractor's Name: _____ Phone No: _____

Application Rate: _____ Gallons of undiluted material per ☐ mile or ☐ acre treated.

Application Frequency: _____ Applications per ☐ week, ☐ month, ☐ year

Application Equipment: _____

Number of Application Equipment Available: _____

Application Equipment Capacity: _____

Attach each of the following information that fully describes this product. Use the checklist below to make sure all information is submitted with this plan.

- ☐ Product Specifications (MSDS, Product Safety Data Sheet, etc.)
- ☐ Manufacturer's Usage Instructions (method, frequency, and intensity of application)
- ☐ Environmental impacts and approvals or certifications related to the appropriate and safe use for ground application.

FOR BIDDING PURPOSES ONLY

Section 4 – Dust Control Methods – Page 3

Project Name: Basins and Stormwater Capture Project

4-C Other Dust Control Methods

Check below the other types of dust control methods that will be employed at the construction site.
(Rule 8021 Sec. 5.2)

- ☒ Restricting unauthorized vehicle access:
  - ☒ Fences ☒ Gates ☐ Posts ☐ Berms ☐ Concrete Barriers ☒ Signs
  - ☐ Other: _____
- ☐ Wind barriers Describe: _____
- ☐ Posted speed limit signs that meet State and Federal Department of Transportation standards.
  (Rule 8021 Sec. 5.3)
  - ☐ Posted at 15 miles per hour ☐ Posted at _____ miles per hour (less than 15 MPH)
- ☐ Re-establish vegetation for temporarily stabilizing previously disturbed surfaces.
  Explain: _____
- ☐ Apply and maintain gravel:
  - ☐ On haul roads ☐ On access roads ☐ At equipment storage yards
  - ☐ At vehicle traffic areas ☐ For temporarily stabilizing previously disturbed areas.
  Explain: _____
- ☐ Apply pavement:
  Explain: _____
- ☐ Other: _____

FOR BIDDING PURPOSES ONLY

4-D Contingencies

Contingencies to be implemented should the listed control measures fail to meet the stability and visible emission requirements. Examples include, but are not limited to: replacement equipment, additional equipment, increased water application, additional water resources, adding chemical/organic dust suppressants, restricting access, and additional staffing. Attach any additional information if needed.
(Rule 4102 and Rule 8021 Sec. 5.2)

If a water truck becomes non-operational another will be rented from a local company or another from the contractor's equipment yard will be brought in. If dust emissions are uncontrollable, work will cease until they can be brought back under control.

4-E Record Keeping (Rule 8011 Sec. 6.2)

Records and any other supporting documents for demonstrating compliance must be maintained, but only for those days when a control measure is implemented. The District has developed record keeping forms that may be used for complying with this requirement. Check one or both below:

- ☒ Records will be maintained using the forms developed by the District.
- ☐ Records will be maintained using documents or forms developed by the owner or operator.
  Explain and include copies: _____

Section 5 – Carryout and Trackout – Page 1

Project Name: Basins and Stormwater Capture Project

5-A Treatments for Preventing Trackout

Select the control devices that will be used for preventing trackout from occurring onto paved public roads. Trackout is any material that adheres to vehicle tires and is deposited onto a paved public road or the paved shoulder of a paved public road. Check one or a combination that will apply to this project.

☐ **Grizzly:** Rails, pipes, or grates used to dislodge debris off of vehicles before exiting the site. Extends from the intersection with the paved public road surface for the full width of the unpaved exit surface for a distance of at least 25 feet. (Rule 8041 Sec. 5.9.1)

Width: _____ Feet Length: _____ Feet

☒ **Gravel Pad:** A layer of washed gravel at least one (1) inch or larger in diameter, three (3) inches deep, and extends from the intersection with the public paved road surface for the full width of the unpaved exit surface for a distance of at least 50 feet. (Rule 8041 Sec. 5.9.2)

Width: **12** Feet Length: **50** Feet Depth: **3** Inches

Gravel Size: **1** Inches Clean-up Frequency: **1 min weekly**

☐ **Paved Surface:** Extends from the intersection with the paved public road surface for the full width of the unpaved access road for at least 100 feet to allow mud and dirt to drop off of vehicles before exiting the site. (Rule 8041 Sec. 5.9.3)

Width: _____ Feet Length: _____ Feet

Mud and dirt deposits accumulating on paved interior roads used for trackout control will be removed with sufficient frequency, but not less frequently than once per workday. Cleanup will commence within ½ hour of generating any carryout and trackout onto public roads. (Rule 8041 Sec. 5.8.2 and 5.9.3)

Clean-up Frequency: _____

☐ **Wheel Washer:** Uses water to dislodge debris from tires and vehicle undercarriage. (Rule 8011 Sec. 3.73)

Describe: _____

☐ **Other:** (Rule 8041 Sec. 5.8.1.2) _____

FOR BIDDING PURPOSES ONLY

5-B Treatments for Preventing Carryout

Report the required treatments that will be used for preventing carryout from occurring on paved public roads. Carryout occurs when materials from emptied or loaded haul trucks, vehicles, or trailers falls onto a paved public road or paved shoulder of a paved public road. (Rule 8031 Sec 5.0)

☒ No haul trucks will be routinely entering or leaving the project site.

☐ Spillage or loss of bulk materials from holes or other openings in the cargo compartment's floor, sides, and tailgates will be prevented when material is transported onto any paved public access road.

Emptied Haul Trucks:

- ☐ Interior cargo compartments will be cleaned before leaving the project site.
- ☐ Cargo compartment will be covered with a tarp or suitable cover before leaving the project site.

Loaded Haul Trucks:

- ☐ Haul trucks will be loaded such that the freeboard is not less than six inches with water applied to the top of the load before leaving the project site.
- ☐ Cargo compartment and load will be covered with a tarp or suitable cover before leaving the project site.

☐ **Other:** _____

Section 5 – Carryout and Trackout – Page 2

Project Name: Basins and Stormwater Capture Project

5-C Cleaning up Carryout and Trackout

Check and report below the methods and frequency for cleaning up carryout and trackout from the surface and paved shoulders of paved public roads.

The use of blower devices, or dry rotary brushers or brooms, for removal of carryout and trackout from paved public roads is prohibited. (Rule 8041 Sec. 5.0)

Projects subject to a dust control plan are required to prevent and mitigate carryout and trackout beyond the minimum cleanup requirements. (Rule 8041 Sec. 5.3)

Cleanup Frequency:

☒ In the event the control device becomes insufficient to prevent carryout and trackout, removal of any carryout and trackout must be accomplished within one-half hour of the generation of such carryout and trackout. (Rule 8041 Sec. 5.8.2.)

Cleanup Method: Check the method below that will be used for cleaning carryout and trackout.

☒ Manually sweeping and picking up. (Rule 8041 Sec. 5.7.1)

☐ Mechanical sweeping with a rotary brush or broom accompanied or preceded by water. (Rule 8041 Sec. 5.7.2)

Describe the types of equipment that will used: _____

☐ Operating a PM10-efficient street sweeper. (Rule 8041 Sec. 5.7.3)

Make and Model: _____

☐ Flushing with water: allowed if: (Rule 8041 Sec. 5.7.4)

- No curbs or gutters are present.
- Using water will not result as a source of trackout and carryout.
- Using water will not result in adverse impacts on storm water drainage systems.
- Using water will not violate any National Pollutant Discharge Elimination System permit program.

FOR BIDDING PURPOSES ONLY

5-D Record keeping for Cleanup of Carryout and Trackout (Rule 8011 Sec. 6.2)

Records and any other supporting documents for demonstrating compliance must be maintained. The District has developed a record keeping form specific for cleaning carryout and trackout from paved public roads and may be used for complying with this requirement. Check one or both below:

☒ Records will be maintained using the form developed by the District.

☐ Records will be maintained using documents or forms developed by the owner or operator.

Explain and include copies: _____

Section 6 – Plot Plan

Project Name: Basins and Stormwater Capture Project

6-A Plot Plan

A plot plan identifies the type and location of each project. Attach appropriately sized maps with the project boundaries outlined or use the space in section 6-B to draw a plot plan. Attached maps may include tract maps, site maps, and topographic maps. Use the checklist below to make sure all areas have been identified on the plot plan. (Rule 8021 Sec. 6.3.6.2 & 6.3.6.5)

Identify the relative locations of actual and potential sources of fugitive dust emissions.

- ☒ Bulk material handling and storage areas.
- ☒ Paved and unpaved access roads, haul roads, traffic areas, and equipment storage yards.
- ☒ Exit points where carryout and trackout onto paved public roads may occur.
- ☒ Water supply locations if water application will be used for controlling visible dust emissions.

Identify the relative locations of sensitive receptors within ¼ mile of the project. (Rule 4102 Sec. 4.1)

- ☐ No sensitive receptors within ¼ mile of the project.
- ☒ Residential areas, schools, day care, churches, hospitals, nursing facilities, commercial, retail, etc.
- ☒ Freeways, roads, or traffic areas that may be affected by the dust generating activities.
- ☐ Other: _____

6-B Draw Plot Plan (if one is not attached)

May use the back of this form
Include a North Arrow

☒ Plot plan is attached (Skip to Section 7).

FOR BIDDING PURPOSES ONLY

Section 7 – Certification

Project Name: Basins and Stormwater Capture Project

7-A Certification

The owner, principle operator, or the individual implementing must certify the plan. (Rule 8021 Sec 6.3). For Title V sources, the responsible official must provide the certification. (Rule 2520 Sec. 3.28 and 10.0).

I certify that all information contained herein and information submitted in the attachments to this documents are true and correct.

Print Name _____ Title _____

Signature _____ Date _____

Phone Number _____ Fax Number _____ Cell Number _____

E-Mail Address _____

FOR BIDDING PURPOSES ONLY

811 Know what's below. Call before you dig.

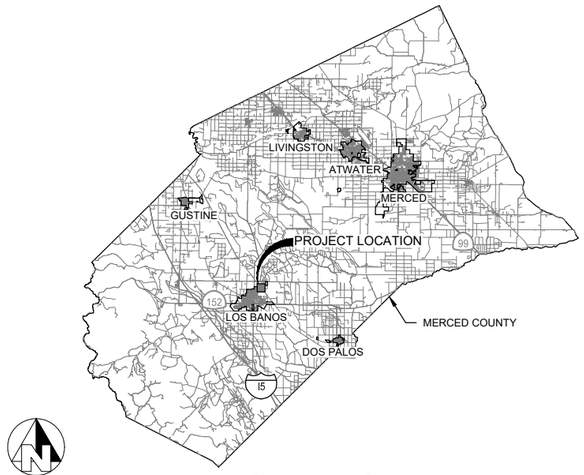
WARNING
POWER LINES OVERHEAD

DUST CONTROL PLAN
BMP SITE MAPS
BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS

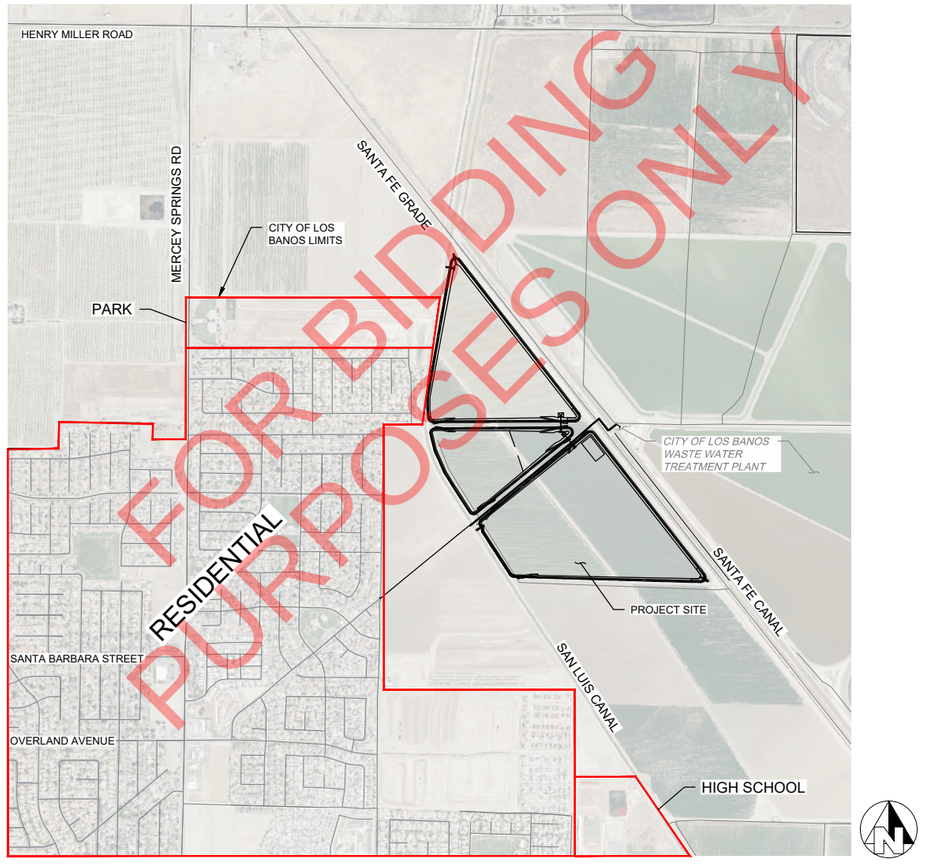
LOS BANOS, MERCED, CALIFORNIA

SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT
DCP NO._____

DCP PREPARED BY:
PROVOST AND PRITCHARD CONSULTING GROUP
455 W FIR AVE
CLOVIS, CA 93611
PH: (559) 449-2700



VICINITY MAP
NOT TO SCALE



SITE MAP
NOT TO SCALE

LEGEND

SENSITIVE RECEPTOR (HOME, SCHOOL, HOSPITAL, ETC.) WITHIN 1/2 MILE OF PROJECT BOUNDARY (TYP)

***INTERSTATES, HIGHWAYS, STATE ROUTES, AND LOCAL ROADWAYS ARE NOT SHOWN AS SENSITIVE RECEPTORS BUT ARE LABELED.

PROJECT CONTACTS

1. OWNER
   CITY OF LOS BANOS
   411 MADISON AVE
   LOS BANOS, CA 93635

2. PROJECT ENGINEER
   ERIC ABRAHAMSEN
   PROVOST AND PRITCHARD CONSULTING GROUP
   455 W FIR AVENUE
   CLOVIS, CA 93611
   (559) 449-2700

3. DCP PREPARER
   GRETCHEN HEISDORF
   PROVOST AND PRITCHARD CONSULTING GROUP
   455 W FIR AVENUE
   CLOVIS, CA 93611
   (559) 449-2700

GENERAL DUST CONTROL NOTES

1. THE IFORMATION ON THESE DRAWINGS ARE INTENDED TO BE USED AS A GUIDELINE FOR CONTRACTORS AND SUBCONTRACTORS TO INSTALL DUST CONTROL DEVICES AT THE LOCATIONS SHOWN. THESE DRAWINGS ARE TO SHOW THE LOCATIONS FOR DUST CONTROL MANAGEMENT PRACTICES. THESE DRAWINGS ARE TO BE USED IN CONJUNCTION WITH THE NARRATIVE SECTIONS OF THE DUST CONTROL PLAN (DCP).
2. FIELD CONDITIONS MAY NECESSITATE MODIFICATIONS TO THESE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE OWNER ON ANY UPDATES TO THESE DRAWINGS BASED ON THE CONDITIONS THAT DIFFER FROM THIS DRAWING SET.
3. THE CONTRACTOR SHALL REFER TO THE SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT (SJVAPCD) FOR SITE MANAGEMENT PRACTICES.
4. DUST CONTROL SHALL BE PERFORMED ON ALL OPEN AND ACTIVE AREAS OF CONSTRUCTION.
5. DUST CONTROL SHALL BE PER THE APPROVED PROJECT DUST CONTROL PLAN.
6. DUST CONTROL RECORDS SHALL BE KEPT ON THE FORMS DEVELOPED BY THE SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT.
7. TRACKOUT CONTROLS SHALL BE MAINTAINED AT THE CONSTRUCTION ENTRANCE/EXIT. GRAVEL TRACKOUT SHALL NOT IMPEDE TRAVEL PATHS.
8. TRACKOUT AREAS, REGARDLESS OF UTILIZED CONTROL TYPE, SHALL BE SWEPT TO MEET SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT STANDARDS.
9. COORDINATE WITH PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP) FOR ADDITIONAL DUST CONTROL BMPs AND/OR CONTROL MEASUERES.

SHEET INDEX

SHEET NO.	DESCRIPTION
DUST CONTROL PLAN	
1	COVER
2	LEGEND & ABBREVIATIONS
3	NOTES & STAGING AREA
4	EXISTING CONDITIONS AND DEMOLITION
5	SOUTH CELL BMP SITE MAP
6	CENTER CELL BMP SITE MAP
7	NORTH CELL BMP SITE MAP
8	FINAL STABILIZATION SOUTH CELL
9	FINAL STABILIZATION CENTER CELL
10	FINAL STABILIZATION NORTH CELL
11	DETAILS

THIS PLAN ACCURATE FOR DUST CONTROL WORK ONLY

FOR BIDDING PURPOSES ONLY

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FOR DCP PURPOSES ONLY
08/07/2025

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER — ERIC ABRAHAMSEN — No. 77241 — STATE OF CALIFORNIA — REVIEW ONLY

DATE SIGNED: _____

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY
DUST CONTROL PLAN

COVER

PROVOST & PRITCHARD
455 W FIR AVENUE
CLOVIS, CA 93611-0615
PHONE (559) 449-2700
FAX (559) 449-2715
www.provostandpritchard.com

DESIGN ENGINEER: GRETCHEN HEISDORF
LICENSE NO: RCE 77241, CASQA 00485

DRAFTED BY:	CHECKED BY:
IRC	GMH

DATE: 08/07/2025
JOB NO: 350123007
PROJECT NO:
PHASE:

0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET 1
---- OF 12

8/8/2025 9:47 AM g:\los banos_city of-350\350123007-recharge basin and stormwater capture\300 CAD\340 sheet sets\DCP\1 COVER.dwg -Juan Reyes-Chapa

ABBREVIATIONS

AB	AGGREGATE BASE
AC	ASPHALT CONCRETE
ACP	ASBESTOS-CEMENT PIPE
AGG	AGGREGATE
APN	ASSESSOR'S PARCEL NUMBER
AVE	AVENUE
BTM	BOTTOM
BWR	BARB WIRE
C, CONC	CONCRETE
CA	CALIFORNIA
CLVT	CULVERT
CL	CENTERLINE
CLF	CHAIN LINK FENCE
CNS	COMPACTED NATIVE SOIL
CONT	CONTINUOUS
CONST	CONSTRUCT/CONSTRUCTION
CP	CULVERT PROTECTION
CR	CROWN
D/S	DOWNSTREAM
(E)	EXISTING
EG	EXISTING GRADE
EL, ELEV	ELEVATION
ELEC	ELECTRIC
EP	EDGE OF PAVEMENT
ESMT	EASEMENT
ES	EROSION/SEDIMENT CONTROL
FF	FINISHED FLOOR
FG	FINISHED GRADE
FL	FLOW LINE
FNC	FENCE
FR	FIBER ROLL
GB	GRADE BREAK
GM	GAS METER
GRVL	GRAVEL
GUY	GUY WIRE
GV	GATE VALVE
HGL	HYDRAULIC GRADE LINE
HP	HINGE POINT, HIGH POINT
HP GAS	HIGH PRESSURE GAS
HWL	HIGH WATER LEVEL
IRR	IRRIGATION
IP	INLET PROTECTION
MAX	MAXIMUM
MIN	MINIMUM
MISC	MISCELLANEOUS
NTS	NOT TO SCALE
OC	ON CENTER
OH	OVERHEAD
(P)	PROPOSED
PL	PROPERTY LINE
PP	POWER POLE
PVMT	PAVEMENT
R/W	RIGHT OF WAY
S=	SLOPE
SF	SILT FENCE
STRC	STRUCTURE
SWL	SWALE
STWL	STILLING WELL
TB	TOP OF BANK
TOE	TOE OF SLOPE
TOP	TOP OF SLOPE
TP	TELEPHONE POLE
TS	TOP OF STRUCTURE
TYP	TYPICAL
U/S	UPSTREAM
VERT	VERTICAL
W	WATER
WV	WATER VALVE

LINETYPES

LINETYPE EXISTING	LINETYPE NEW	DESCRIPTION
		WATER LEVEL
		BARRICADE
		CONTOUR (DEPRESSION)
123	123	CONTOUR (MAJOR)
		CONTOUR (MINOR)
		EMBANKMENT TOE
		EMBANKMENT TOP
		FENCE (BLOCK WALL)
		FENCE (CHAIN LINK)
		FENCE (WOOD)
		FENCE (WIRE)
		GATE SWING
		GRADE BREAK
FL	FL	SWALE CENTERLINE
		SWALE W/FLOW ARROWS
OE OE	OE	ELECTRIC (AERIAL)
UE	UE	ELECTRIC (BURIED)
G G	G	GAS
		CENTERLINE
		EASEMENT
		PROPERTY LINE
		RIGHT-OF-WAY
		SECTION LINE
		STATE/COUNTY/CORPORATE LIMIT
		ROLLING DIP PER USFS SPECIFICATION (SPACING PER USFS)
		SWPPP PIPELINE AND/OR SLOPE DRAIN
		BERM WITH DRAIN SYSTEM
	FR	FIBER ROLL
SF	SF	FENCE (SILT)
EC	EC	LINEAR EROSION CONTROL

HATCHES

EXISTING	NEW	DESCRIPTION	NEW	DESCRIPTION
		AGGREGATE		TRAVEL PATH
		AC PAVEMENT		DEMOLITION
		CONCRETE		EQUIPMENT/MAINTENANCE AREAS (CONTRACTOR TO VERIFY LOCATION)
		CONCRETE LINING (PLAN VIEW)		BMP: TRACKOUT DEVICE (CONTRACTOR TO VERIFY LOCATION)
		EARTH		BMP: MATERIAL STORAGE (CONTRACTOR TO VERIFY LOCATION)
		RIP RAP		BMP: CONCRETE WASTE MANAGEMENT (CONTRACTOR TO VERIFY LOCATION)
		SAND		BMP: ASPHALT CONCRETE STOCKPILE MANAGEMENT (CONTRACTOR TO VERIFY LOCATION)
		GRATING		BMP: SOIL STOCKPILE MANAGEMENT (CONTRACTOR TO VERIFY LOCATION)

SYMBOLS

SYMBOL EXISTING	SYMBOL NEW	DESCRIPTION
		UTILITY POLE
		UTILITY POLE ANCHOR
		2-NOZZLE HYDRANT
		3-NOZZLE HYDRANT
FD	FD	FIRE DEPT. CONNECTION
F	F	FIRE VAULT
		WATER METER
W	W	WELL
		WATER VALVE
		BLOW-OFF
		AIR RELIEF VALVE
BFP	BFP	BACK FLOW PREVENTOR
		GATE VALVE HANDLE
		STILLING WELL
		FENCE POST
		FENCE GATE
	XX	REVISION
	X	CONSTRUCTION CALLOUT
XX / XXXX	DETAIL NUMBER / SHEET NUMBER	DETAIL CALLOUT
		LINE BREAK
		SPILL KIT
		DRAINAGE DIRECTION
E		CONSTRUCTION SITE ENTRANCE/EXIT, TRACKOUT LOCATION
		EMBANKMENT ARROW
HWL= XXX.XX		HIGH WATER LINE
XXX.X± FG MATCH (E)	SPOT ELEVATION DESCRIPTION	SPOT ELEVATION
		SECTION VIEW
SF ES FR		BMP: EROSION & SEDIMENT CONTROL BARRIER AND WIND EROSION CONTROL MEASURES PER BMP HANDBOOK (CONTRACTOR TO VERIFY LOCATION)
		SEDIMENT BASIN; LOCATION & DESIGN PER CONSTRUCTION PLAN SET
CP IP		BMP: STORM DRAIN INLET/CULVERT PROTECTION PER BMP HANDBOOK
S#		TENTATIVE SAMPLING LOCATION (TO BE FIELD DETERMINED)
D#		POTENTIAL DISCHARGE LOCATION (TO BE FIELD DETERMINED)

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08/07/2025

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER — GRETCHEN HEISDORF — No. RCE 77241 — STATE OF CALIFORNIA — REVIEW

DATE SIGNED:

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY
DUST CONTROL PLAN

LEGEND & ABBREVIATIONS

PROVOST& PRITCHARD
455 W FIR AVENUE
CLOVIS, CA 93611-9166
PHONE (559) 449-2700
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www.provostandpritchard.com

DESIGN ENGINEER: GRETCHEN HEISDORF
LICENSE NO: RCE 77241, CASQA 00485
DRAFTED BY: IRC | CHECKED BY: GMH
DATE: 08/07/2025
JOB NO: 350123007
PROJECT NO:
PHASE:
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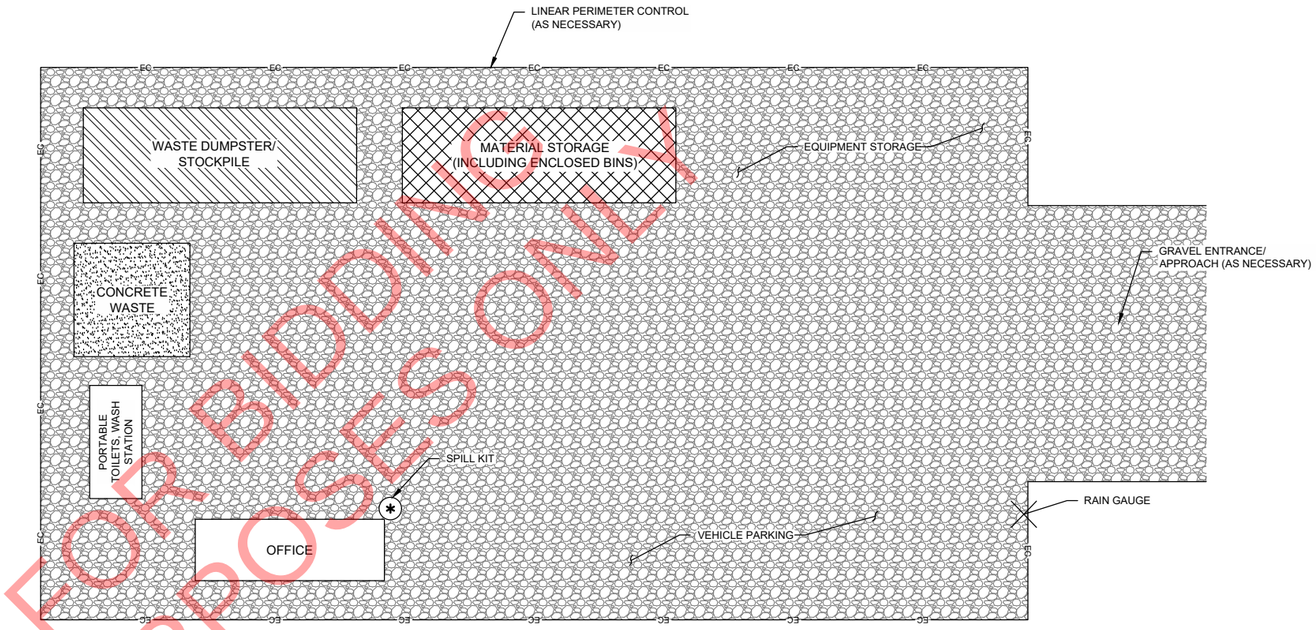
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 2
---- OF 12

8/8/2025 9:47 AM g:\los banos_city of-350\350123007-recharge basin and stormwater capture\300 CAD\340 sheet sets\DCP\2 LEGEND & ABBREVIATIONS.dwg Juan Reyes-Chapa

NOTES

1. CONSTRUCTION MANAGER AND OWNER SHALL BE NOTIFIED AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CONSTRUCTION CONTRACT DOCUMENTS.
3. SWPPP AND DCP BMP IMPLEMENTATION SHALL MEET THE MINIMUMS REQUIRED BY THE SWRCB CONSTRUCTION GENERAL PERMIT GENERAL ORDER AND SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT RULES.
4. CONTRACTOR IS RESPONSIBLE FOR THE IMPLEMENTATION OF ALL STORMWATER AND NON-STORMWATER POLLUTION PREVENTION PRACTICES REGARDLESS OF INCLUSION IN THESE SITE MAPS, IN THE PROJECT SWPPP, OR DCP.
5. CONTRACTOR SHALL USE THESE DRAWINGS FOR ANY CHANGES TO THE BMPS, HOWEVER, BMPS MAY NOT BE ALTERED TO BECOME LESS STRINGENT. DCP DEVELOPER AND OWNER APPROVAL IS REQEUIRED FOR REVISIONS/NEW BMP LOCATIONS.
6. CONTRACTOR SHALL LIMIT GROUND DISTURBANCES AT ALL TIMES TO THE MAXIMUM EXTENT FEASIBLE TO ACCOMPLISH WORK. ALL GROUND DISTURBANCES REQUIRE EROSION AND SEDIMENT CONTROL MITIGATIONS.
7. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ADEQUATE DUST CONTROL AT ALL TIMES.
8. THE CONTRACTOR SHALL HAVE A SECURE ONSITE LOCATION FOR DCP AND ENVIRONMENTAL DOCUMENT STORAGE.
9. DO NOT BLOCK DRIVEWAYS OR ENTRANCE LOCATIONS WITH ANY BMP ITEMS.
10. ALL DEMOLITION SHALL BE IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.
11. IF PERIMETER CONTROLS ARE USED, THEY WILL MATCH THOSE LISTED IN THE SWPPP.
12. TRACKOUT ONTO PUBLIC ROADS IS PROHIBITED AND MUST BE CLEANED IMMEDIATELY VIA HAND OR MECHANICAL MEANS. GRAVEL TRACKOUT IN ACCORDANCE WITH CASQA BMP TC-1 OR APPROVED EQUIVALENT IS REQUIRED AT ALL EXIT LOCATIONS TO THE PROJECT AREA(S) ONTO PUBLIC ROADS PER THE DCP REGARDLESS OF SPECIFIC INCLUSION IN THESE DRAWINGS.
13. BULK MATERIAL STORAGE WILL BE IN THE STAGING AREA(S) OR IN OTHER OWNER APPROVED LOCATIONS. ALL MATERIAL STORAGE WILL BE IN ACCORDANCE WITH CASQA BMPS WM-1 AND WM-3.
14. SOIL/MATERIAL STOCKPILES WILL BE COVERED WITH VISQUEEN AND LINEAR CONTROLS INSTALLED PER CASQA BMP WM-3.
15. ALL EXCESS ERODIBLE OR NON-FINAL STATE CONSTRUCTION MATERIALS SHALL BE REMOVED FROM THE SITE OR HOUSED IN WATERTIGHT ENCLOSURES, INCLUDING SOIL/OVERBURDEN AND DEBRIS.
16. CONCRETE DEMOLITION, INSTALLATION, AND/OR WASTES REQUIRE CASQA BMPS WM-8, WM-3, NS-12, AND NS-13 REGARDLESS OF SPECIFIC INCLUSIONS ON THESE DRAWINGS. LIQUID DECANT IS CONSIDERED A WASTE PRODUCT AND MUST BE DISPOSED OF PROPERLY IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REQUIREMENTS. IT CAN NOT BE USED FOR DUST CONTROL.
17. VEHICLES & EQUIPMENT SHALL BE STORED IN THE STAGING AREA WHEN NOT IN USE & OVERNIGHT. WHILE IN USE, VEHICLES & EQUIPMENT SHALL BE MONITORED TO PREVENT SPILLS OR LEAKS. VEHICLES & EQUIPMENT, WHILE STORED OR INACTIVE, SHALL HAVE ADEQUATELY SIZED SECONDARY CONTAINMENT EMPLOYED AT ALL TIMES AND BE MONITORED AT START & END OF DAY FOR SPILLS OR LEAKS.
18. PORTABLE TOILETS/SANITARY STATIONS AND WASH STATIONS SHALL BE LOCATED ON A FLAT SURFACE WITHIN SECONDARY CONTAINMENT.
19. IT IS RESPONSIBILITY OF THE CONTRACTOR TO INSTALL FINAL STABILIZATION.
20. BMP GUIDANCE SHEETS ARE AVAILABLE FROM WWW.CASQA.COM.



GENERIC STAGING AREA
NTS

NOTES

1. ALL EQUIPMENT SHALL BE STORED ON AN IMPERVIOUS SURFACE WITH ADEQUATE SECONDARY CONTAINMENT.
2. ALL FUELING SHALL INCLUDE THE USE OF DRIP PANS AND RAGS REGARDLESS OF LOCATION. A SPILL KIT SHALL BE IN THE IMMEDIATE VICINITY DURING FUELING.
3. STAGING AREA(S) WILL INCLUDE, BUT WILL NOT BE LIMITED TO, PERVIOUS CONSTRUCTED SURFACES (GRAVEL OR HARD PACKED EARTH), LINEAR PERIMETER CONTROLS, VEHICLE AND EQUIPMENT CLEANING, FUELING, AND MAINTENANCE CONTROLS (INCLUDING IMPERVIOUS SURFACING), WASTE MANAGEMENT CONTROLS, CONCRETE WASTE MANAGEMENT CONTROLS, HAZARDOUS/NON-HAZARDOUS CHEMICAL/MATERIAL CONTAINMENT CONTROLS, SEDIMENT AND EROSION CONTROLS, AND SANITARY, WASH WATER, AND LIQUID WASTE CONTROLS.
4. LOCATE RAIN GAUGE IN AN OPEN AREA WITH EASY ACCESS FOR MEASUREMENT READING AND GAUGE MAINTENANCE.
5. IF PROJECT OFFICE IS LOCATED IN THE STAGING AREA, MAINTAIN APPROPRIATE SWPPP AND ENVIRONMENTAL DOCUMENTATION INSIDE.

SCALE IN FEET
0 X X X

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08/07/2025

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER ★ VIRGINIA ★ STATE OF CALIFORNIA ★ GRETCHEN M. HEISDORF ★ No. RCE 77241 ★ REVIEW ONLY

DATE SIGNED: _____

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY
DUST CONTROL PLAN

NOTES & STAGING AREA

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DESIGN ENGINEER: GRETCHEN HEISDORF
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ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 3
---- OF 12

8/8/2025 9:47 AM g:\los banos_city of-350\350123007-recharge basin and stormwater capture\300 CAD\340 sheet sets\DCP\3 NOTES & STAGING AREA.dwg Ivan Reyes-Chapa

811 Know what's below. Call before you dig.

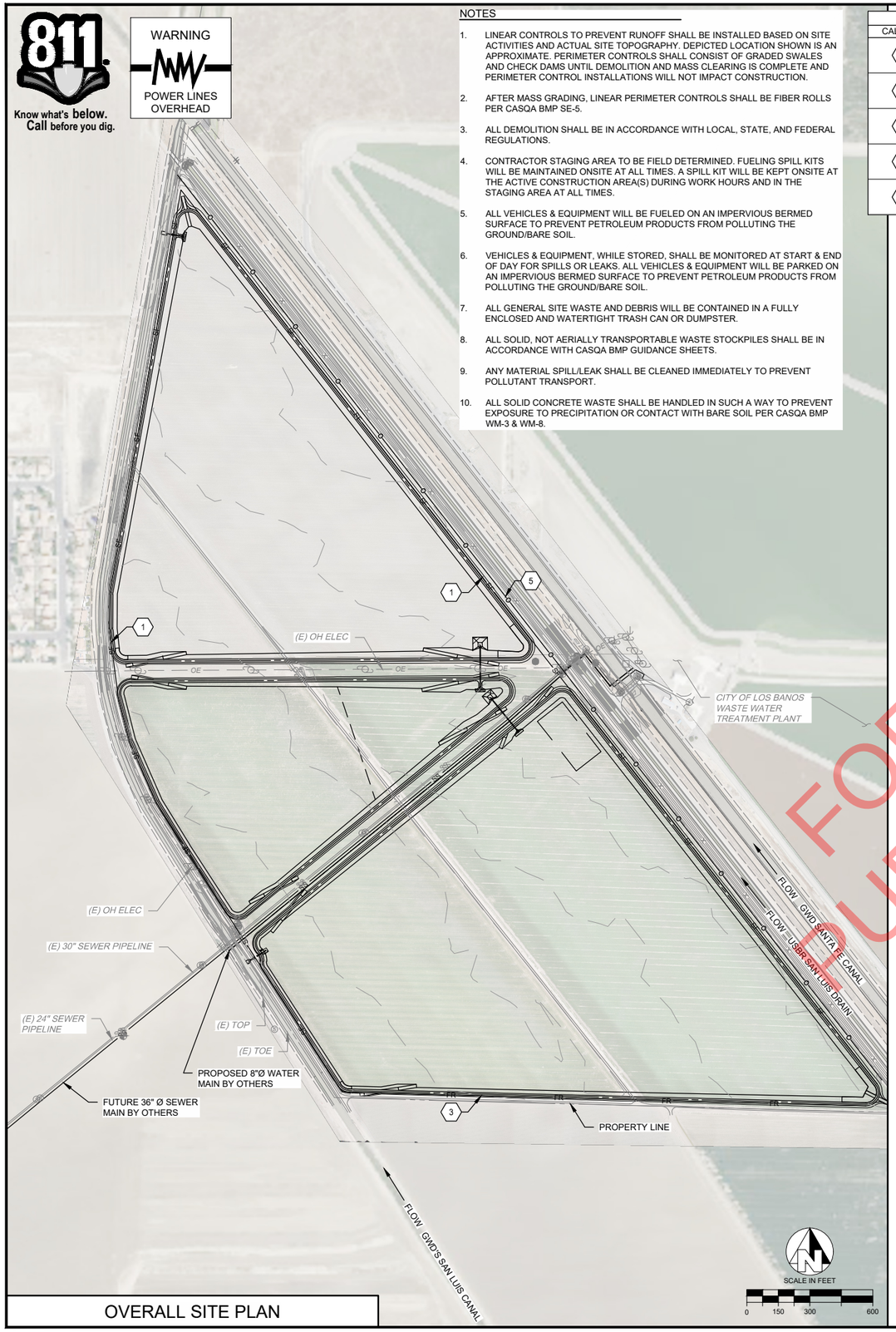
WARNING
POWER LINES OVERHEAD

NOTES

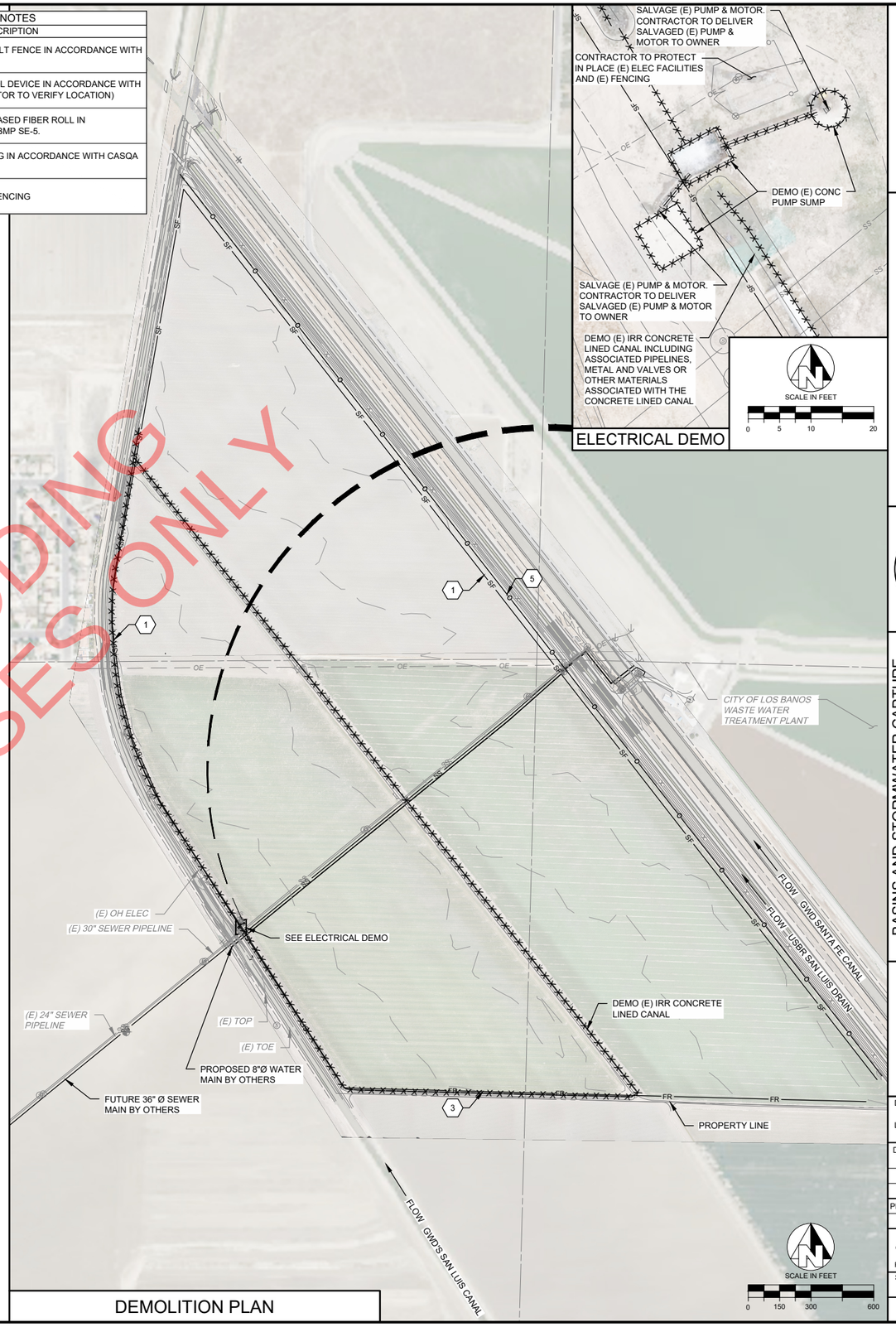
1. LINEAR CONTROLS TO PREVENT RUNOFF SHALL BE INSTALLED BASED ON SITE ACTIVITIES AND ACTUAL SITE TOPOGRAPHY. DEPICTED LOCATION SHOWN IS AN APPROXIMATE. PERIMETER CONTROLS SHALL CONSIST OF GRADED SWALES AND CHECK DAMS UNTIL DEMOLITION AND MASS CLEARING IS COMPLETE AND PERIMETER CONTROL INSTALLATIONS WILL NOT IMPACT CONSTRUCTION.
2. AFTER MASS GRADING, LINEAR PERIMETER CONTROLS SHALL BE FIBER ROLLS PER CASQA BMP SE-5.
3. ALL DEMOLITION SHALL BE IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.
4. CONTRACTOR STAGING AREA TO BE FIELD DETERMINED. FUELING SPILL KITS WILL BE MAINTAINED ONSITE AT ALL TIMES. A SPILL KIT WILL BE KEPT ONSITE AT THE ACTIVE CONSTRUCTION AREA(S) DURING WORK HOURS AND IN THE STAGING AREA AT ALL TIMES.
5. ALL VEHICLES & EQUIPMENT WILL BE FUELED ON AN IMPERVIOUS BERMED SURFACE TO PREVENT PETROLEUM PRODUCTS FROM POLLUTING THE GROUND/BARE SOIL.
6. VEHICLES & EQUIPMENT, WHILE STORED, SHALL BE MONITORED AT START & END OF DAY FOR SPILLS OR LEAKS. ALL VEHICLES & EQUIPMENT WILL BE PARKED ON AN IMPERVIOUS BERMED SURFACE TO PREVENT PETROLEUM PRODUCTS FROM POLLUTING THE GROUND/BARE SOIL.
7. ALL GENERAL SITE WASTE AND DEBRIS WILL BE CONTAINED IN A FULLY ENCLOSED AND WATERTIGHT TRASH CAN OR DUMPSTER.
8. ALL SOLID, NOT AERIALLY TRANSPORTABLE WASTE STOCKPILES SHALL BE IN ACCORDANCE WITH CASQA BMP GUIDANCE SHEETS.
9. ANY MATERIAL SPILL/LEAK SHALL BE CLEANED IMMEDIATELY TO PREVENT POLLUTANT TRANSPORT.
10. ALL SOLID CONCRETE WASTE SHALL BE HANDLED IN SUCH A WAY TO PREVENT EXPOSURE TO PRECIPITATION OR CONTACT WITH BARE SOIL PER CASQA BMP WM-3 & WM-8.

CONSTRUCTION NOTES

CALLOUT	DESCRIPTION
1	INSTALL 36" WIRE BACKED SILT FENCE IN ACCORDANCE WITH CASQA BMP SE-1.
2	INSTALL TRACKOUT CONTROL DEVICE IN ACCORDANCE WITH CASQA BMP TC-1 (CONTRACTOR TO VERIFY LOCATION)
3	INSTALL STERILE HEMP ENCASED FIBER ROLL IN ACCORDANCE WITH CASQA BMP SE-5.
4	PERFORM STREET SWEEPING IN ACCORDANCE WITH CASQA BMP SE-7.
5	CONTRACTOR EXCLUSION FENCING



OVERALL SITE PLAN



DEMOLITION PLAN

ELECTRICAL DEMO

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08/07/2025

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER GRETCHEN M. HEISDORF STATE OF CALIFORNIA

DATE SIGNED: ____

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY

DUST CONTROL PLAN
EXISTING CONDITIONS AND DEMOLITION

PROVOST & PRITCHARD
455 W FIR AVENUE
CLOVIS, CA 93611-9166
PHONE (559) 449-2700
FAX (559) 449-2715
www.provostandpritchard.com

DESIGN ENGINEER: GRETCHEN HEISDORF
LICENSE NO: RCE 77241, CASQA 00485
DRAFTED BY: IRC
CHECKED BY: GMH
DATE: 08/07/2025
JOB NO: 350123007
PROJECT NO:
PHASE:
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 4
---- OF 12

8/8/2025 9:48 AM g:\los banos_city of-350\350123007-recharge basin and stormwater capture\300 CAD\340 sheet sets\DCP4 EXISTING CONDITIONS AND DEMOLITION.dwg -Juan Reyes-Chapa

811
Know what's below. Call before you dig.

WARNING
POWER LINES OVERHEAD

CONSTRUCTION NOTES	
CALLOUT	DESCRIPTION
1	INSTALL 36" WIRE BACKED SILT FENCE IN ACCORDANCE WITH CASQA BMP SE-1.
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3	INSTALL STERILE HEMP ENCASED FIBER ROLL IN ACCORDANCE WITH CASQA BMP SE-5.
4	PERFORM STREET SWEEPING IN ACCORDANCE WITH CASQA BMP SE-7.
5	CONTRACTOR EXCLUSION FENCING

NOTES

1. LINEAR CONTROLS TO PREVENT RUNOFF SHALL BE INSTALLED BASED ON SITE ACTIVITIES AND ACTUAL SITE TOPOGRAPHY. DEPICTED LOCATION SHOWN IS AN APPROXIMATE. PERIMETER CONTROLS SHALL CONSIST OF GRADED SWALES AND CHECK DAMS UNTIL DEMOLITION AND MASS CLEARING IS COMPLETE AND PERIMETER CONTROL INSTALLATIONS WILL NOT IMPACT CONSTRUCTION.
2. AFTER MASS GRADING, LINEAR PERIMETER CONTROLS SHALL BE FIBER ROLL PER CASQA BMP SE-5.
3. LINEAR CONTROLS ARE NOT SHOWN ALONG NORTH PROJECT BORDER ADJACENT TO EXISTING DEID TURNIPSEED BASIN PHASE 2.
4. ALL DEMOLITION SHALL BE IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.
5. CONTRACTOR STAGING AREA TO BE FIELD DETERMINED. FUELING SPILL KITS WILL BE MAINTAINED ONSITE AT ALL TIMES. A SPILL KIT WILL BE KEPT ONSITE AT THE ACTIVE CONSTRUCTION AREA(S) DURING WORK HOURS AND IN THE STAGING AREA AT ALL TIMES.
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13. EXCAVATED/REMOVED MATERIAL FROM TRENCHED ROAD AREAS SHALL BE DISPOSED OF PER LOCAL, STATE, AND FEDERAL REGULATIONS. TRENCH SPOIL STOCKPILES SHALL BE PER CASQA BMP WM-3.

LEGEND

- PROPOSED TOP OF BANK
- PROPOSED SIDE SLOPES; 5H:1V INTERIOR, 2H:1V EXTERIOR. UNLESS OTHERWISE NOTED

SCALE IN FEET
0 50 100 200

SEE NOTE 3
(E) 30" SEWER PIPELINE
(E) SSMH, TYP
(E) 24" SEWER PIPELINE
FUTURE 36" Ø SS HDPE SDR 21 (100 PSI) PIPE
100'
R50', TYP
(E) CITY OF LOS BANOS WASTE WATER TREATMENT PLANT
(E) WIRE FENCE
(E) DIRT ROAD
FLOW GWD SANTA FE CANAL
FLOW USBR SAN LUIS DRAIN
FLOW GWD SAN LUIS CANAL
SOUTH CELL
72.7± AC FLOOR AREA
262.5± AF STORAGE AT
HWL 102.0±
20'
40'
PROPERTY LINE

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08/07/2025

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER
GRETCHEN M. HEISDORF
No. RCE 77241
STATE OF CALIFORNIA
REVIEW

DATE SIGNED:

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY
DUST CONTROL PLAN

SOUTH CELL BMP SITE MAP

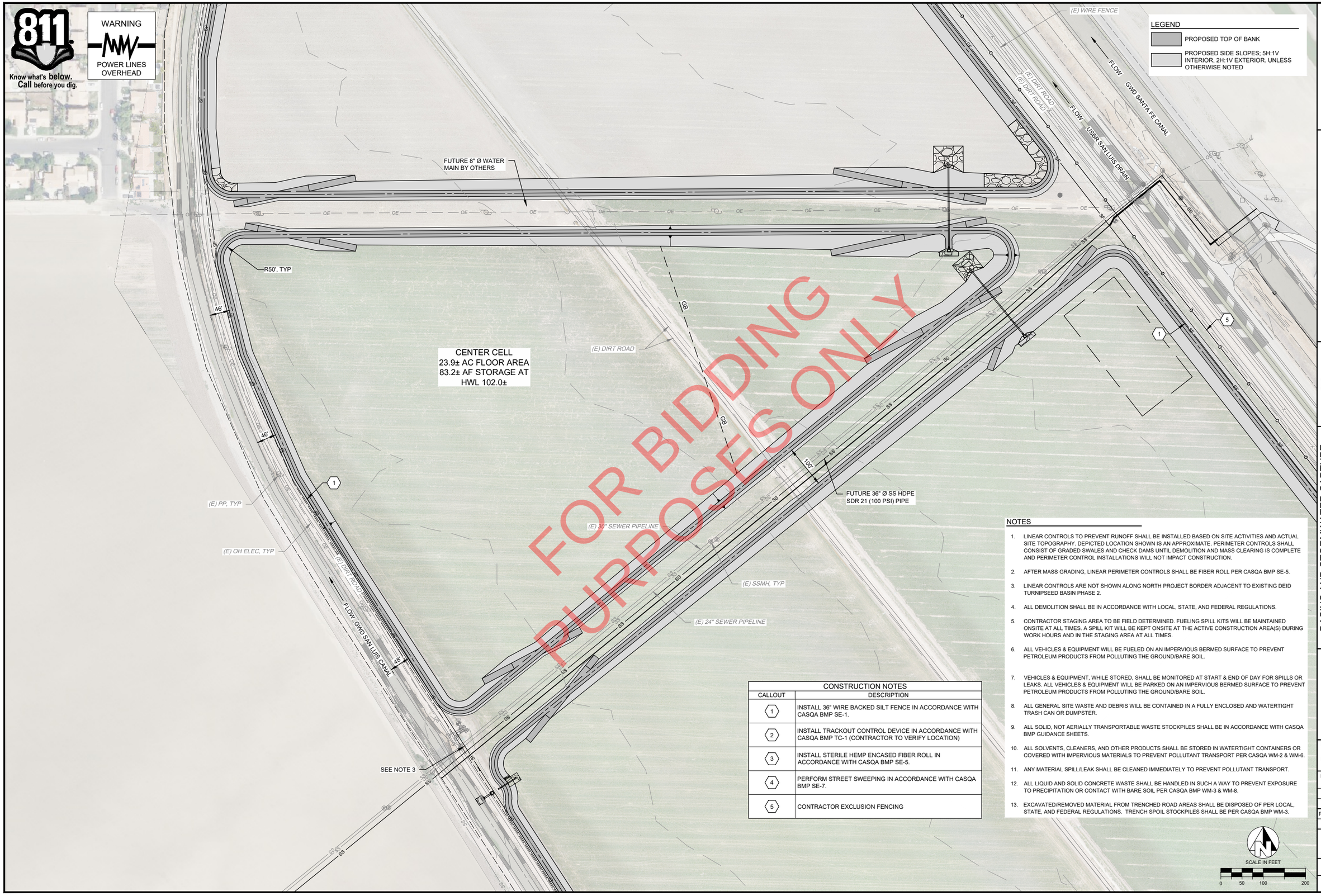
PROVOST& PRITCHARD
455 W FIR AVENUE
CLOVIS, CA 93611-0166
PHONE (559) 449-2700
FAX (559) 449-2715
www.provostandpritchard.com

DESIGN ENGINEER: GRETCHEN HEISDORF
LICENSE NO: RCE 77241, CASQA 00485
DRAFTED BY: IRC | CHECKED BY: GMH
DATE: 08/07/2025
JOB NO: 350123007
PROJECT NO:
PHASE:
0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 5
---- OF 12

8/8/2025 9:49 AM g:\los banos_city of-350\350123007-recharge basin and stormwater capture\300 CAD\340 sheet sets\DCP\5 SOUTH CELL BMP SITE MAP.dwg Ivan Reyes-Chapa

811
Know what's below. Call before you dig.

WARNING
POWER LINES OVERHEAD



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SCALE IN FEET
0 50 100 200

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08/07/2025

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER — GRETCHEN HEISDORF — STATE OF CALIFORNIA — REVIEW ONLY
DATE SIGNED:

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY

DUST CONTROL PLAN

CENTER CELL BMP SITE MAP

PROVOST & PRITCHARD
455 W FIR AVENUE
CLOVIS, CA 93611-0615
PHONE (559) 449-2700
FAX (559) 449-2715
www.provostandpritchard.com

DESIGN ENGINEER: GRETCHEN HEISDORF
LICENSE NO: RCE 77241, CASQA 00485
DRAFTED BY: IRC | CHECKED BY: GMH
DATE: 08/07/2025
JOB NO: 350123007
PROJECT NO:
PHASE:
0 — 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 6
---- OF 12

8/8/2025 9:59 AM g:\los banos_city of\350135012300\7-recharge basin and stormwater capture\300 CAD\340 sheet sets\DCP\6 CENTER CELL BMP SITE MAP.dwg Juan Reyes-Chapa

811 Know what's below. Call before you dig.

WARNING
POWER LINES OVERHEAD

LEGEND
- PROPOSED TOP OF BANK
- PROPOSED SIDE SLOPES; 5H:1V INTERIOR, 2H:1V EXTERIOR. UNLESS OTHERWISE NOTED

(E) DIRT ROAD

GWD SAN LUIS CANAL FLOW

55'

(E) DIRT ROAD

(E) PP, TYP

(E) OH ELEC, TYP

NORTH CELL
48.9± AC FLOOR AREA
259.1± AF STORAGE AT
HWL 102.0±

80'

FUTURE 8" Ø WATER MAIN BY OTHERS

FUTURE 36" Ø SS HDPE
SDR 21 (100 PSI) PIPE

(E) SSMH, TYP

(E) 30" SEWER PIPELINE
(E) 24" SEWER PIPELINE

SEE NOTE 3

(E) DIRT ROAD
(E) DIRT ROAD
(E) DIRT ROAD

USBR SAN LUIS DRAIN FLOW

GWD SANTA FE CANAL FLOW

(E) WIRE FENCE

FOR BIDDING PURPOSES ONLY

CONSTRUCTION NOTES

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SCALE IN FEET
0 50 100 200

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08/07/2025

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER — GRETCHEN M. HEISDORF — STATE OF CALIFORNIA — REVIEW ONLY

DATE SIGNED:

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY
DUST CONTROL PLAN

NORTH CELL BMP SITE MAP

PROVOST & PRITCHARD
455 W FIR AVENUE
CLOVIS, CA 93611-9166
PHONE (559) 449-2700
FAX (559) 449-2715
www.provostandpritchard.com

DESIGN ENGINEER: GRETCHEN HEISDORF
LICENSE NO: RCE 77241, CASQA 00485
DRAFTED BY: IRC | CHECKED BY: GMH
DATE: 08/07/2025
JOB NO: 350123007
PROJECT NO:
PHASE:

0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET 7
---- OF 12

8/8/2025 9:51 AM g:\los banos_city of-350135\0123007-recharge basin and stormwater capture\300 CAD\340 sheet sets\DCP\7 NORTH CELL BMP SITE MAP.dwg Ivan Reyes-Chapa

811
Know what's **below.**
Call before you dig.

WARNING
POWER LINES OVERHEAD

SEE NOTE 3

(E) 30" SEWER PIPELINE

(E) SSMH, TYP

(E) 24" SEWER PIPELINE

FUTURE 36" Ø SS HDPE
SDR 21 (100 PSI) PIPE

100'

(E) DIRT ROAD

SOUTH CELL
72.7± AC FLOOR AREA
262.5± AF STORAGE AT
HWL 102.0±

R50', TYP

(E) DIRT ROAD

FLOW GWD SAN LUIS CANAL

46'

20'

PROPERTY LINE

(E) CITY OF LOS BANOS
WASTE WATER
TREATMENT PLANT

(E) WIRE FENCE

(E) DIRT ROAD

(E) DIRT ROAD

FLOW GWD SANTA FE CANAL

FLOW USBR SAN LUIS DRAIN

32'

FOR BIDDING
PURPOSES ONLY

LEGEND

PROPOSED TOP OF BANK

PROPOSED SIDE SLOPES; 5H:1V INTERIOR, 2H:1V EXTERIOR. UNLESS OTHERWISE NOTED

NOTES

1. THE CANAL PRISM, INTERNAL BASIN SLOPES AND BASIN FLOOR SHALL BE NATURAL EARTH.
2. CANAL DRIVE AND BASIN TRAVEL PATHS SHALL BE COMPACTED NATURAL EARTH.
3. EXTERIOR SLOPES WILL BE KEPT AS NATURAL OR SCALPED SLOPES FOR FUELS MANAGEMENT.
4. FINAL STORAGE SWALES ARE PER THE CONSTRUCTION PLAN SET.

SCALE IN FEET
0 50 100 200

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GRETCHEN M. HEISDORF
No. 77241
STATE OF CALIFORNIA

DATE SIGNED: _____

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY

DUST CONTROL PLAN

FINAL STABILIZATION SOUTH CELL

PROVOST & PRITCHARD
455 W FIR AVENUE
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PH (559) 449-2700
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JOB NO: 350123007
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0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 8
---- OF 12

8/8/2025 9:53 AM g:\los banos_city of\350113501\23007-recharge basin and stormwater capture\300 CAD\340 sheet sets\DCP\8 FINAL STABILIZATION SOUTH CELL.dwg - Ivan Reyes-Chapa



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www.provostandpritchard.com

DESIGN ENGINEER: GRETCHEN HEISDORF
LICENSE NO: RCE 77241, CASQA 00485

DRAFTED BY:	CHECKED BY:
IRC	GMH

DATE: 08/07/2025
JOB NO: 350123007
PROJECT NO:
PHASE:

0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET 9
---- OF 12

8/8/2025 9:54 AM g:\los banos_city of\3501\350123007-recharge basin and stormwater capture\300 CAD\340 sheet sets\DCP\9 FINAL STABILIZATION CENTER CELL.dwg -Ivan Reyes-Chapa

811
Know what's **below.**
Call before you dig.

WARNING
POWER LINES OVERHEAD

LEGEND
- PROPOSED TOP OF BANK
- PROPOSED SIDE SLOPES; 5H:1V INTERIOR, 2H:1V EXTERIOR. UNLESS OTHERWISE NOTED

(E) DIRT ROAD
55'
GWD SAN LUIS CANAL FLOW
(E) DIRT ROAD
(E) PP, TYP
(E) OH ELEC, TYP
NORTH CELL
48.9± AC FLOOR AREA
259.1± AF STORAGE AT HWL 102.0±
80'
FUTURE 36" Ø SS HDPE SDR 21 (100 PSI) PIPE
(E) SSMH, TYP
(E) 30" SEWER PIPELINE
(E) 24" SEWER PIPELINE
(E) DIRT ROAD
(E) DIRT ROAD
USBR SAN LUIS DRAIN FLOW
GWD SANTA FE CANAL FLOW
(E) WIRE FENCE

FOR BIDDING PURPOSES ONLY

NOTES
1. THE CANAL PRISM, INTERNAL BASIN SLOPES AND BASIN FLOOR SHALL BE NATURAL EARTH.
2. CANAL DRIVE AND BASIN TRAVEL PATHS SHALL BE COMPACTED NATURAL EARTH.
3. EXTERIOR SLOPES WILL BE KEPT AS NATURAL OR SCALPED SLOPES FOR FUELS MANAGEMENT.
4. FINAL STORAGE SWALES ARE PER THE CONSTRUCTION PLAN SET.

SCALE IN FEET
0 50 100 200

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FOR DCP PURPOSES ONLY
08/07/2025

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER ★ VIRGINIA ★ STATE OF CALIFORNIA
DATE SIGNED: ____

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY

DUST CONTROL PLAN

FINAL STABILIZATION NORTH CELL

PROVOST& PRITCHARD
455 W FIR AVENUE
CLOVIS, CA 93611-9166
PHONE (559) 449-2700
FAX (559) 449-2715
www.provostandpritchard.com

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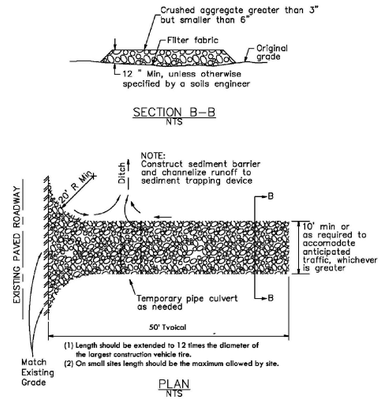
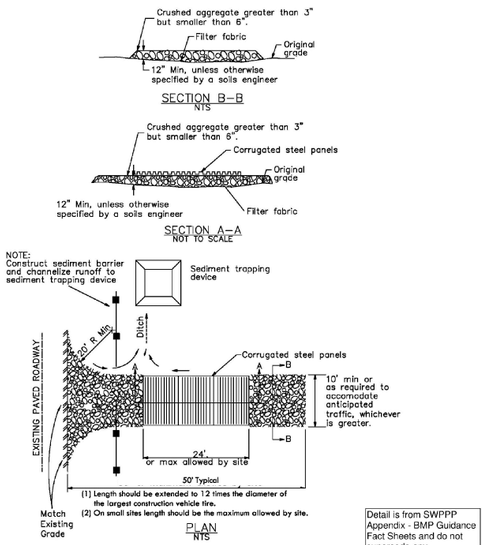
8/8/2025 9:55 AM g:\las banos_city of-350113\350123007-recharge basin and stormwater capture\300 CAD\340 sheet sets\DCP\10 FINAL STABILIZATION NORTH CELL.dwg –Ivan Reyes-Chapa

Stabilized Construction Entrance/Exit TC-1



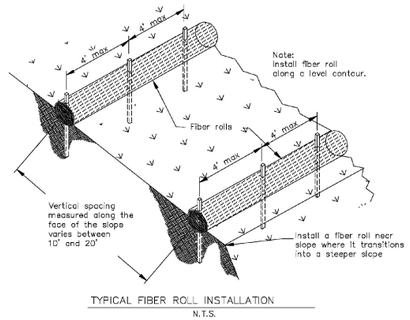
Detail is from SWPPP Appendix - BMP Guidance Fact Sheets and do not supersede any specifications elsewhere in the SWPPP or CGP

Stabilized Construction Entrance/Exit TC-1

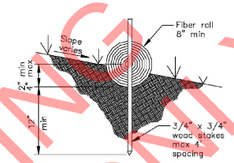


Detail is from SWPPP Appendix - BMP Guidance Fact Sheets and do not supersede any specifications elsewhere in the SWPPP or CGP

Fiber Rolls SE-5



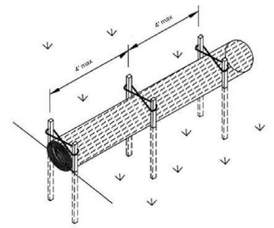
TYPICAL FIBER ROLL INSTALLATION
N.T.S.

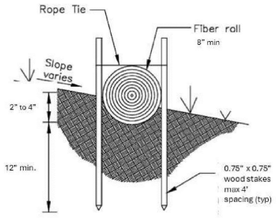


ENTRENCHMENT DETAIL
N.T.S.

Detail is from SWPPP Appendix - BMP Guidance Fact Sheets and do not supersede any specifications elsewhere in the SWPPP or CGP

Fiber Rolls SE-5



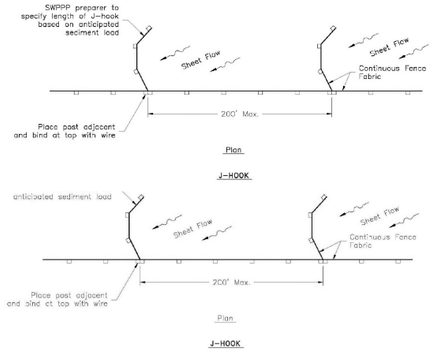


OPTIONAL ENTRENCHMENT DETAIL
N.T.S.

Detail is from SWPPP Appendix - BMP Guidance Fact Sheets and do not supersede any specifications elsewhere in the SWPPP or CGP

Reference: Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425-11.1, Section 4, Fiber Rolls SC-5, California Department of Transportation (Caltrans), March 2024.

Silt Fence SE-1



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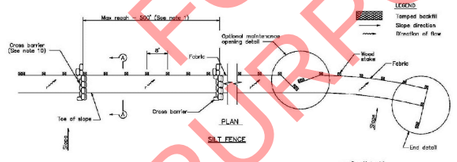
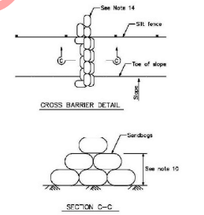
Silt Fence SE-1



NOTES

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the linear barrier, in no case shall the reach length exceed 500'.
2. The last 8'-0" of fence shall be turned up slope.
3. Stake dimensions are nominal.
4. Dimension may vary to fit field condition.
5. Stakes shall be spaced at 8'-0" maximum and shall be positioned on downstream side of fence.
6. Stakes to overlap and fence fabric to fold around each stake one full turn. Secure fabric to stake with 4 staples.
7. Stakes shall be driven tightly together to prevent potential flow-through of sediment at joint. The tops of the stakes shall be secured with wire.
8. For end stake, fence fabric shall be folded around two stakes one full turn and secured with 4 staples.
9. Minimum 4 staples per stake. Staplelocations shown are typical.
10. Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
11. Maintenance openings shall be constructed in a manner to ensure sediment remains behind silt fence.
12. Joining sections shall not be placed at sump locations.
13. Sandbag rows and layers shall be offset to eliminate gaps.
14. Add 3-4 bags to cross barrier on downgradient side of silt fence as needed to prevent bypass or undermining and as directed based on site limits of disturbance.



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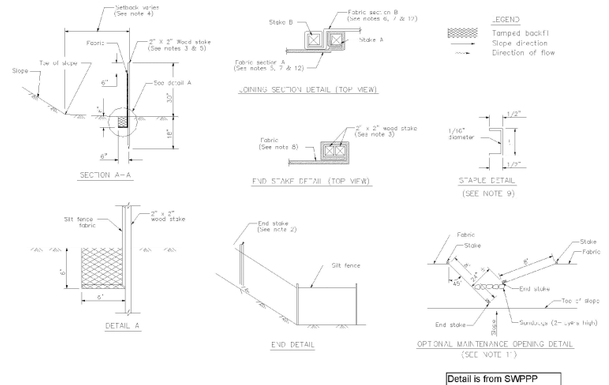
Silt Fence SE-1



Detail is from SWPPP Appendix - BMP Guidance Fact Sheets and do not supersede any specifications elsewhere in the SWPPP or GCP

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08/07/2025

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER — GRETCHEN M. HEISDORF — No. RCE 77241 — STATE OF CALIFORNIA — REVIEW ONLY

DATE SIGNED:

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY
DUST CONTROL PLAN

DETAILS

PROVOST & PRITCHARD
455 W FIR AVENUE
CLOVIS, CA 93611-6166
PHONE (559) 449-2700
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SHEET 11
---- OF 12

8/8/2025 9:55 AM g:\los banos_city of-350\350123007-recharge basin and stormwater capture\300 CAD\340 sheet sets\DCP\11 DETAILS.dwg - Ivan Reyes-Chapa

San Joaquin Valley
Air Pollution Control District
Compliance Division

FOR BIDDING PURPOSES ONLY

Presents this
Certificate of Completion
to

Gretchen Heisdorf

On May 14, 2008, at Fresno, CA for

Regulation VIII — Dust Control Training

San Joaquin Valley
Air Pollution Control District

Signature

5/14/08
Date

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

Regulation VIII Record Keeping Forms

This matrix lists the suggested forms that may be used for Regulation VIII record keeping. The left column lists potentially applicable rules. The next column lists major industry groups affected by the various rules of Regulation VIII. The letters A, B, C, and D refer to the record keeping forms developed by the SJVUAPCD.

		Activity at site and corresponding record keeping forms					
Regulation VIII Rule Number	Type of Business or Commercial Activity	Bulk Materials	Unpaved Roads	Equip. & Vehicle Storage	Open Areas	Earth Moving	Trackout and Carryout
8021 8031 8041 8051 8061 8071	Construction	**A C**	**A C D**	**A C D**	**A C**	**A**	**B**
8021 8031 8041 8051 8061 8071	Oilfields	**A C**	**A C D**	**A C D**	**A C**	**A**	**B**
8081	Off-field Agricultural Operations	**A C**	**A C D**	**A C D**			
8031 8041 8551 8061	Agricultural Product Processing	**A C**	**A C D**	**A C D**			**B**
8031 8041 8071	Bulk Materials	**A C**	**A C D**	**A C D**			**B**
8041 8061 8071	Equipment and Vehicle Storage	**A C**	**A C D**	**A C D**	**A C**		**B**
8041 8051 8071	Truck Stops	**A C**	**A C D**	**A C D**	**A C**		**B**

FOR BIDDING PURPOSES ONLY

Form A = Area Water Application
Form B = Sweeping/cleanup
Form C = Permanent control measure such as paving, gravel, a grizzly, chemical/organic dust suppressants
Form D = Water Application onto Unpaved Roads and Traffic Areas

(Rev. 06.01.09)

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 ♦ FAX (209) 557-6475

Central Region (Main Office)
1990 East Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 ♦ FAX (559) 230-6062

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: (661) 392-5500 ♦ FAX (661) 392-5585

www.valleyair.org

Regulation VIII Record Keeping Form

Month:

FORM A – Area Water Application

Project Location: _____ City: _____ Size: _____ (Miles/ Acres)

Owner: _____ Address: _____ City: _____ Zip: _____

Contact Person: _____ Title: _____ Phone: _____

Watering Schedule

Use this form to document daily water applications at a single site by recording total gallons per day and number of applications per day at a single area. Use additional forms, as necessary, for areas with different treatment schedules.

Area treated: _____

Week	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1							
2							
3							
4							
5							

Area treated: _____

Week	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1							
2							
3							
4							
5							

Retain for one year after project ends. Title V sources are required to retain for five years after project ends.

FOR BIDDING PURPOSES ONLY

Regulation VIII Record Keeping Form

Month:

FORM B – For Cleanup of Trackout and Carryout

Project Location: _____ City: _____ Size: _____ (Miles/ Acres)

Owner: _____ Address: _____ City: _____ Zip: _____

Contact Person: _____ Title: _____ Phone: _____

Sweeping / Cleanup Schedule

Use this form to document the cleanup schedule by entering the time of day cleanup is done. **Mornings =am; Afternoon = pm.** Write "end of day" if cleanup is done at the end of the workday. In urban areas, preventing or cleaning-up trackout at construction sites is required immediately if it extends 50 feet or more. Record keeping is required for construction sites subject to Rule 8021, sites that store bulk materials subject to Rule 8031 and vehicle/equipment storage areas subject to Rule 8071.

FOR BIDDING PURPOSES ONLY

Week		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	am							
	pm							
2		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	am							
	pm							
3		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	am							
	pm							
4		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	am							
	pm							
5		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	am							
	pm							

Retain for one year after project ends. Title V sources are required to retain for five years after project ends.

Regulation VIII Record Keeping Form

Month:

FORM C: For Permanent / Long Term Dust Controls

Project Location: _____ City: _____ Size: _____ (Miles/ Acres)

Owner: _____ Address: _____ City: _____ Zip: _____

Contact Person: _____ Title: _____ Phone: _____

Permanent Activities

Describe the types of permanent dust controls implemented, the date, the activity, such as applying an organic dust suppressant, gravel, paving or a trackout control device. Add comments such as the amount used, where used, brand name.

Date	Dust Control Activity Performed (Gravel, paving)	Comments: Type of material, application rate.

FOR BIDDING PURPOSES ONLY

Comments: _____

Retain for one year after project ends. Title V sources are required to retain for five years after project ends. Attach product information, maps and other specifications as appropriate unless already addressed in an approved or verified Fugitive PM10 Management Plan.

Regulation VIII Record Keeping Form

Month:

FORM D: Water Application onto Unpaved Roads & Equipment Areas

Project Location: _____ Size: _____ Miles or Acres (circle one)

Owner: _____ Address: _____ City: _____ Zip: _____

Contact Person: _____ Title: _____ Phone: _____

Use this form to document daily water applications at the same or different areas. Use additional forms, as necessary.

Date	Time	Area Treated	Distance, Area, or Gallons Applied

FOR BIDDING PURPOSES ONLY

Comments: _____

_____

_____

_____

Retain for one year after project ends. Title V sources are required to retain for five years after project ends. Attach product information, maps and other specifications as appropriate unless already addressed in an approved or verified Fugitive PM10 Management Plan.

APPENDIX C

CALIFORNIA ENVIRONMENTAL QUALITY ACT
MITIGATION MONITORING AND REPORTING PROGRAM

CHAPTER 5 MITIGATION, MONITORING, AND REPORTING PROGRAM

This MMRP has been formulated based upon the findings of the Initial Study/Mitigated Negative Declaration (IS/MND) for the Project in the City of Los Banos. The MMRP lists mitigation measures recommended in the IS/MND for the Project and identifies monitoring and reporting requirements.

Table 5-1: Mitigation, Monitoring, and Reporting Program presents the mitigation measures identified for the Project. Each mitigation measure is numbered with a symbol indicating the topical section to which it pertains, a hyphen, and the impact number. For example, AIR-2 would be the second mitigation measure identified in the Air Quality analysis of the IS/MND.

The first column of *Table 5-1: Mitigation, Monitoring, and Reporting* Program identifies the mitigation measure. The second column, entitled "When Monitoring is to Occur," identifies the time the mitigation measure should be initiated. The third column, "Frequency of Monitoring," identifies the frequency of the monitoring of the mitigation measure. The fourth column, "Agency Responsible for Monitoring," names the party ultimately responsible for ensuring that the mitigation measure is implemented. The last columns will be used by the Lead and Responsible Agencies to ensure that individual mitigation measures have been complied with and monitored.

Table 5-1: Mitigation, Monitoring, and Reporting Program

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
Biological Resources						
BURROWING OWL 4.2.1A	**(Take Avoidance Survey)**. A pre-construction "take avoidance" survey will be conducted by a qualified biologist for burrowing owl no less than 14 days prior to the onset of construction in the APE according to the methods described in the *Staff Report on Burrowing Owl Mitigation* (CDFW 2012). The survey area will include all suitable habitat on and within 200 meters of the Project impact area, where accessible.	Prior to construction activities	Prior to construction activities	City of Los Banos with assistance of a qualified biologist	Precon Survey Memo	
4.2.1B	**(Avoidance of Active Nests)**. If Project activities are undertaken during the breeding season (February 1-August 31) and active nest burrows are identified on or within the APE, a 200-meter disturbance-free buffer will be established around these burrows. The buffers will be enclosed with temporary fencing to prevent construction equipment and workers from entering the setback area. Buffers will remain in place for the duration of the breeding season unless otherwise arranged with CDFW. After breeding season has ended and all young have left the nest, passive relocation of any remaining owls may take place as described below.	Prior to construction activities	Prior to construction activities	City of Los Banos with assistance of a qualified biologist	Site Inspection to verify construction of buffers.	
4.2.1C	**(Avoidance of Resident Owls During Construction)**. During the non-breeding season (September 1-January 31), resident owls occupying burrows in Project-construction areas will be avoided.	Prior to construction activities	Prior to construction activities	City of Los Banos with assistance of a qualified biologist	Site Inspection to verify construction of buffers.	
4.2.1D	**(Avoidance and Minimization During Operations and Maintenance).** Burrowing owls observed during operations and maintenance activities will be avoided. Information about the burrowing owl, its status, and avoidance procedures will be distributed to operations and maintenance staff.	During operations and maintenance activities	During operations and maintenance activities	City of Los Banos	n/a	

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
4.2.1E	**(CDFW Consultation).** If avoidance of burrowing owls is not possible, CDFW will be consulted for recommendations and guidance on the development of mitigation measures such as take avoidance, minimization, and mitigation.	During operations and maintenance	During operations and maintenance	City of Los Banos	Development of mitigation measures	
SWAINSON'S HAWK 4.2.2A	**(Construction Timing)**. If feasible, Project construction will occur entirely outside the Swainson's hawk nesting season, typically defined as March 1- September 15.	Prior to construction activities	Prior to construction activities	City of Los Banos with assistance of a qualified biologist	n/a	
4.2.2B	**(Preconstruction Surveys)**. If construction activities must occur between March 1 and September 15, then, a qualified biologist will conduct surveys for nesting Swainson's hawk following the survey methodology developed by the Swainson's hawk Technical Advisory Committee (SWHA TAC 2000) during the nesting season of or prior to Project initiation, within the Project APE and a ½-mile buffer around the Project APE.	Prior to construction activities	Prior to construction activities	City with assistance of a qualified biologist	Precon Survey Memo	
4.2.2C	**(Avoidance of Active Nests)**. Should any active nests be discovered within the survey area, a ½-mile disturbance-free buffer, or lesser buffer distance established in consultation with CDFW, will be established around the nest. Disturbance free buffers will be delineated on the ground with flagging, fencing, or by other easily visible means and will remain in effect until a qualified biologist has determined that the young have fledged and are capable of foraging independently.	Prior to construction activities	Prior to construction activities	City of Los Banos with assistance of a qualified biologist	Site Inspection to verify construction of buffers.	
NESTING BIRDS 4.2.3A	**(Construction Timing)**. If feasible, the Project will be implemented outside of the avian nesting season, typically defined as February 1 to August 31.	Prior to construction activities	Prior to construction activities	City of Los Banos with assistance of a qualified biologist	n/a	
4.2.3B	**(Preconstruction Surveys)**. If construction is to occur between February 1 and August 31, a qualified biologist will conduct pre-construction surveys for active bird nests within 10 days prior to the start of construction. The survey area will encompass the site and accessible surrounding lands within 250	Prior to construction activities	Prior to construction activities	City with assistance of a qualified biologist	Precon Survey Memo	

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	feet for nesting migratory birds and 500 feet for raptors (i.e., birds of prey).					
4.2.3C	**(Avoidance of Active Nests).** Should any active nests be discovered in or near proposed construction zones, the biologist will identify a suitable construction-free buffer around the nest. This buffer will be identified on the ground with flagging or fencing and will be maintained until the biologist has determined that the young have fledged and are capable of foraging independently.	Prior to construction activities	Prior to construction activities	City of Los Banos with assistance of a qualified biologist	Site Inspection to verify construction of buffers.	
Cultural Resources						
CUL-1	(**Archaeological Remains**): Should archaeological remains or artifacts be unearthed during any stage of project activities, work in the area of discovery shall cease until the area is evaluated by a qualified archaeologist. If mitigation is warranted, the project proponent shall abide by recommendations of the archaeologist.	During construction activities	Daily	City of Los Banos	Memo summarizing discovery.	
CUL-2	(**Human Remains**): In the event that any human remains are discovered on the Project site, the Merced County Coroner must be notified of the discovery (California Health and Safety Code, Section 7050.5) and all activities in the immediate area of the find or in any nearby area reasonably suspected to overlie adjacent human remains must cease until appropriate and lawful measures have been implemented. If the Coroner determines that the remains are not recent, but rather of Native American origin, the Coroner shall notify the Native American Heritage Commission (NAHC) in Sacramento within 24 hours to permit the NAHC to determine the Most Likely Descendent of the deceased Native American	During construction activities	Daily	City of Los Banos	Memo summarizing discovery.	
Geology and Soils						
GEO-1	**(Paleontological Resources)** Should paleontological resources be encountered on the Project site, all ground disturbing activities in the area shall stop. A	During construction activities	Daily	City of Los Banos	Memo summarizing discovery.	

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	qualified paleontologist shall be contacted to assess the discovery. Mitigation may include monitoring, recording the fossil locality, data recovery and analysis, and a final report. Public educational outreach may also be appropriate. Upon completion of the assessment, a report documenting methods, findings, and recommendations shall be prepared and submitted to the County of Merced for review, and (if paleontological materials are recovered) a paleontological repository, such as the University of California Museum of Paleontology					
Tribal Cultural Resources						
TCR-1	**(Sensitivity and Awareness Training)**: Prior to construction the applicant/contractor shall be required to provide a cultural resources and tribal cultural resources sensitivity and awareness training program (Worker Environmental Awareness Program [WEAP]) for all personnel involved in project construction, including field consultants and construction workers. The WEAP will be developed in coordination with an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archeology, as well as culturally affiliated Native American tribes. The WEAP shall be conducted before any project-related construction activities begin in the project site. The WEAP will include relevant information regarding sensitive cultural resources and tribal cultural resources, including applicable regulations, protocols for avoidance, and consequences of violating State laws and regulations. The WEAP will also describe appropriate avoidance and impact minimization measures for cultural resources and tribal cultural resources that could be located at the project site and will outline what to do and who to contact if any potential cultural resources or tribal cultural resources are encountered. The WEAP will	Prior to Construction	Once	City of Los Banos	Record of training attendance.	

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	emphasize the requirement for confidentiality and culturally appropriate treatment of any discovery of significance to Native Americans and will discuss appropriate behaviors and responsive actions, consistent with Native American tribal values					
TCR-2	(**Inadvertent Discoveries**): In the case of any inadvertent discoveries at any time during the duration of construction or implementation, all work will be stopped within 100 feet of the discovery, and the City shall contact the Santa Rosa Rancheria Tachi-Yokut Tribe for further information, investigation, and guidance on the process for handling such discoveries.	During Construction	During ground disturbing activities	City of Los Banos	Memo summarizing discovery.	

APPENDIX D

SAN LUIS DELTA MENDOTA WATER AUTHORITY
ACCESS AGREEMENT

August 21, 2025

Mr. Joe Heim
City of Los Banos
411 Madison Ave.
Los Banos, CA 93635

Subject: Access Permit No. P2641024 – Truck Route to Access City of Los Banos Project – San Luis Drain, from Milepost 91.62-R to Milepost 94.76-R (HWY-152) - Central Valley Project (CVP) CA

Dear Mr. Heim:

This permit is being provided to City of Los Banos or its authorized representatives to enter upon the San Luis Drain right-of-way for the purpose of accessing City owned property as part of the Basin and Stormwater Capture Project. The truck route will include the Operations & Maintenance Roadway of the San Luis Drain from Milepost 91.62-R to Milepost 94.76-R. Heavy equipment will not be allowed to cross over bridges located at Milepost 91.56 and at Milepost 91.62.

The San Luis Drain (Canal) is owned by Reclamation and operated and maintained by the San Luis & Delta-Mendota Water Authority (Authority). **On behalf of Reclamation, the Authority grants permission to perform this work upon receipt of a signed copy of the appropriate signature page agreeing to the permit terms and conditions.** This permit shall expire on April 15, 2026. All work shall cease after this date, unless an extension is requested and approved. This letter permit must be signed by a representative authorized to accept liability.

City of Los Banos (Grantee) and its authorized representatives agree to the following terms and conditions:

1. The Grantee hereby agrees to indemnify and hold harmless the Authority, the United States, their employees, agents, and assigns from any loss or damage and from any liability on account of personal injury, property damage, or claims for personal injury or death (minimum $1,000,000) which may arise out of the Grantee's activities under this permit.

2. All field activities on land administered by the Authority shall be coordinated with and approved by the Water Authority's Chief Operating Officer, Tracy Office, or an authorized representative.

3. The Authority and the United States reserve the right to terminate this permit at any time. The Authority and the United States, its agents, and assigns shall have the right to inspect all activities covered by this permit and modify the terms and conditions as deemed necessary.

15990 KELSO ROAD
BYRON, CA
94514
209 832-6200
209 833-1034 FAX

4. The Grantee shall protect the terrain and vegetation to prevent erosion.

5. The Grantee shall exercise all due caution while performing this work to ensure that no disturbances or harm of natural habitat occurs in any fashion. All activities shall be done to the satisfaction of the Authority's Chief Operating Officer, Reclamation-Tracy Office, or an authorized representative.

6. Caution shall be exercised to ensure that the waterways are protected from any foreign objects or substance.

7. The Grantee shall comply with all Federal, State, County and local requirements for work of this nature.

8. The Grantee shall furnish, erect, and maintain such fences, barriers, lights and signs, and provide such flagmen and guards as are necessary to give adequate warning to the public of the construction, access, and of any dangerous condition to be encountered as a result thereof. The Grantee shall be responsible for maintaining the graveled road crossing in a manner that prevents a safety hazard and shall immediately repair crossing if found in an unsafe condition.

9. The Grantee shall, upon completion of the work, remove all waste material and debris from the site and the site shall be left in a condition equal to or better than before the repair work commenced.

10. The Grantee shall comply with the following Reclamation guidelines for the handling of Hazardous Materials on the Canal Right-of-Way:

(a) The Grantee shall comply with all applicable Federal, State, and local laws and regulations, and Reclamation policies and instructions, existing or hereafter enacted or promulgated, concerning any hazardous material that will be used, produced, transported, stored or disposed of on or in lands, waters or facilities owned by the United States or administered by Reclamation.

b) "Hazardous material" means any substance, pollutant or contaminant listed as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. § 1901, et seq., and the regulations promulgated pursuant to the Act.

(c) The Grantee may not allow contamination of lands, waters or facilities owned by the United States or administered by Reclamation by hazardous materials, thermal pollution, refuse, garbage, sewage effluent, industrial waste, petroleum products, mine tailings, mineral salts, pesticides (including, but not limited to, the misuse of pesticides), pesticide containers or any other pollutants.

(d) The Grantee shall report to the Authority, within 24 hours of its occurrence, any event which may or does result in pollution or contamination adversely affecting lands, water or facilities owned by the United States or administered by Reclamation.

(e) Violation of any of the provisions of this Article shall constitute grounds for immediate termination of this permit and shall make the Grantee liable for the cost of full and complete remediation and/or restoration of any Federal resources or facilities that are adversely affected as a result of the violation.

(f) The Grantee agrees to include the provision contained in paragraphs (a) through (e) of this Article in any subcontract or third party contract it may enter into pursuant to this contract.

(g) The Authority agrees to provide information necessary for the Grantee, using reasonable diligence, to comply with the provision of this Article. This information is available upon request.

11. All work shall meet or exceed with requirements of the latest edition (currently July 2014 edition) of the **Reclamation Safety and Health Standards** handbook while conducting any activity on Reclamation land or facilities. A copy can be downloaded from Reclamation's public web site at: http://www.usbr.gov/ssle/safety/RSHS/rshs.html

12. The Authority will perform a pre and post inspection (video and/or photos) of the San Luis Drain roadway condition for reference. Note: This roadway is not designed for extended use by heavy equipment or vehicles. Roadway damage will occur and the Grantee shall be responsible for repairing the damage caused by this use.

13. Any damage to the roadway or San Luis Drain facilities must be repaired immediately and any repairs shall be approved by the Authority.

14. Weather permitting, a maximum speed limit of 25 mph shall be observed while traveling on the O&M roadway. Signage with the maximum speed limit posted on them shall be used throughout the truck route as a reminder to drivers not to exceed speed limit.

15. Traffic gates to remain closed when project site is not active to prevent unauthorized vehicles from entering.

16. Use Best Management Practices to protect material being hauled from entering the San Luis Drain canal.

17. Immediately upon completion of the work, the Authority requires a final inspection. The purpose of the final inspection is to ensure the work is acceptable to the Authority. Any work found to be unacceptable shall be repaired/replaced immediately. Contact Jessie Ixta at (209) 832-6222 to schedule the final inspection.

18. The Grantee shall keep a copy of this permit on the project site at all times.

If you should have any questions, please don't hesitate to contact Jessie Ixta of my staff at (209) 832-6222 or Jacob Bejarano of my staff at (209) 832-6216.

Sincerely,

Bob Martin
Facilities O&M Director
San Luis & Delta-Mendota Water Authority

cc: Seth Harris, Pablo Arroyave, Reclamation-Michael Inthavong

City of Los Banos and its authorized representatives, by signature below, agree to the terms and conditions above.

City of Los Banos:

By: J-c Heim

Title: Acting Public Works Director

Date: 8/26/25

Note: Return signature copy to the Authority. Digital signatures are acceptable.

APPENDIX E

CONTRACTOR'S REQUEST FOR CONSTRUCTION STAKING

EST. 1968
PROVOST& PRITCHARD
CONSULTING GROUP
An Employee Owned Company

CONSTRUCTION STAKING REQUEST FORM

Project Name: _____

ATTN: _____ **Date:** _____

P&P Proj. No.: _____ Phase: _____ PM: _____

Prime Contractor: _____ Construction Manager: _____

*Note: Staking requests must come from Prime Contractor only, subcontractor submittals will not be recognized.

Date Stakes Needed On-site: _____ **Requested by:** _____
(72 Working Hours Notice Required) (name and contact phone no.)

Breifly Describe Staking Request: _____

_____

_____

No. 1 Request (item to be staked): _____

Identify: ☐ Rough Grade ☐ Finish Grade ☐ Restake ☐ Other: _____

Feature: ☐ EP ☐ TFC ☐ FL ☐ Other: _____

Offset: ☐ 3' ☐ 5' ☐ 10' ☐ Corner Staking/Control ____ X ____
☐ Other Offset (explain): _____

Stations: ☐ 50' ☐ 100' ☐ 300' ☐ Other: _____

No. 2 Request (item to be staked): _____

Identify: ☐ Rough Grade ☐ Finish Grade ☐ Restake ☐ Other: _____

Feature: ☐ EP ☐ TFC ☐ FL ☐ Other: _____

Offset: ☐ 3' ☐ 5' ☐ 10' ☐ Corner Staking/Control ____ X ____
☐ Other Offset (explain): _____

Stations: ☐ 50' ☐ 100' ☐ 300' ☐ Other: _____

No. 3 Request (item to be staked): _____

Identify: ☐ Rough Grade ☐ Finish Grade ☐ Restake ☐ Other: _____

To Feature: ☐ EP ☐ TFC ☐ FL ☐ Other: _____

Offset: ☐ 3' ☐ 5' ☐ 10' ☐ Corner Staking/Control ____ X ____
☐ Other Offset (explain): _____

Stations: ☐ 50' ☐ 100' ☐ 300' ☐ Other: _____

Notes: _____

_____

_____

APPENDIX F

GEOTECHNICAL ENGINEERING INVESTIGATION ENTITLED,
PROPOSED NEW RECHARGE BASIN AND SEWER IMPROVEMENT BY BSK ASSOCIATES,
DATED JANUARY 15, 2024

GEOTECHNICAL ENGINEERING INVESTIGATION REPORT
PROPOSED NEW RECHARGE BASIN AND SEWER IMPROVEMENTS
LOS BANOS
MERCED COUNTY, CALIFORNIA

BSK PROJECT G00001262

PREPARED FOR:

PROVOST & PRITCHARD CONSULTING GROUP
455 W FIR AVENUE
CLOVIS, CALIFORNIA 93611

JANUARY 15, 2024

GEOTECHNICAL ENGINEERING INVESTIGATION REPORT
PROPOSED NEW RECHARGE BASIN AND SEWER IMPROVEMENTS
LOS BANOS
MERCED COUNTY, CALIFORNIA

Prepared for:

Provost & Pritchard Consulting Group
455 W Fir Avenue
Clovis, California 93611

BSK Project: G00001262

January 15, 2024

Prepared by:

Tolleman Gorham, EIT
Staff Engineer II

Neva M. Popenoe, PE, GE
Fresno Branch Manager



BSK Associates
691 N Laverne Avenue, Suite 101
Fresno, California 93727
(559) 497-2880
www.bskassociates.com

Distribution: Eric Abrahamsen, Provost & Pritchard (eabrahamsen@ppeng.com)

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1 INTRODUCTION

1.1 General

This report presents the results of our geotechnical engineering investigation for the proposed Improvements outlined in the project description.

In the event that significant changes occur in the design or location of the proposed improvements, the conclusions and recommendations presented in this report will not be considered valid unless the changes are reviewed by BSK and the conclusions and recommendations are modified or verified in writing as necessary.

1.2 Project Description

We understand the project consists of a new recharge basin and sanitary sewer replacement projects west of the San Luis Drain and Santa Fe Grade. The proposed recharge basin is planned to be placed east of Los Banos, California, and west of Santa Fe Grade and the San Luis Canal. The basin is anticipated to be less than 10 feet below grade. Basin embankment slopes are anticipated to be composed of material generated on-site. Slopes are anticipated to be no steeper than 2H:1V (Horizontal:Vertical). Additionally, we anticipate turnouts to be located on each side of the basin with pump stations and necessary pipelines.

The proposed sewer replacement is anticipated to include a 24 to 36 inch diameter pipeline approximately 20 feet below grade. The sewer is anticipated to utilize trenchless excavation methods to cross three canals.

1.3 Purpose and Scope of Services

The purpose of the geotechnical investigation is to assess soil conditions at the project site and provide geotechnical engineering recommendations for use by the project designers. The scope of the investigation included a field exploration, laboratory testing, engineering analysis, and preparation of this report.

2 FIELD INVESTIGATION AND LABORATORY TESTING

2.1 General

The field exploration, conducted on November 1 through November 3, 2023, consisted of a site reconnaissance and drilling ten (10) exploratory test borings to a maximum depth of approximately 16.5 to 51.5 feet below ground surface (bgs). The test borings were drilled with a truck-mounted drill rig, equipped with 8-inch augers. Details of the field exploration and the boring logs are provided in Appendix A.

At five feet below the first encountered groundwater, a "grab" water sample was obtained by bailing out water from within the hollow stem auger at borings B-1, B-3, B-5, B-6, B-7 and B-8.

2.2 Laboratory Testing

Laboratory testing of selected soil samples were performed to evaluate certain physical, chemical, and engineering characteristics and properties. The testing program included: gradation, in-situ moisture and density, collapse potential, direct shear, and corrosion potential. The in-situ moisture and dry density test results are presented on the boring logs in Appendix A. Descriptions of the laboratory test methods and test results are provided in Appendix B.

Analytical testing of water sampled was performed as requested and test results are presented in Appendix D.

3 SITE CONDITIONS

3.1 Site Description

The proposed improvements will be situated in Merced County, California. The project site was located east of Los Banos, California, and west of Santa Fe Grade.

The proposed basins are located in an area planted with agricultural fields. The proposed area is surrounded by the unlined canals: Santa Fe Canal and San Luis Canal. A concrete lined irrigation ditch runs along the middle of the proposed basin area, parallel to Santa Fe Grade (northwest to southeast). The irrigation ditch is less than 5 feet deep, and the canal depths are unknown. Unpaved roadways run along the canal and ditch levees.

The proposed sewer pipeline alignment runs diagonally from Rockport Drive and Westminster Way extending northeast across the project site to the wastewater treatment access road across the Santa Fe Canal. The alignment crosses the Santa Fe Canal, the San Luis Drain, and the San Luis Canal. The project site was bound to the north and east by the Santa Fe Canal with agricultural fields beyond, to the south by agricultural fields, and to the west by a residential area. The project site contained overhead powerlines, access roads, agricultural pumps, and unlined canals.

3.2 Subsurface Conditions

The near surface soil consisted of sandy clay, clayey sand and sandy silt, underlain by sandy silt, silty sand and poorly graded sand to the maximum depth explored (51.5 feet bgs). The boring logs in Appendix A provide a more detailed description of the soils encountered in each boring, including the applicable Unified Soil Classification System symbols. The approximate locations of the soil borings are shown on the Boring Location Map (Figure 2).

Near surface soils exhibit a low to moderate expansion potential, and low collapse potential.

The soil types encountered in the upper 10 to 20 feet were predominantly sandy silts and clays. Based on these encountered soil types BSK recommends a Lanes Weighted Creep Factor (C_W) of 4.0.

3.3 Groundwater

Groundwater was encountered as shallow as 20 feet in the test borings during our field exploration, November 1 through November 3, 2023. The California Department of Water Resources indicates the depth to recent regional groundwater at the project site is greater than 25 feet bgs. However, fluctuations in the groundwater level or the presence of perched groundwater may occur due to variations in rainfall, irrigation, seasonal factors, pumping from wells and other factors that were not evident at the time of our investigation. Groundwater is not anticipated to affect construction of the proposed improvements above 20 feet bgs. For construction extending below groundwater, dewatering will be necessary.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 General

Based upon the data collected during this investigation and from a geotechnical engineering standpoint, it is our opinion that there are no soil conditions that would preclude the construction of the proposed improvements, provided the recommendations presented in this report are incorporated into the project design and construction.

4.2 Soil Corrosivity

One (1) surface soil sample obtained from the Site was tested to provide a preliminary screening of the potential for concrete deterioration or steel corrosion due to attack by soil-borne soluble salts. The test results are presented in Appendix B. The soil was evaluated for minimum resistivity and pH (CT 643), soluble sulfate (CT 417), and chlorides (CT 422).

The water-soluble sulfate content severity class is considered negligible to concrete. (Exposure Category S0 per Table 19.3.1.1 of ACI 318-19). The water-soluble chloride content exposure class is C0 per Table 19.3.1.1 of ACI 318-19. The site soils minimum resistivity is low and is considered very severely corrosive to buried metal. Buried reinforcing steel protection must be provided with the minimum concrete cover required by the American Concrete Institute (ACI) Building Code for Structural Concrete, ACI 318, Chapter 7.7. Buried metal conduits, ferrous metal pipes, and exposed steel must have protective coatings in accordance with the manufacturer's specifications.

4.3 Seismic Design Criteria

There are no known active fault zones within the vicinity of the project site. In accordance with Section 1613.2.2 of the 2022 California Building Code (CBC) and Table 20.3-1 of ASCE 7-16, the site can be classified as Site Class D (default).

Use of the 2022 California Building Code (CBC) seismic design criteria is considered appropriate and the following parameters are considered applicable for the structural design of foundations.

Table 1: Seismic Design Parameters

Seismic Design Parameter	2022 CBC Value		Reference
MCE Mapped Spectral Acceleration (g)	S_S = 1.11	S_1 = 0.384	USGS Mapped Value
Amplification Factors (Site Class D)	F_a = 1.056	F_v = null[1](1.916)[2]	ASCE Table 11.4
Site Adjusted MCE Spectral Acceleration (g)	S_{MS} = 1.172	S_{M1} = null[1](0.736)[2]	ASCE Equations 11.4.1-2
Design Spectral Acceleration (g)	S_{DS} = 0.781	S_{D1} = null[1] (0.490)[2]	ASCE Equations 11.4.1-4
Geometric Mean PGA (g)	PGA_M = 0.523		Section 11.8.3, ASCE 7-16
Site Short Period – T_s (seconds)	T_s = 0.628		$T_s = S_{D1}/ S_{DS}$
Site Long Period – T_L (seconds)	T_L = 8		USGS Mapped Value

Notes: [1] Requires site-specific ground motion procedure or exception as per ASCE 7-16 Section 11.4.8.

[2] Values from ASCE 7-16 supplement shall only be used to calculate T_s. Values provided based on use of exception, as provided in Section 11.4.8.2 to Site-Specific Ground Motion Procedures and assumes the value of the seismic response coefficient C_s is determined by Eq. 12.8-2 for values of $T \leq 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either Eq. 12.8-3 for $T_L \geq T > 1.5T_s$ or Eq. 12.8-4 for $T > T_L$. The 1.5 increase has not been applied to the values presented.

As shown above, the short period design spectral response acceleration coefficient, S_{DS}, is greater than 0.5, therefore the Site lies in Seismic Design Category D as specified in Section 1613.2.5 of the 2022 CBC. The long period design spectral response acceleration coefficient, S_{D1}, is greater than 0.2, therefore the Site lies in Seismic Design Category D as specified in Section 1613.2.5 of the 2022 CBC. In accordance with the 2022 CBC, each structure shall be assigned to the more severe seismic design category in accordance with Table 1613.2.5(1) or 1613.2.5(2), irrespective of the fundamental period of vibration of the structure.

4.4 Slope Stability Analysis

The maximum depth for the proposed basin embankment is anticipated to be 10 feet. The gradient of the proposed basin is anticipated to be 2:1 (H:V). The stability of the cut and fill slopes was analyzed for the static and pseudo-static condition using Janbu's and Bishop's Simplified Method of Slices and modeled

in the computer program, Slide v7.0. The slope model was analyzed for stability using circular slip surfaces originating and terminating at critical points along the cross sections analyzed. The inputs required for the site include slope geometry, subsurface profile data, groundwater conditions, horizontal ground acceleration, as well as constraints on the upper and lower limits of the search region for the critical slip circle, numbers and locations of initiation and termination points of trial surfaces, and number of trial surfaces for each initiation point.

The values used in our analysis are summarized in the following table:

Table 2: Slope Stability Soil Parameters

Material	Depth (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degrees)
Sandy Clay (CL)	0-10	120	330	18
Poorly Graded Sand (SP)	10-15	120	0	35

The horizontal ground motion site coefficient of 0.174g (1/3 of PGA_M) was used in the slope stability analysis. Vertical ground motions and groundwater conditions were not considered in the analysis. For each cross section, 25,640 randomly generated slip circles were analyzed for the critical factor of safety.

A summary of the critical factors of safety is provided in the following table:

Table 3: Critical Factors of Safety
Maximum Slope Height – 10'

Maximum Slope (H:V) and Method	STATIC	PSEUDO-STATIC
2:1	2.2	1.6

Based upon the data collected during this investigation and from a geotechnical engineering standpoint, it is our opinion that there are no soil conditions that would preclude the construction of the proposed basin provided that the recommendations presented in this report are incorporated into the project design and construction. The engineered fill must be placed in accordance with Section 4.5 of this report. The proposed basin may be designed/constructed with a maximum depth of 10 feet below ground surface with inboard slopes of 2H:1V or flatter.

4.5 Site Preparation and Earthwork Construction

The following procedures must be implemented during site preparation for the proposed improvements. It should be noted that references to maximum dry density, optimum moisture content, and relative compaction are based on ASTM D1557 (latest test revision) laboratory test procedures.

1. Prior to any site grading, all miscellaneous surface obstructions must be removed from the improvement area. Near surface soils containing vegetation, roots, organics, or other objectionable material must be stripped to a depth of at least 3-inches to expose a clean soil surface. Surface strippings must not be incorporated into engineered fill unless the organic content is less than 3 percent by weight (ASTM D2974).

2. Within the area of the planned improvements, remove existing vegetation, underground utilities, and debris to expose a clean soil surface free of deleterious material.

   Existing utilities or irrigation pipes must be removed to a point at least 5-feet horizontally outside the proposed improvement area. Resultant cavities must be backfilled with engineered fill. Abandoned pipelines to remain that are less than 2 inches in diameter must be capped at the cutoff point, while pipelines greater than 2 inches in diameter must be filled with a 1-sack sand-cement slurry.

3. Soil disturbed as a result of undocumented fill, debris, demolition, animal burrows, and abandoned underground structures must be excavated to expose undisturbed native soil.

4. Following the required stripping, and/or removal of underground structures, the exposed soil surface in proposed at-grade improvement areas must be over-excavated uniformly to a depth of 24 inches below existing site grade or 12 inches below the bottom of the proposed foundation or embankment, whichever is deeper. The over-excavation must extend at least 5 feet laterally beyond the outside edge of the proposed foundation or areas to receive fill, whichever distance is greater. The exposed subgrade must be proof-rolled under the observation of a BSK field representative to detect soft or pliant areas. Soft or pliant areas must be over-excavated to firm native soil. The exposed surface must be scarified at minimum of 8 inches, uniformly moisture conditioned to 2 percent above optimum moisture, and compacted to 90 percent relative compaction.

5. For new embankments, a minimum 5-foot-wide keyway must be placed below the proposed embankments. The keyway should extend an additional 1 foot below over-excavation. Over-excavation is not necessary for cut areas greater than 2 feet in depth. The over-excavation must extend at least 3 feet laterally beyond the outside edge of the proposed areas to receive fill.

6. Engineered fill must consist of non-expansive soil (EI < 20), moisture conditioned to at or above optimum moisture, and compacted to 90 percent relative compaction. Excavated soils, free of deleterious substances (organic matter, demolition debris, tree roots, etc.), with at least 30 percent passing the No. 200 sieve, and with less than 3 percent organic content by weight, may be reused as engineered fill for the backfill.

7. Engineered fill must be placed in uniform layers not exceeding 8-inches in loose thickness, moisture-conditioned and compacted as recommended above. Acceptance of engineered fill placement must be based on both moisture content at time of compaction and relative compaction.

8. Imported fill materials must be free of deleterious substances and have less than 3 percent organic content by weight. The project specifications must require the contractor to contact BSK for review

of the proposed import fill materials for conformance with these recommendations at least two weeks prior to importing to the site, whether from on-site or off-site borrow areas. Imported fill soils must be non-hazardous and be derived from a single, consistent soil type source conforming to the following criteria:

Maximum Particle Size:	3-inches
Percent Passing #4 Sieve:	65 – 100
Percent Passing #200 Sieve:	30 – 45
Plasticity Index:	less than 12
Expansion Index:	< 20
Low Corrosion Potential:	
Soluble Sulfates:	< 1,500 mg/kg
Soluble Chlorides:	< 300 mg/kg
Soil Resistivity:	> 2,000 ohm-cm

Grading operations must be scheduled as to avoid working during periods of inclement weather. Should these operations be performed during or shortly following periods of inclement weather, unstable soil conditions may result in the soils exhibiting a "pumping" condition. This condition is caused by excess moisture, in combination with compaction, resulting in saturation and near zero air voids in the soils. If this condition occurs, the affected soils must be over-excavated to the depth at which stable soils are encountered and replaced with suitable soils compacted as engineered fill. Alternatively, the Contractor may proceed with grading operations after utilizing a method to stabilize the soil subgrade, which must be subject to review by BSK prior to implementation.

4.6 Shallow, Mat, and Pole-Type Foundations

Provided the recommendations contained in this report are implemented during design and construction, it is our opinion that the proposed structures can be supported on shallow, mat, or pole-type foundations. A structural engineer must evaluate reinforcement and embedment depth based on the requirements for the structural loadings.

4.6.1 Shallow Foundations

The proposed structures may be supported on reinforced concrete spread footings bearing on engineered fill. The allowable bearing pressure applies to the dead load plus live load (DL + LL) condition. Footing design must follow the criteria listed below:

Table 4: Allowable Bearing Pressure		
	Minimum Footing Width (inches)	**Allowable Bearing Capacity[1] (psf)**

Footing Embedment[2] (inches)	Continuous Footing	Isolated Spread Footing	Continuous Footing	Isolated Spread Footing
12	18	24	2,000	2,500

Note (1) – The bearing pressure can be increased one-third for transient loading such as wind or seismic.
(2) – Measure with respect to the lowest adjacent subgrade surface.

The estimated total and differential settlement for the recommended spread footings is shown below:

Table 5: Anticipated Post-Construction Settlement

Footing Type	Post-Construction Settlement (inches)	Differential Settlement (inches)	Angular Distortion
Continuous	1.0	--	0.005
Isolated	1.0	0.5	--

Isolated footing differential settlement is based on adjacent similarly loaded footings spaced at 30-feet. The settlement values given above are applicable to the maximum loading conditions. For loads, other than the design maximum loads, the settlements can be decreased proportionally.

4.6.2 Mat Foundations

The proposed improvements may be supported on a thickened mat/slab foundation. The foundation may be designed for a maximum allowable bearing pressure of 1,500 psf (DL + LL). Estimated total settlement for mat/slabs is approximately 1.0 inch. Differential settlement across mat/slab foundations is anticipated to be on the order of about half of the total settlement over the length of the mat foundation. The weight of the concrete should be included in evaluating the contact pressure at the base of mat/slab foundations. The weight of embedded concrete can be reduced by the unit weight of soil times the depth of embedded concrete.

Mat foundations must be a minimum of 4-inches thick and must be supported on a compacted subgrade prepared in accordance with the "Site Preparation and Earthwork Construction" section of this report. In order to regulate cracking of the slabs, construction joints and/or saw-cut control joints must be provided in each direction at a maximum spacing of 10 feet on centers along with steel reinforcement as recommended by the project's Structural Engineer. Control joints must have a minimum depth of one-quarter of the slab thickness. It is recommended that steel reinforcement used in concrete slabs-on-grade consist of steel rebar. Structural concrete slabs-on-grade may be designed using an unadjusted long-term Modulus of Subgrade Reaction (Ks) of 150 pounds per cubic inch (pci) constructed on a properly

compacted subgrade or engineered fill. This value is based on the correlations to soil strength using one foot by one-foot plate-load tests and should therefore be scaled (adjusted) to the actual slab width. The adjusted Ks value can be obtained by multiplying the value provided above by $[(B+B_1)/(2B)]^2$, where B is the slab width in feet and B_1 is 1 foot (width of a one foot by one foot plate-load test apparatus).

4.6.3 Pole Type Foundations

The structures may be supported on pole-type foundations such as driven piles or drilled piers. This type of foundation should be designed in accordance with Section 1807.3 of the 2022 CBC. However, it is recommended that an allowable lateral soil bearing pressure of 120 psf per foot of embedment be used to develop parameters S_1 and S_3 rather than one of the values given in Table 1806.2. This value includes a factor of safety of 2. Piles should be placed a minimum distance from the top of the basin equivalent to the depth of the pile below grade, or a reduction in lateral pile capacity will be required. The upper one foot of the soil should be ignored when calculating the minimum embedment depth. The lateral bearing pressure shall be permitted to be increased by 1/3 where used with the alternative basic load combinations of CBC Section 1605A.3.2 that include wind or earthquake loads.

To support vertical loads applied to the pile foundations, an allowable static downward or uplift skin friction value of 300 psf (includes a factor of safety of 1.5) to support vertical loads applied to the pile foundations. Pole-type foundations should be spaced a minimum of 3 diameters apart. The total settlement of pile foundations designed in accordance with these recommendations should not exceed 0.5 inch. Skin friction may be increased by 1/3 for short term loading. The weight of the pile may be taken into consideration when determining resistance to uplift loads.

4.7 Launch and Receiving Pits

The depths of launch and receiving pits for the implementation of directional drilling are estimated to not exceed 20 feet. Soils in this upper zone, as observed in the test boring, consisted of sandy silt and sandy clay to a depth of 15 feet. Soils deeper than 15 feet bgs along the proposed pipeline consist of silty sands, poorly graded sands, and clays.

Pit excavation can be accomplished by laying slopes back not steeper than 1.5:1 (horizontal to vertical) or with the installation of a shoring system. Where sands are encountered, soils will need to be laid back flatter (at least 2H:1V, see Section 4.9) or shielding will need to be provided.

Groundwater is not anticipated to be encountered in the pits. Availability of construction dewatering provisions are not anticipated to be required for the duration of the project, provided water in the adjacent Creek is below the proposed pit elevation.

4.8 Lateral Earth Pressures and Frictional Resistance

Lateral loads applied against foundations may be resisted by a combination of passive resistance against the vertical faces of the foundations and friction between the foundation bottom and the supporting subgrade. An unfactored coefficient of friction of 0.32 may be used between soil subgrade and the cast-in-place foundation bottom. The unfactored passive pressure is presented in Table 6. The coefficient of friction and passive earth pressure values given above represent ultimate soil strength values. BSK recommends that a safety factor consistent with the design conditions be included in their usage. For resistance against lateral sliding that is countered solely by the passive earth pressure against footings or friction along the bottom of footings, a minimum safety factor of 1.5 is recommended. For stability against lateral sliding that is resisted by combined passive pressure and frictional resistance, a minimum safety factor of 2.0 is recommended. For lateral resistance against seismic loading conditions, a minimum safety factor of 1.2 is recommended. We based these lateral resistance values on the assumption that the concrete for the foundations is either placed directly against undisturbed soils or that the voids created from the use of forms are backfilled with engineered fill or other approved materials, such as lean concrete. Passive resistance in the upper foot of soil cover below finished grades should be neglected unless the ground surface is confined by concrete slabs, pavements, or other such positive protection.

The following earth pressure parameters may be used for designing earth retaining structures and foundations.

Table 6: Lateral Earth Pressures

Lateral Pressure Conditions	Equivalent Fluid Pressure (pcf)
Active Pressure	70
At-Rest Pressure	90
Passive Pressure	225
Dynamic Increment	19.4H

Notes: 1. H is wall height in feet

Parameters are shown in the above table for drained conditions of select engineered fill or prepared native soil. In addition, the drained condition assumes that positive drainage will be provided away from the structure improvements and that water does not accumulate around the structure and cause a build-up of hydrostatic pressure.

4.9 Excavation Stability

Soils encountered within the upper 10-feet are generally Type C soil in accordance with OSHA (Occupational Safety and Health Administration). The slopes surrounding or along temporary excavations must be no steeper than 1.5H:1V to a maximum depth of 10-feet, and 2H:1V for excavations deeper than 10 feet, provided water is kept sufficiently out of the excavation by pumping or other dewatering

methods. It is anticipated that loose sands may be encountered as shallow as 10-feet below grade. Where sandy soils are encountered, slopes must be laid back flatter. Temporary excavations for the project construction must be left open for as short a time as possible and must be protected from water runoff. Slope height, slope inclination, and excavation depths (including utility trench excavations) must in no case exceed those specified in local, state, or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations 29 CFR Part 1926, or successor regulations). These excavation recommendations are based on soil characteristics derived from the borings. Variations in soil conditions will likely be encountered during excavation. At the time of construction, BSK must be afforded the opportunity to observe and document sloping and shoring conditions, and the opportunity to provide review of actual field conditions to account for condition variations not otherwise anticipated in the preparation of these recommendations.

4.10 Gasses Encountered

BSK did not encounter subterranean gasses during our investigation.

4.11 Temporary Shoring

Where there is insufficient space to layback slopes, temporary shoring will be necessary. Lateral earth pressures for cantilevered or braced shoring supporting level ground are presented in the following table.

Table 7: Lateral Earth Pressures for Temporary Shoring

Parameter	Pressure
Active Pressure	70 psf/ft
Braced Pressure	41.2H psf
Allowable Passive Pressure	
Solid Sheeting	135 psf/ft
Isolated Soldier Pile	340 psf/ft

Notes: [1] H is shored height in feet
[2] Values for isolated soldier piles already include an increase for arching, no further consideration should be applied.

In areas where the stability of adjoining improvements could be compromised by excavation operations, support systems such as shoring, bracing or underpinning may be required to provide stability and to protect personnel working within the excavation. Shoring, bracing, or underpinning required for the project (if any), should be designed by a professional engineer registered in the State of California.

4.12 Trench Backfill and Compaction

Processed on-site soils comprising silty sand and sand, which are free of organic material, are suitable for use as general trench backfill above the pipe envelope. The backfill must be placed in thin layers, not exceeding 12-inches in loose thickness, scarified (if necessary) to achieve a smooth and consistent texture, moisture conditioned to within one to three percent above optimum moisture content, and compacted to at least 90 percent of the maximum dry density as determined by ASTM: D1557. The uppermost 12-inches of trench backfill below pavement must be compacted to at least 95 percent of the maximum dry density as determined by ASTM: D1557 within proposed pavement areas, or as per Merced County or Caltrans Standards. Mechanical compaction methods are recommended, ponding or jetting should not be used. Moisture content within two percent of optimum moisture content must be maintained while compacting the upper 12-inch zone.

Field density testing must conform to ASTM Test Methods D1556, and/or D6938. We recommend that field density tests be performed in the utility trench bedding, envelope and backfill for every vertical lift, at an approximate longitudinal spacing of not greater than 250-feet. Backfill that does not conform to the criteria represented by the failing test must be removed or reworked as applicable over the trench length represented by the failing tests so as to conform to BSK recommendations.

4.13 Pipe Subgrade Preparation

Excavations to pipe subgrade elevation and setting of final grade is expected to produce soil disturbance, particularly in the sandier zones. In disturbed zones, six (6) inches below final subgrade elevation must be compacted to a minimum of 90 percent. Moisture conditions during compaction must be not less than optimum but not greater than 3 percent above optimum.

4.14 Pipe Bedding and Envelope

Pipes and conduits must be bedded and shaded in accordance with the requirements of the pipe manufacturer. Where no specific requirements exist, we recommend a minimum of 6-inches of sand bedding material for pipe installations 12 to 24-inches in diameter. For pipe diameters smaller than 12-inches, the bedding thickness may be reduced to 4-inches. Bedding material must consist of sand with not more than 5 percent passing the #200 Sieve and with 100 percent passing the 3/8-inch Sieve. We recommend that the pipe zone up to the spring line also be backfilled with the bedding materials described above.

The remaining pipe zone up to 12-inches above the top of the pipe must consist of friable granular backfill. Silty sand deposits with 35 percent or less passing the #200 sieve are suitable for backfill. Selective stockpiling may be necessary to isolate non-cemented friable soils.

Bedding and pipe zone backfill must be placed in loose thickness not exceeding 8-inches and compacted to not less than 90 percent of the maximum dry density as determined by ASTM Test Method D1557. Backfill moisture content during compaction must be maintained at 1 to 3 percent above optimum. Sand-cement slurry may be used for envelope backfill (50-200 psi at 28 days).

4.15 Modulus of Soil Reaction E´

Modulus of Soil Reaction E´ values for use in the Iowa Formula for estimating the deflection of buried flexible pipes are provided in Table 5. The materials include undisturbed native soils (trench sidewalls), compacted native soil backfill, Class 2 base rock conforming to Caltrans Section 26 of Standard Specifications and sand-cement slurry (50 psi at 7 days).

Table 8: Modulus of Subgrade Reaction (E´)

Material Designation	Modulus of Subgrade Reaction (E´), psi	Degree of Compaction of Bedding & Envelope (ASTM: D1557)
Trench Sidewalls: 0'-20' (SP/SM)	1050	-
Compacted Native Soil Backfill	1350	90 percent
Class 2 Base Rock:	3400	95 percent
Sand-Cement Slurry	4000	--

Note: * - Derived from standard penetration tests SM: Silty sand, SP: Sand

The Modulus of Subgrade Reaction is applicable to the determination of initial deflection only. For long-term deflection, a deflection lag factor of 1.25 is recommended for design purposes.

4.16 Horizontal Bearing Capacity-Thrust Blocks

We recommend that thrust blocks size determinations, in cases when force mains stabilization is required at pipe direction changes, be based on the following bearing values for shallow and deep thrust blocks. Shallow thrust blocks have a height greater than 70% of depth to center of pipeline. Deep thrust blocks have a height less than 70% of the depth to the pipe center.

Table 9: Horizontal Bearing Capacity

Loading	Thrust Block	Design Horizontal Bearing Capacity (psf)
Sustained	Shallow	225 psf/ft of depth
	Deep	400H psf

Test	Shallow Deep	300 psf/ft of depth 600H psf

Note: H is block height in feet

The thrust blocks must be cast between the pipe and undisturbed soil at the trench sidewalls. The horizontal deformation associated with the available capacity of shallow thrust blocks is 0.005D for test and sustained loading, where D is the depth to the bottom of the thrust block. It is anticipated the lateral movement associated with the available lateral bearing of deep thrust blocks under sustained or test loading is about 0.25 inch per 1000 psf of horizontal loading.

4.17 Pipe Loading Design Factors

Pipe loading design factors listed in Table below are provided for bedding material consisting of:

1) Native and imported sand or silty sand soil with less than 35 percent passing the #200 sieve and 100 percent passing the 3/8-inch sieve (SP/SM);
2) Class 2 crushed base rock conforming to Caltrans Section 26 of standard specifications;
3) Sand-cement slurry with 28-day compressive strength of 50-200 psi.

Table 10: Pipe Loading Design Factors

Materials Classification	Angle of Internal Friction, Degrees	Kμ (Marston's Formula)	Degree of Compaction ASTM: D1557
(1) ML/CL	18	0.17	90
(2) SM/SP	34	0.19	90
(3) Class 2 Aggregate Base	45	0.17	95
(4) Cement/Sand Slurry (CLSM)	55	0.14	--

A bulk unit weight of 130 pcf is recommended for compacted soil backfill within the pipe bedding and envelope. For Class 2 aggregate base, a unit weight of 140 pcf is recommended.

In the determination of the load coefficient, Kμ, "K" is Rankine's lateral earth pressure ratio and μ is equal to the coefficient of friction.

4.18 Trenchless Excavations

Three trenchless excavations ("jack and bore" operations) are planned for the proposed alignment, at the canal crossings. The soil conditions which will be encountered at the anticipated casing elevations are anticipated to be sandy silt and sandy clay to depths of approximately 16 feet bgs, underlain by silty sand,

clay, and poorly graded sand to depths of approximately 45 feet bgs, see Appendix A for detailed boring logs at the proposed crossings.

Soils caving may be present; therefore, a pipe extension may be required (e.g. sand plate or bonnet extension). Care should be taken to avoid advancement of the boring ahead of the casing.

4.19 Surface Drainage Control

Final grading around site improvements must provide for positive and enduring drainage. Ponding of water must not be allowed on or near the proposed structures. Saturation of the soils immediately adjacent to or below structures must not be allowed. Although landscaping is not anticipated, irrigation water must be applied in amounts not exceeding those required to offset evaporation, sustain plant life, and maintain a relatively uniform moisture profile around and below, site improvements. Fill elevations are anticipated to be less than 15 feet above natural grade to achieve positive site drainage.

5 PLANS AND SPECIFICATIONS REVIEW

BSK recommends that it be retained to review the draft plans and specifications for the project, with regard to foundations and earthwork, prior to there being finalized and issued for construction bidding.

6 CONSTRUCTION TESTING AND OBSERVATIONS

Geotechnical testing and observation during construction is a vital extension of this geotechnical investigation. BSK recommends that it be retained for those services. Field review during site preparation and grading allows for evaluation of the exposed soil conditions and confirmation or revision of the assumptions and extrapolations made in formulating the design parameters and recommendations. BSK's observations must be supplemented with periodic compaction tests to establish substantial conformance with these recommendations. BSK must also be called to the site to observe foundation excavations, prior to placement of reinforcing steel or concrete, in order to assess whether the actual bearing conditions are compatible with the conditions anticipated during the preparation of this report. BSK must also be called to the site to observe placement of foundation and slab concrete.

If a firm other than BSK is retained for these services during construction, that firm must notify the owner, project designers, governmental building officials, and BSK that the firm has assumed the responsibility for all phases (i.e., both design and construction) of the project within the purview of the geotechnical engineer. Notification must indicate that the firm has reviewed this report and any subsequent addenda, and that it either agrees with BSK's conclusions and recommendations, or that it will provide independent recommendations.

7 LIMITATIONS

The analyses and recommendations submitted in this report are based upon the data obtained from the test borings performed at the locations shown on Figure 2. The report does not reflect variations, which may occur between or beyond the borings. The nature and extent of such variations may not become evident until additional exploration and testing is performed, or construction is initiated. If variations then appear, a re-evaluation of the recommendations of this report will be necessary after performing on-site observations during the excavation period and noting the characteristics of the variations.

The validity of the recommendations contained in this report is also dependent upon an adequate testing and observation program during the construction phase. BSK assumes no responsibility for construction compliance with the design concepts or recommendations unless it has been retained to perform the testing and observation services during construction as described above.

The findings of this report are valid as of the present. However, changes in the conditions of the site can occur with the passage of time, whether caused by natural processes or the work of man, on this property or adjacent property. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation, governmental policy or the broadening of knowledge.

BSK has prepared this report for the exclusive use of the Client and members of the project design team. The report has been prepared in accordance with generally accepted geotechnical engineering practices, which existed in Merced County at the time the report was written. No other warranties either express or implied are made as to the professional advice provided under the terms of BSK's agreement with Client and included in this report.

FIGURES



SITE VICINITY MAP

FIGURE 1

Los Banos Santa Fe Grade Basin

Los Banos, California

REFERENCE IMAGE: Google Earth

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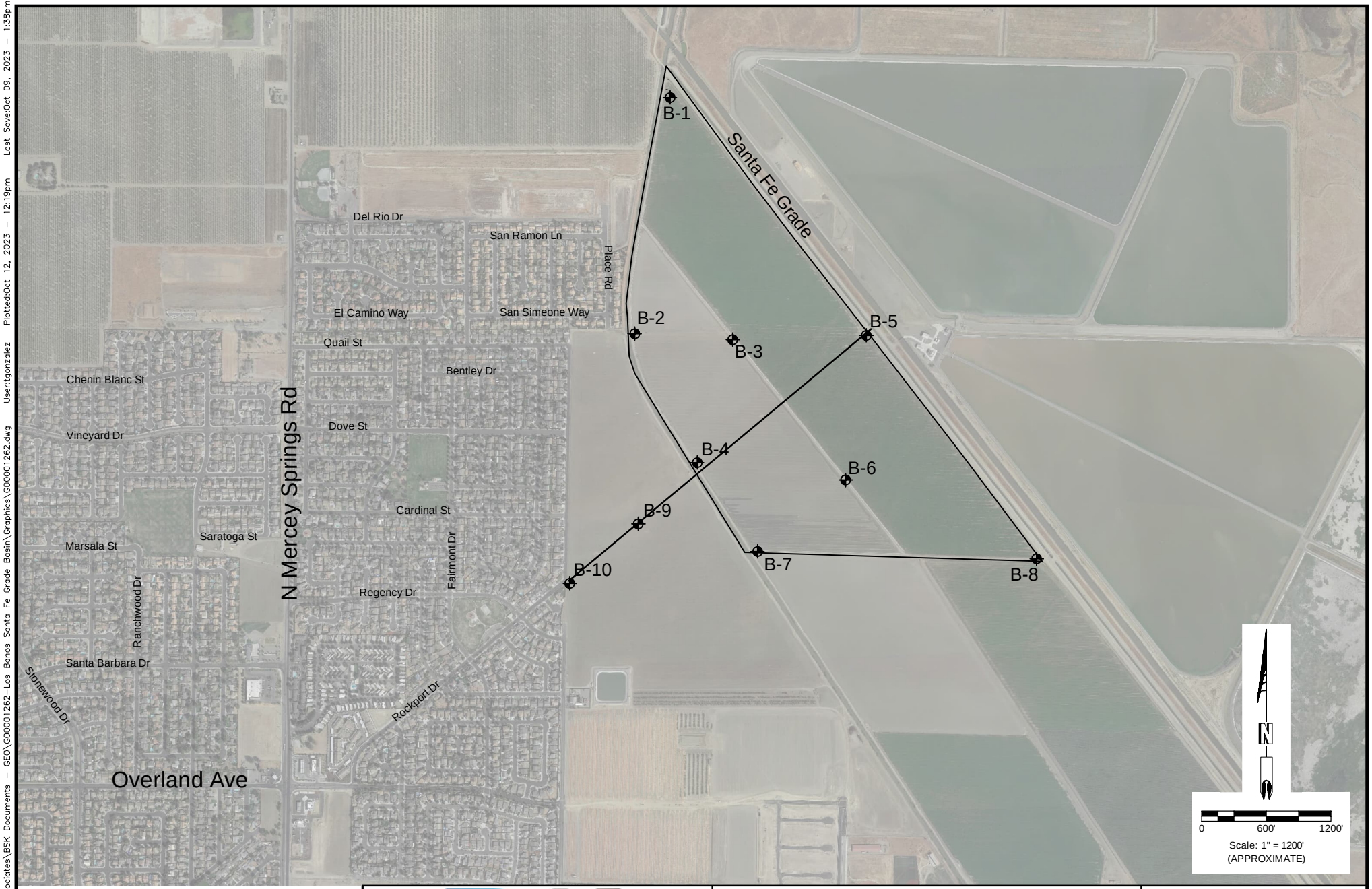
JOB NO. G00-001-262
DATE October 12, 2023
DR. BY TG
CH. BY NP
SCALE AS SHOWN
SHEET NO. 1
OF 1 SHEETS

C:\Users\tgonzalez\BSK Associates\BSK Documents - GEO\G000001262-Los Banos Santa Fe Grade Basin\Graphics\G000001262.dwg User:tgonzalez Plotted:Oct 12, 2023 - 12:20pm Last Save:Oct 09, 2023 - 1:38pm



LEGEND:

B-10 APPROXIMATE BORING LOCATIONS

REFERENCE IMAGE: Google Earth

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BORING LOCATION MAP

Los Banos Santa Fe Grade Basin

Los Banos, California

FIGURE 2

JOB NO. G00-001-262
DATE October 12, 2023
DR. BY TG
CH. BY NP
SCALE AS SHOWN
SHEET NO. 1
OF 1 SHEETS

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APPENDIX A

FIELD EXPLORATION

APPENDIX A
Field Exploration

The field exploration, conducted on November 1 through November 3, 2023, consisted of a site reconnaissance and drilling ten (10) exploratory test boring to a maximum depth of approximately 16.5 to 51.5 feet below ground surface (bgs). The test borings were drilled with a truck-mounted drill rig, equipped with 8-inch augers. Details of the field exploration and the boring logs are provided in Appendix A.

The soil materials encountered in the test borings were visually classified in the field and logs were recorded during the excavation and sampling operations. Visual classification of the materials encountered in the test borings were made in general accordance with the Unified Soil Classification System (ASTM D2487). A soil classification chart is presented herein. Boring logs are presented herein and should be consulted for more details concerning subsurface conditions.

Subsurface samples were obtained at the various depths shown on the boring logs by driving samplers which consisted of a 2.5-inch inside diameter (I.D.) lined with stainless sleeves and 1.4-inch I.D. Standard Penetration Test (SPT) sampler. The samplers were driven 18 inches using a 140-pound, automatic hammer dropping 30 inches. The number of blows required to drive the last 12 inches was recorded as the blow count (blows/foot) on the log of borings. The relatively undisturbed soil core samples were capped at both ends to preserve the samples at their natural moisture content. Disturbed soil samples were obtained using the Split-Spoon Sampler (marked X in logs) and were placed and sealed in polyethylene bags. At the completion of the field exploration, the test borings were backfilled with the soil cuttings, as set forth in BSK's proposal.

It should be noted that the use of terms such as "soft", "medium stiff", "very stiff" or "hard" to describe the consistency of a soil is based on sampler blow count and is not necessarily reflective of the in-place density or unit weight of the soils being sampled. The relationship between sampler blow count and consistency is provided in the following Tables A-1 and A-2 for coarse grained (sandy and gravelly) soils and fine grained (silty and clayey) soils, respectively.

Table A-1: Density of Coarse-Grained Soil versus Sampler Blow Count		
Consistency	**SPT Blow Count Blows / Foot)**	**2.5" I.D. Cal. Sampler (Blows / Foot)**
Very Loose	<4	<6
Loose	4 – 10	6 – 15
Medium Dense	10 – 30	15 – 45
Dense	30 – 50	45 – 80
Very Dense	>50	>80

Table A-2: Consistency of Fine-Grained Soil versus Sampler Blow Count		
Consistency	**SPT Blow Count (Blows / Foot)**	**2.5" I.D. Cal. Sampler (Blows / Foot)**
Very Soft	<2	<3
Soft	2 – 4	3 – 6
Medium Stiff	4 – 8	6 – 12
Stiff	8 – 15	12 – 24
Very Stiff	15 – 30	24 – 45
Hard	>30	>45

MAJOR DIVISIONS				TYPICAL NAMES
COARSE GRAINED SOILS More than Half > #200 sieve	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 15% FINES	GM	SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 15% FINES	SM	SILTY SANDS, POOORLY GRADED SAND-SILT MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS More than Half < #200 sieve	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

■	Modified California	RV	R-Value
⊠	Standard Penetration Test (SPT)	SA	Sieve Analysis
☒	Split Spoon	SW	Swell Test
◪	Pushed Shelby Tube	TC	Cyclic Triaxial
▯	Auger Cuttings	TX	Unconsolidated Undrained Triaxial
✋	Grab Sample	TV	Torvane Shear
⊘	Sample Attempt with No Recovery	UC	Unconfined Compression
CA	Chemical Analysis	(1.2)	(Shear Strength, ksf)
CN	Consolidation	WA	Wash Analysis
CP	Compaction	(20)	(with % Passing No. 200 Sieve)
DS	Direct Shear	▽	Water Level at Time of Drilling
PM	Permeability	▼	Water Level after Drilling(with date measured)
PP	Pocket Penetrometer		

SOIL CLASSIFICATION CHART AND LOG KEY

Figure A-1

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Project: Los Banos Santa Fe Grade Basin

Location: Los Banos, CA

Project No.: G00-001-262

Logged By: J. Leu

Checked By: N. Popenoe

Boring: **B- 1**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–5								CL	**Sandy CLAY** - brown, moist, fine to coarse grained sand	
6–9			68					SC	**Clayey SAND** - brown, moist, dense, fine to coarse grained sand	P.P. > 4.5 tsf
10–19			25	86.7	7.6			SP	**Poorly Graded SAND** - brown, wet, stiff, fine to coarse grained sand	
20–24			15	105.8	21.5			CL	**Sandy CLAY** - brown, wet, medium stiff, fine to coarse grained sand	▽ P.P. = 1.5 tsf
25–29			20							
30–34			11					SC	**Clayey SAND** - brown, wet, loose, fine to coarse grained sand	P.P. = 1.5 tsf

Drilling Contractor: Baja Exploration
Drilling Method: Hollow Stem Auger
Drilling Equipment: CME75
Date Started: 11/2/23
Date Completed: 11/2/23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: 20 Feet
Completion Depth: 51.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

GEO BORING LOGS.GPJ BSK.GDT 12/1/23

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Project: Los Banos Santa Fe Grade Basin

Location: Los Banos, CA

Project No.: G00-001-262

Logged By: J. Leu

Checked By: N. Popenoe

Boring: **B- 1**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
36								CL	**Sandy CLAY** - brown, moist, stiff, fine to coarse grained sand *(continued)*	
37										
38										
39										
40										
41			23						... wet	P.P. = 1.75 tsf
42								SP	**Poorly Graded SAND** - gray, wet, fine to coarse grained sand	
43										
44										
45										
46			3							
47										
48										
49										
50										
51										
52										
53									Boring terminated at approximately 51.5 feet bgs. Groundwater encountered at 20 feet bgs. Boring backfilled with soil cuttings and grout.	
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
65										
66										
67										
68										
69										

Drilling Contractor: Baja Exploration
Drilling Method: Hollow Stem Auger
Drilling Equipment: CME75
Date Started: 11/2/23
Date Completed: 11/2/23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: 20 Feet
Completion Depth: 51.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

GEO BORING LOGS.GPJ BSK.GDT 12/1/23

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Fresno, CA 93727
Telephone: (559) 497-2880

Project: Los Banos Santa Fe Grade Basin

Location: Los Banos, CA

Project No.: G00-001-262

Logged By: J. Leu

Checked By: N. Popenoe

Boring: **B- 2**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–4								CL	**Sandy CLAY** - yellow brown, moist, fine to medium grained sand	
5–6	■		30						... medium dense	
7–10										
11	■		18	95.7	27.0					
12–15										
15–16	■		14	98.7	26.9			SM	**Silty SAND** - brown, moist, medium-dense, fine grained sand	
17–34									Boring terminated at approximately 16.5 feet bgs. No groundwater encountered. Boring backfilled with soil cuttings and grout.	

Drilling Contractor: Baja Exploration
Drilling Method: Hollow Stem Auger
Drilling Equipment: CME75
Date Started: 11/1/23
Date Completed: 11/1/23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 16.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: Los Banos Santa Fe Grade Basin

Location: Los Banos, CA

Project No.: G00-001-262

Logged By: J. Leu

Checked By: N. Popenoe

Boring: **B- 3**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–4								SC	**Clayey SAND** - brown, moist, fine to coarse grained sand, trace silt	
5	■							ML	**Sandy SILT** - brown, moist, hard, fine to coarse grained sand, trace clay	
6	■		52	103.8	22.7					
7–10										
11	■		60							
12–14								CL	**Sandy CLAY** - brown, moist, medium stiff, fine to coarse grained sand	
15	⧓									
16	⧓		9							
17–20										
21	■		17					SC	**Clayey SAND** - brown, moist, medium dense, fine to coarse grained sand	
22–23								SP	**Poorly Graded SAND** - brown, moist, fine to coarse grained sand	
24–25										
26	⧓		8					CL	**Sandy CLAY** - brown, moist, medium stiff, fine to coarse grained sand	
27–29										
30	■									▽
31	■		54						... increasing sand content	
32–34										

Drilling Contractor: Baja Exploration
Drilling Method: Hollow Stem Auger
Drilling Equipment: CME75
Date Started: 11/1/23
Date Completed: 11/1/23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: 30 Feet
Completion Depth: 51.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: Los Banos Santa Fe Grade Basin

Location: Los Banos, CA

Project No.: G00-001-262

Logged By: J. Leu

Checked By: N. Popenoe

Boring: **B- 3**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
36	X		17						**Sandy CLAY** - brown, moist, medium stiff, fine to coarse grained sand *(continued)*	
37									... decreasing sand content	
38										
39										
40								SP	**Poorly Graded SAND** - brown, wet, loose, fine to coarse grained sand, trace clay	
41			10							
42										
43										
44										
45										
46	X		22						... without clay	
47										
48										
49										
50										No Recovery, flowing sands
51										
52									Boring terminated at approximately 51.5 feet bgs. Groundwater encountered at approximately 30 feet bgs. Boring backfilled with soil cuttings and grout.	
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
65										
66										
67										
68										
69										

Drilling Contractor: Baja Exploration
Drilling Method: Hollow Stem Auger
Drilling Equipment: CME75
Date Started: 11/1/23
Date Completed: 11/1/23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: 30 Feet
Completion Depth: 51.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Location: Los Banos, CA
Project No.: G00-001-262
Logged By: J. Leu
Checked By: N. Popenoe

Boring: **B- 4**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–5								ML	**Sandy SILT** - yellow brown, moist, fine grained sand, trace clay	
6			13	101.3	17.2				... medium dense	
11			50/ 5"						... very dense	
16			15	100.7	21.1			SM	**Silty SAND** - brown, moist, medium dense, fine to medium grained sand	▽
21			19			11			... wet	
24								CL	**CLAY** - yellow brown, wet, medium dense, fine grained sand	
26			15	106.7	21.2					
31			32							PI = 12

Drilling Contractor: Baja Exploration
Drilling Method: Hollow Stem Auger
Drilling Equipment: CME75
Date Started: 11/1/23
Date Completed: 11/1/23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: 20 Feet
Completion Depth: 45 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: Los Banos Santa Fe Grade Basin

Location: Los Banos, CA

Project No.: G00-001-262

Logged By: J. Leu

Checked By: N. Popenoe

Boring: **B- 4**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
36			26					SM	**Silty SAND** - brown, wet, medium dense, fine to coarse grained sand	
37–39										
40										
41			56						... very dense	
42–44										
45									Boring terminated at approximately 45 feet bgs due to flowing sands. Groundwater encountered at approximately 20 feet bgs. Boring backfilled with soil cuttings and grout.	flowing sands at 45 feet
46–69										

Drilling Contractor: Baja Exploration
Drilling Method: Hollow Stem Auger
Drilling Equipment: CME75
Date Started: 11/1/23
Date Completed: 11/1/23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: 20 Feet
Completion Depth: 45 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: Los Banos Santa Fe Grade Basin

Location: Los Banos, CA

Project No.: G00-001-262

Logged By: J. Leu

Checked By: N. Popenoe

Boring: **B- 5**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–5								CL	**Sandy CLAY** - brown, moist, fine to coarse grained sand	
3				108.5	18.5					
6	■		41							P.P. > 4.5 tsf
10–11	■		15	94.8	27.0					P.P. = 1.5 tsf
15–16	■		20							P.P. = 2.25 tsf
20	▼									▽
21	⧓		8							
21									... increasing sand content	
22								SP	**Poorly Graded SAND** - brown, moist, fine to corase grained sand, trace clay	
24										flowing sands
25									Boring terminated at approximately 25 feet bgs. Groundwater encountered at approximately 20 feet bgs. Boring backfilled with soil cuttings and grout.	

Drilling Contractor: Baja Exploration
Drilling Method: Hollow Stem Auger
Drilling Equipment: CME75
Date Started: 11/2/23
Date Completed: 11/2/23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: 20 Feet
Completion Depth: 25 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: Los Banos Santa Fe Grade Basin

Location: Los Banos, CA

Project No.: G00-001-262

Logged By: J. Leu

Checked By: N. Popenoe

Boring: **B- 6**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–5								CL	**Sandy CLAY** - brown, moist, fine to medium grained sand	
6			50/ 5"						... very dense	
11			19	102.3	22.0				... yellow brown, medium dense	
14								SM	**Silty SAND** - brown, moist-wet, loose, fine to medium grained sand	
16			9							
20										▽
21			34	102.7	23.3	52				
25									Boring terminated at approximately 25 feet bgs. Groundwater encountered at approximately 20 feet bgs. Boring backfilled with soil cuttings and grout.	flowing sands

Drilling Contractor: Baja Exploration
Drilling Method: Hollow Stem Auger
Drilling Equipment: CME75
Date Started: 11/3/23
Date Completed: 11/3/23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: 20 Feet
Completion Depth: 25 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: Los Banos Santa Fe Grade Basin

Location: Los Banos, CA

Project No.: G00-001-262

Logged By: J. Leu

Checked By: N. Popenoe

Boring: **B- 7**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1								CL	**Sandy CLAY** - brown, moist, fine to medium grained sand	
2										
3									... yellow brown	
4										
5										
6			16	96.9	26.0				... brown, medium dense	
7										
8										
9										
10										
11			41						... yellow brown	
12										
13										
14								SM	**Silty SAND** - brown, moist, medium dense, fine to medium grained sand	
15										
16			19	94.2	21.6					
17										
18										
19										
20										▽
21			33					CL	**CLAY** - yellow brown, moist-wet, dense, fine grained sand	
22										
23										
24										
25										
26			9	91.9	31.2				... wet, loose	
27										
28										
29										
30										
31			14						... medium dense	
32										
33										
34										

Drilling Contractor: Baja Exploration
Drilling Method: Hollow Stem Auger
Drilling Equipment: CME75
Date Started: 11/1/23
Date Completed: 11/1/23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: 20 Feet
Completion Depth: 51.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: Los Banos Santa Fe Grade Basin

Location: Los Banos, CA

Project No.: G00-001-262

Logged By: J. Leu

Checked By: N. Popenoe

Boring: **B- 7**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
36			16					SM	**Silty SAND** - brown, moist, medium dense, fine to medium grained sand	
37										
38										
39										
40										
41			27							
42										
43										
44								CL	**CLAY** - yellow brown, wet, medium dense, fine grained sand	
45										
46			18							
47										
48										
49										
50								SM	**Silty SAND** - brown, wet, medium dense, fine to medium grained sand	
51			12							
52									Boring terminated at approximately 51.5 feet bgs. Groundwater encountered at approximately 20 feet bgs. Boring backfilled with soil cuttings and grout.	
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
65										
66										
67										
68										
69										

Drilling Contractor: Baja Exploration
Drilling Method: Hollow Stem Auger
Drilling Equipment: CME75
Date Started: 11/1/23
Date Completed: 11/1/23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: 20 Feet
Completion Depth: 51.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: Los Banos Santa Fe Grade Basin

Location: Los Banos, CA

Project No.: G00-001-262

Logged By: J. Leu

Checked By: N. Popenoe

Boring: **B- 8**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–5								ML	**Sandy SILT** - yellow brown,moist, fine to medium grained sand, trace clay	
6			50/ 4"						... very dense	
11			22	91.2	30.7				... medium dense, increase moisture content	
14								CL	**CLAY** - yellow brown, moist, medium dense, fine grained sand	
16			18							
21			46	107.0	21.9					▽
24								SM	**Silty SAND** - brown, wet, medium dense, fine to medium grained sand	
26			11							
29								CL	**CLAY** - yellow brown, wet, medium dense, fine grained sand	
31			24							
34										

Drilling Contractor: Baja Exploration
Drilling Method: Hollow Stem Auger
Drilling Equipment: CME75
Date Started: 11/1/23
Date Completed: 11/1/23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: 20 Feet
Completion Depth: 40 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: Los Banos Santa Fe Grade Basin

Location: Los Banos, CA

Project No.: G00-001-262

Logged By: J. Leu

Checked By: N. Popenoe

Boring: **B- 8**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
36								SP	**Poorly Graded SAND** - gray, wet, very loose, fine to coarse grained sand	flowing sands
37										
38										
39										
40									Boring terminated at approximately 40 feet bgs. due to flowing sands Groundwater encountered at approximately 20 feet bgs. Boring backfilled with soil cuttings and grout.	
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										
62										
63										
64										
65										
66										
67										
68										
69										

Drilling Contractor: Baja Exploration
Drilling Method: Hollow Stem Auger
Drilling Equipment: CME75
Date Started: 11/1/23
Date Completed: 11/1/23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: 20 Feet
Completion Depth: 40 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: Los Banos Santa Fe Grade Basin

Location: Los Banos, CA

Project No.: G00-001-262

Logged By: J. Leu

Checked By: N. Popenoe

Boring: **B- 9**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–4								CL	**CLAY** - yellow brown, moist, fine grained sand, trace fine to medium grained sand	
5–10	■		65					ML	**SILT** - yellow brown, moist, dense, fine grained sand, trace clay, trace fine to medium grained sand	
11–15	■		70							
16–19	■		48	103.2	12.5					
20–21	⧓		39					CL	**CLAY** - yellow brown, moist, dense, fine grained sand	
22–25										
26	■		33	101.0	24.1				Boring terminated at approximately 26.5 feet bgs. No groundwater encountered. Boring backfilled with soil cuttings and grout.	
27–34										

Drilling Contractor: Baja Exploration
Drilling Method: Hollow Stem Auger
Drilling Equipment: CME75
Date Started: 11/1/23
Date Completed: 11/1/23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 26.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: Los Banos Santa Fe Grade Basin

Location: Los Banos, CA

Project No.: G00-001-262

Logged By: J. Leu

Checked By: N. Popenoe

Boring: **B-10**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–5		✋						CL	**CLAY** - yellow brown, moist, medium dense, fine grained sand, trace fine to medium grained sand	
6	■		26			80				
7–10										
11	■		3	104.6	21.3					
12–15										
16	⧓		12							
17–20										
21	■		11	94.8	28.2					
22–25										
26	⧓		19					SM	**Silty SAND** - brown, wet, medium dense, fine to coarse grained sand	▽
27–34									Boring terminated at approximately 26.5 feet bgs. Groundwater encountered at approximately 26 feet bgs. Boring backfilled with soil cuttings and grout.	

Drilling Contractor: Baja Exploration
Drilling Method: Hollow Stem Auger
Drilling Equipment: CME75
Date Started: 11/1/23
Date Completed: 11/1/23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: 26 Feet
Completion Depth: 26 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

APPENDIX B

LABORATORY TESTING

APPENDIX B
Laboratory Testing

The results of laboratory testing performed in conjunction with this project are contained in this Appendix. The following laboratory tests were performed on soil samples in general conformance with applicable standards.

In-Situ Moisture and Density

The field moisture content and in-place dry density determinations were performed on relatively undisturbed samples obtained from the test borings. The field moisture content, as a percentage of dry weight of the soils, was determined by weighing the samples before and after oven drying in accordance with ASTM D2216 test procedures. Dry densities, in pounds per cubic foot, were also determined for undisturbed core samples in accordance with ASTM D2937 test procedures. Test results are presented on the boring logs in Appendix A.

Double Hydrometer Test

Two (2) double hydrometer tests were performed on bulk samples in the area of planned construction at the site. The tests were performed in general accordance with Test Method ASTM D422. The results of the test are presented on Figure B-1 through Figure B-4.

Direct Shear Test

Two (2) direct shear tests were performed on test specimens trimmed from selected soil samples. The three-point shear test was performed in general accordance with ASTM D3080, Direct Shear Test for Soils under Consolidated Drained Conditions. The test specimens, each 2.42 inches in diameter and 1 inch in height, were subjected to shear along a plane at mid-height after allowing for pore pressure dissipation. The results of the tests are presented on Figures B-5 and B-6.

Collapse Potential Test

Two (2) Collapse Potential Tests were performed on relatively undisturbed soil samples to evaluate collapse potential characteristics. The tests were performed in general accordance with ASTM D5333. The sample was initially loaded under as-received moisture content to a selected stress level, loaded to a load of 2000 psf, saturated, and lastly loaded to a maximum load of 4000 psf. The test results are presented on Figure B-7 and B-8.

Expansion Index Test

One (1) Expansion Index Test was performed on a bulk soil sample in the Site area. The test was performed in general accordance with UBC Standard 18-2. The tests results are presented on Figure B-9.

Soil Corrosivity

The results of chemical analyses performed on a bulk soil sample using California Test Method 643 (for pH and minimum resistivity) and California Test Methods 417 and 422 (for soluble sulfate and chlorides, respectively), are presented below.

SUMMARY OF CHEMICAL TEST RESULTS

Sample Location	pH	Sulfate (ppm)	Chloride (ppm)	Minimum Resistivity (ohms-cm)
B-6 at 0-5´	9.1	390	180	460
B-9 at 20’-21.5’	8.6	270	120	750

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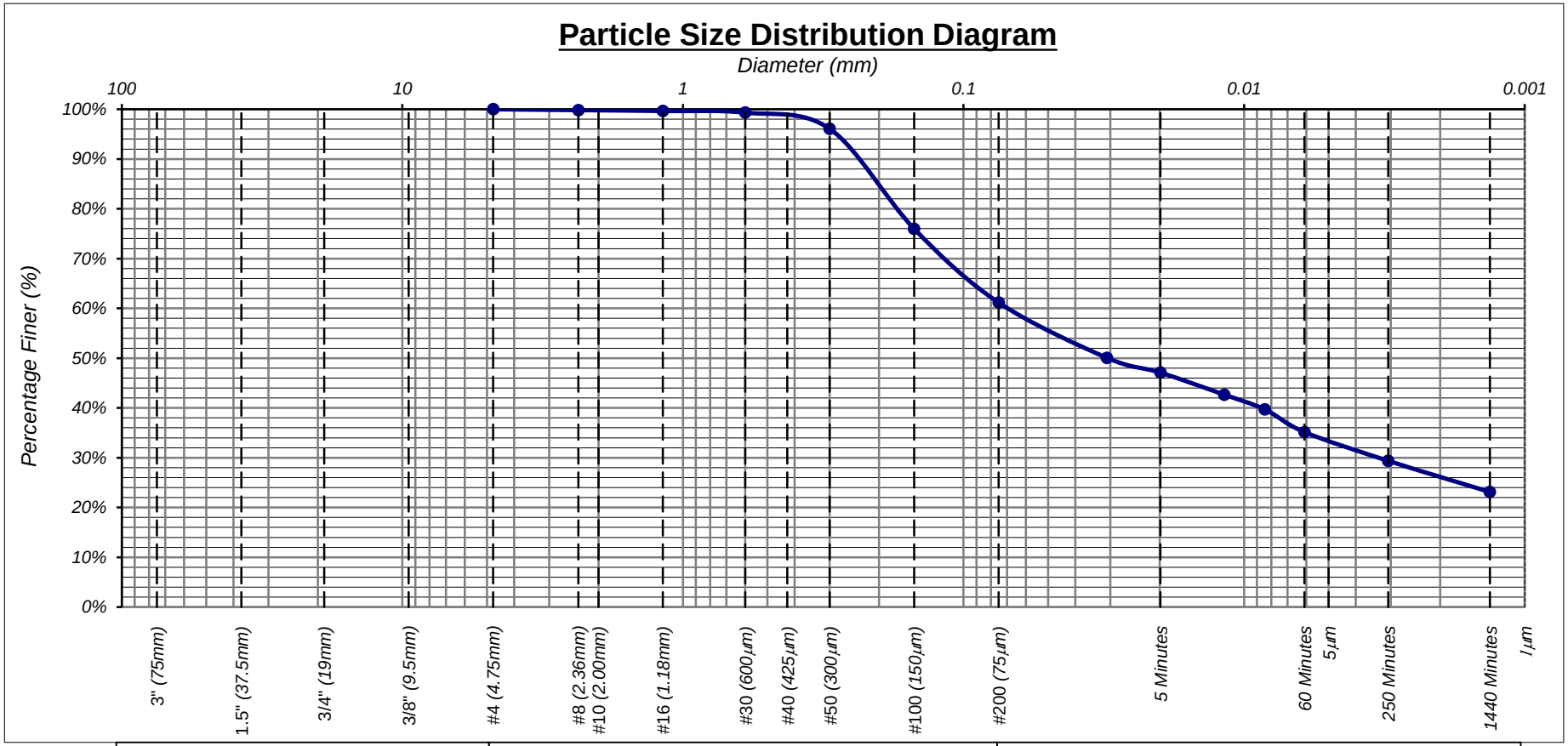
FIGURE B-1

Gradation Analysis Report
ASTM D-422 / ASTM C-136

Project Name:	Los Banos	**Project Number:**	G00001262	**Report Date:**	11/28/23
Sample Location:	B - 1 @ 0 - 5'	**Sample Lab ID:**		**Sample Date:**	11/02/23
Sample Description:	Sandy Clay (CL) - brown, moist, fine to coarse grained sand			**Test Date:**	11/17/23

Particle Size Distribution Diagram



Clear Square Openings (ASTM C-136)			US Standard Series (ASTM D-422)			Hydrometer Readings (ASTM D-422)
Cobble	Gravel		Sand			Silt (Non-Plastic) to Clay (Plastic)
	Coarse	Fine	Coarse	Medium	Fine	

% Gravel =	0%	% Sand =	39%	% Silt =	28%	% Clay =	33%

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Gradation Analysis Report
ASTM D-422 / ASTM C-136

Double Hydrometer **FIGURE B-2**

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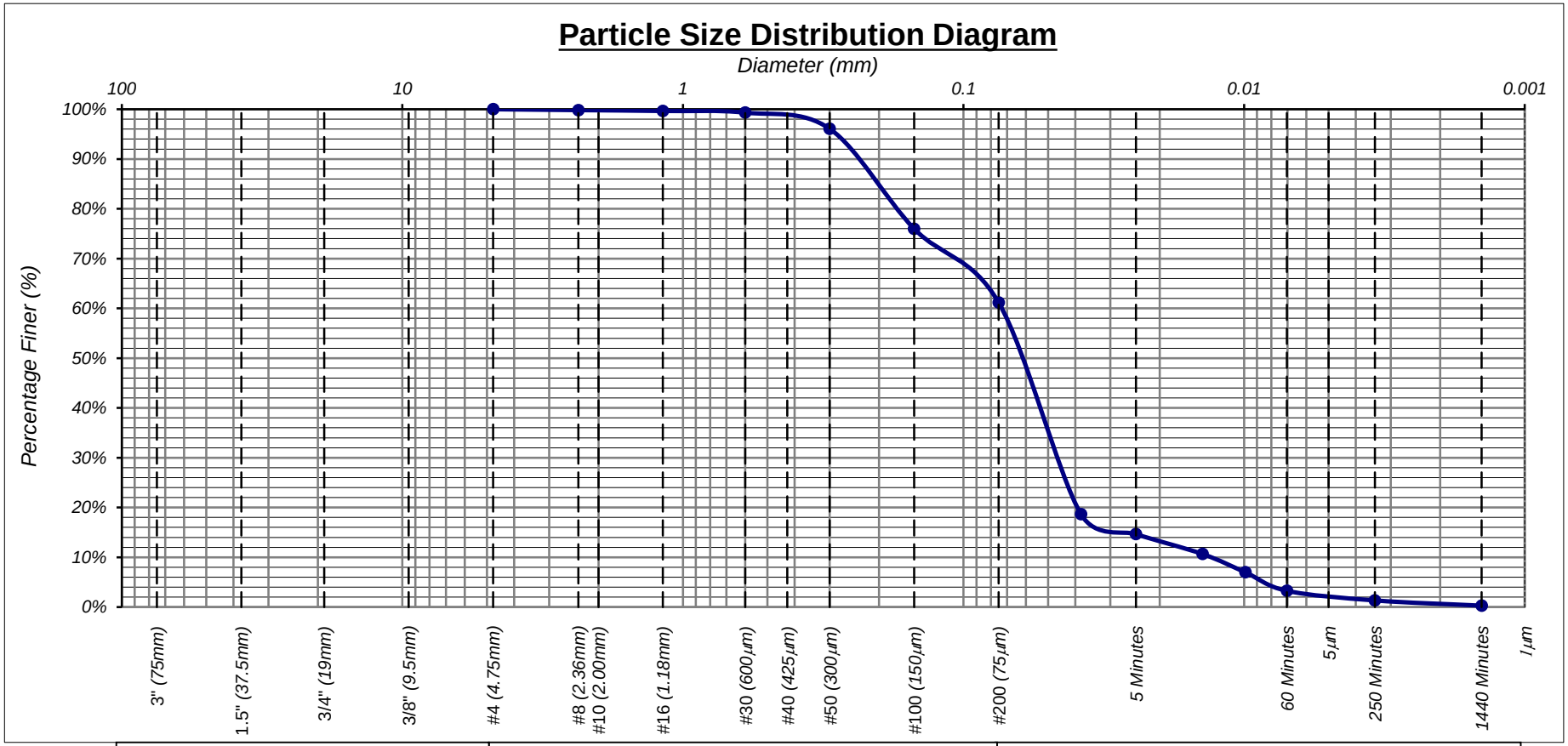
Project Name:	Los Banos	**Project Number:**	G00001262	**Report Date:**	11/28/23
Sample Location:	B - 1 @ 0 - 5'	**Sample Lab ID:**		**Sample Date:**	11/02/23
Sample Description:	Sandy Clay (CL) - brown, moist, fine to coarse grained sand - no deflocculant			**Test Date:**	11/17/23

Particle Size Distribution Diagram



Clear Square Openings (ASTM C-136)			US Standard Series (ASTM D-422)			Hydrometer Readings (ASTM D-422)
Cobble	Gravel		Sand			Silt (Non-Plastic) to Clay (Plastic)
	Coarse	Fine	Coarse	Medium	Fine	

% Gravel =	0%	% Sand =	39%	% Silt =	59%	% Clay =	2%

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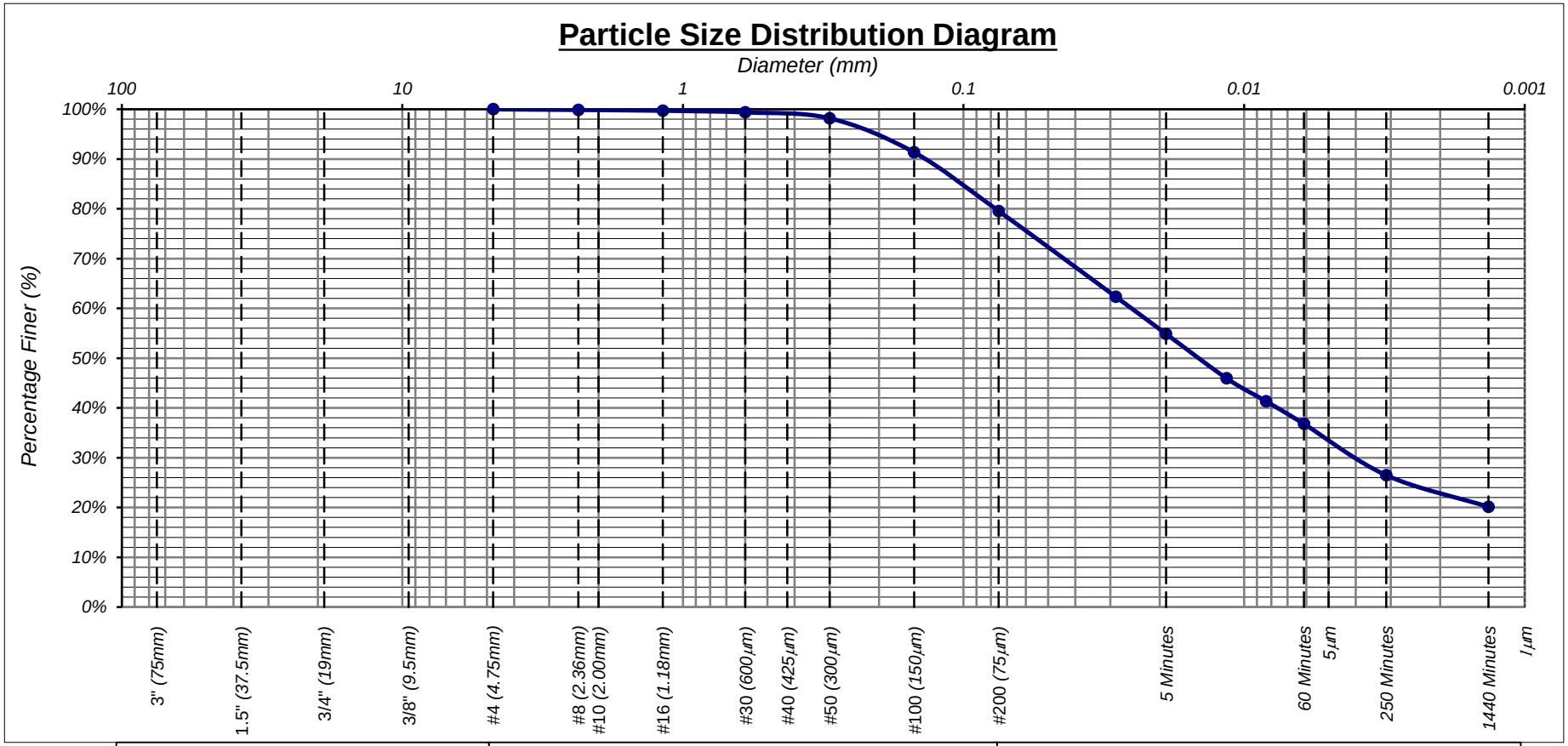
FIGURE B-3

Gradation Analysis Report
ASTM D-422 / ASTM C-136

Project Name:	Los Banos Santa Fe Grade	**Project Number:**	G00001262	**Report Date:**	11/28/23
Sample Location:	B - 6 @ 0 - 5'	**Sample Lab ID:**		**Sample Date:**	11/03/23
Sample Description:	Sandy Clay (CL) - brown, moist, fine to medium grained sand			**Test Date:**	11/17/23

Particle Size Distribution Diagram



Clear Square Openings (ASTM C-136)			US Standard Series (ASTM D-422)			Hydrometer Readings (ASTM D-422)
Cobble	Gravel		Sand			Silt (Non-Plastic) to Clay (Plastic)
	Coarse	Fine	Coarse	Medium	Fine	

% Gravel = 0% **% Sand = 20%** **% Silt = 47%** **% Clay = 33%**

Reviewed By:_____

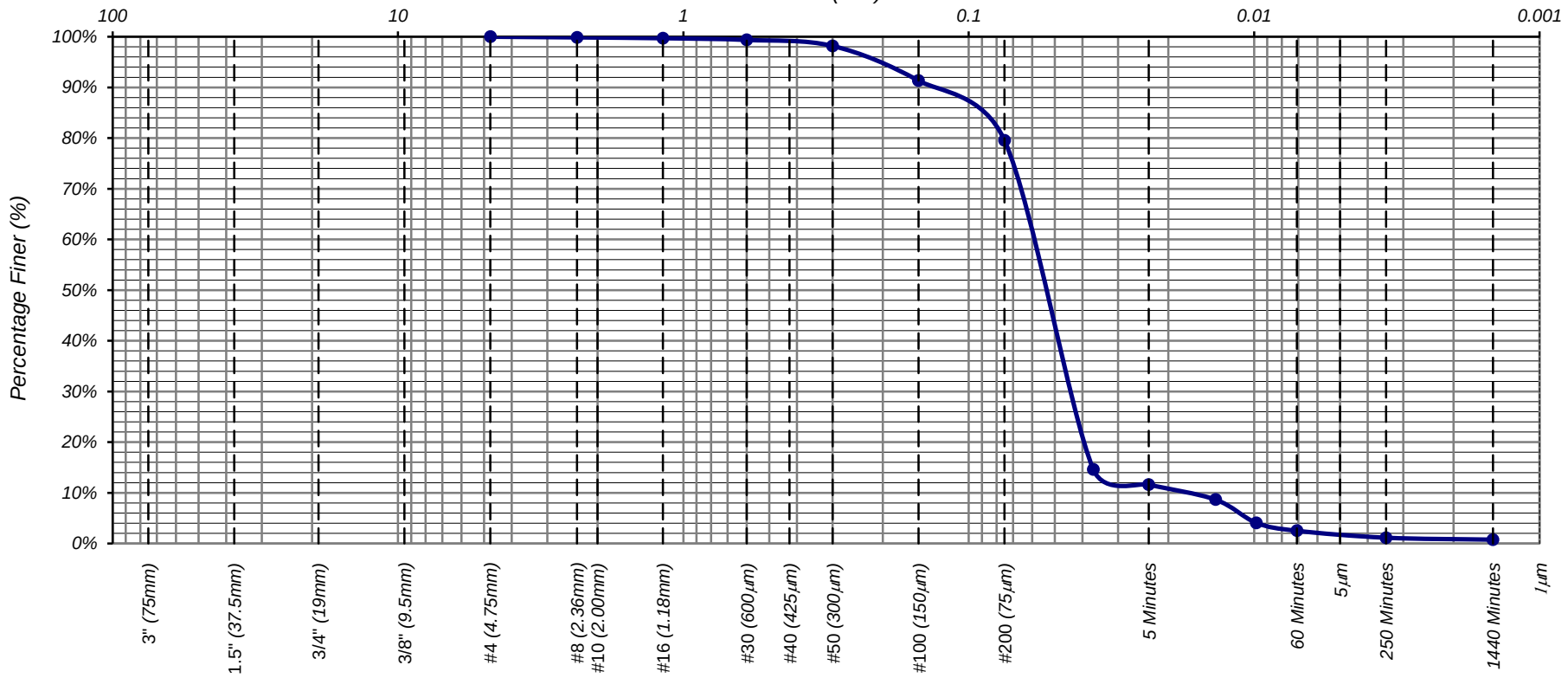
BSK ASSOCIATES
691 N. Laverne, Suite 101
Fresno, CA 93727
Ph: (559) 497-2868

Gradation Analysis Report
ASTM D-422 / ASTM C-136

Double Hydrometer **FIGURE B-4**

Project Name:	Los Banos Santa Fe Grade	**Project Number:**	G00001262	**Report Date:**	11/28/23
Sample Location:	B - 6 @ 0 - 5'	**Sample Lab ID:**		**Sample Date:**	11/03/23
Sample Description:	Sandy Clay (CL) - brown, moist, fine to medium grained sand - no deflocculant			**Test Date:**	11/17/23

Particle Size Distribution Diagram



Clear Square Openings (ASTM C-136)			US Standard Series (ASTM D-422)			Hydrometer Readings (ASTM D-422)
Cobble	Gravel		Sand			Silt (Non-Plastic) to Clay (Plastic)
	Coarse	Fine	Coarse	Medium	Fine	

% Gravel = 0% **% Sand = 20%** **% Silt = 78%** **% Clay = 2%**

Reviewed By:_____

BSK ASSOCIATES
691 N Laverne, Ste 101
Fresno, CA 93727
Ph: (559) 497-2880

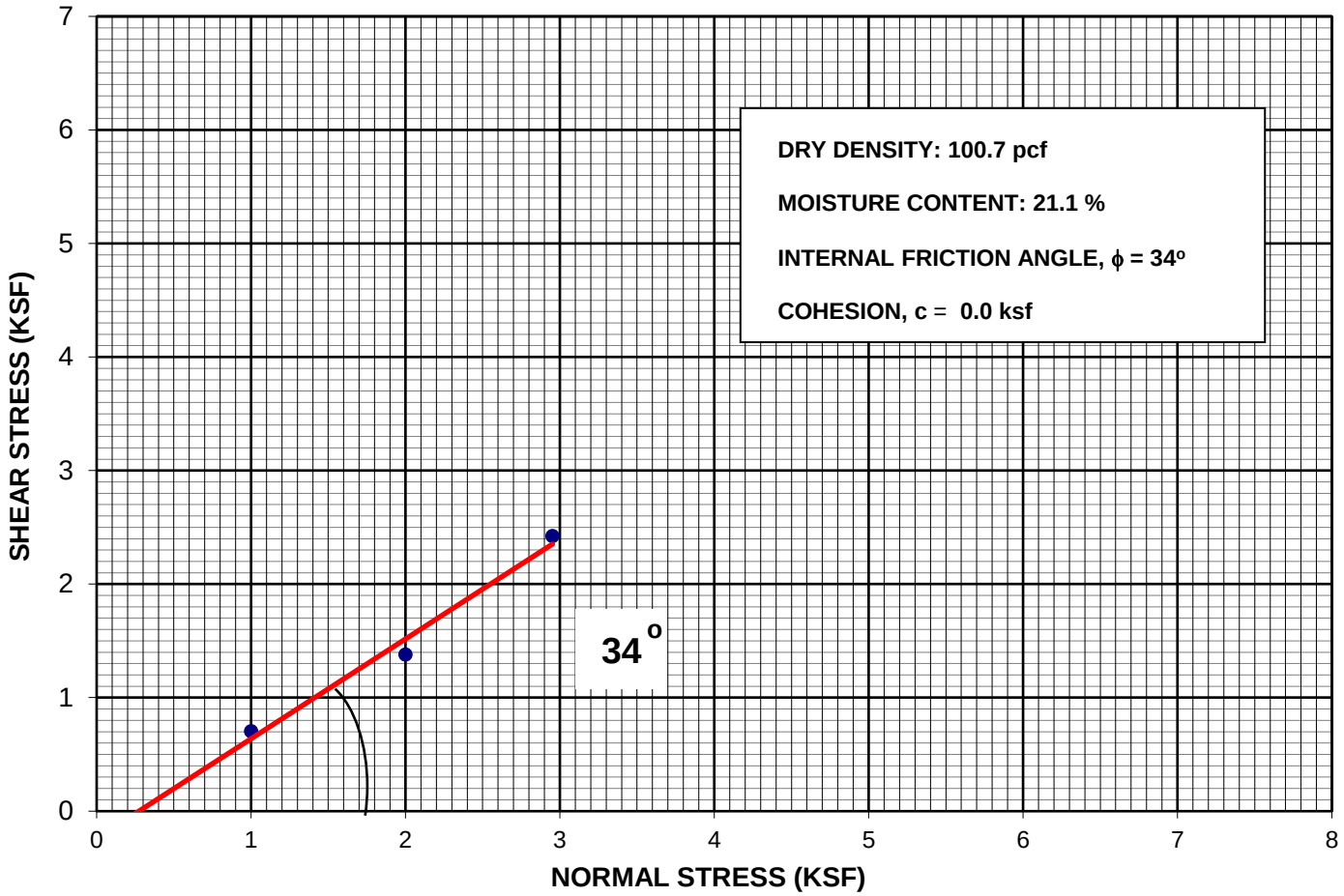
Direct Shear Test

ASTM D-3080

FIGURE B-5

Project Name:	Los Banos Basin	**Sampled By:**	T. Gorham	**Sample Date:**	11/1/23
		Tested By:	D. Messfin	**Test Date:**	11/13/23
Project Number:	G00001262	**Lab Tracking ID:**	N/A	**Report Date:**	11/27/23
Sample Location:	B-4 @ 16'	**Sample Description:**	Silty Sand - brown, moist, medium dense, fine to medium grained sand		

SHEAR STRENGTH DIAGRAM



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691 N Laverne, Ste 101
Fresno, CA 93727
Ph: (559) 497-2880

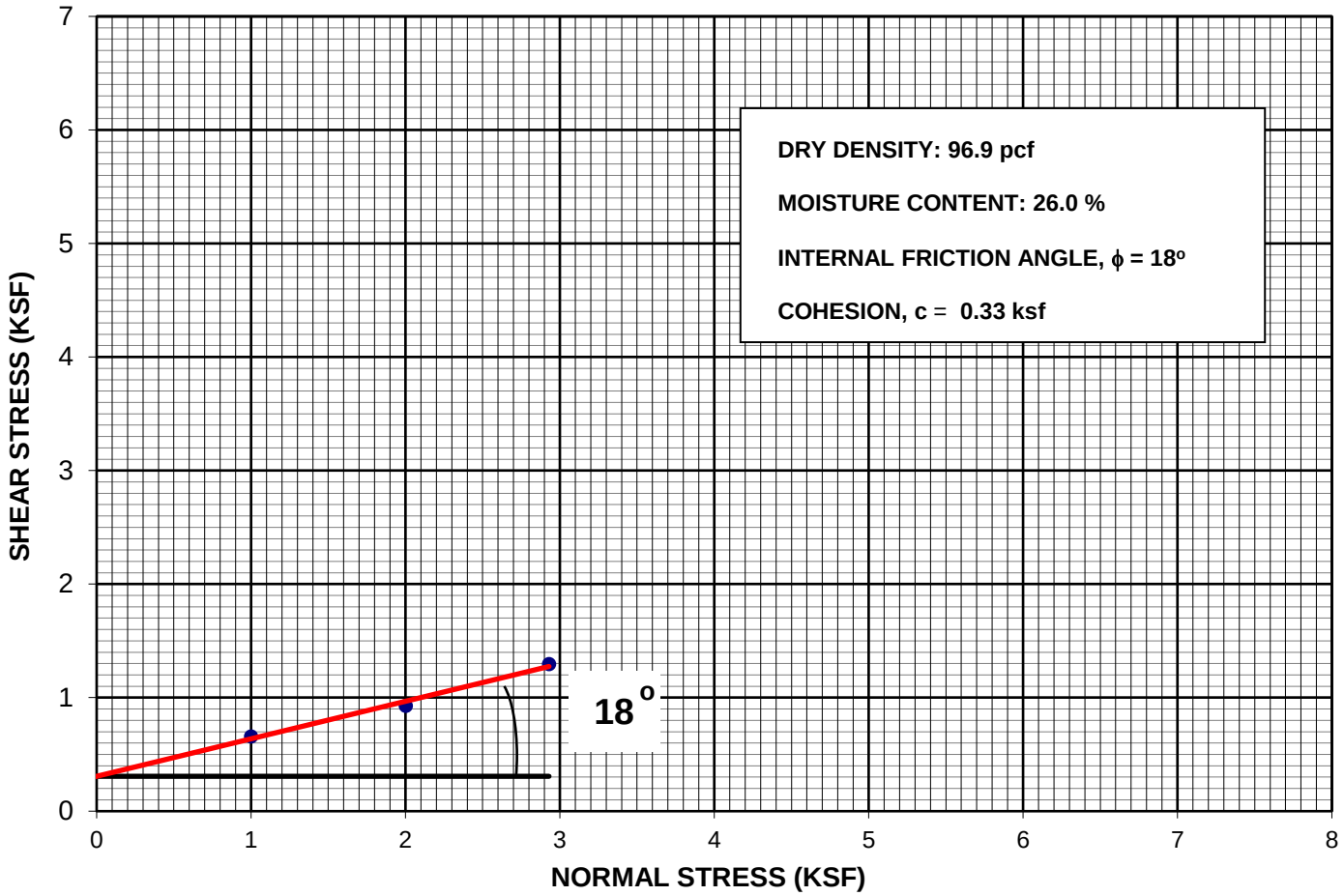
Direct Shear Test

ASTM D-3080

FIGURE B-6

Project Name:	Los Banos Basin	**Sampled By:**	T. Gorham	**Sample Date:**	11/1/23
		Tested By:	D. Messfin	**Test Date:**	11/13/23
Project Number:	G00001262	**Lab Tracking ID:**	N/A	**Report Date:**	11/27/23
Sample Location:	B-7 @ 6'	**Sample Description:**	Silty Clay - brown, moist, medium dense, fine to medium grained sand		

SHEAR STRENGTH DIAGRAM

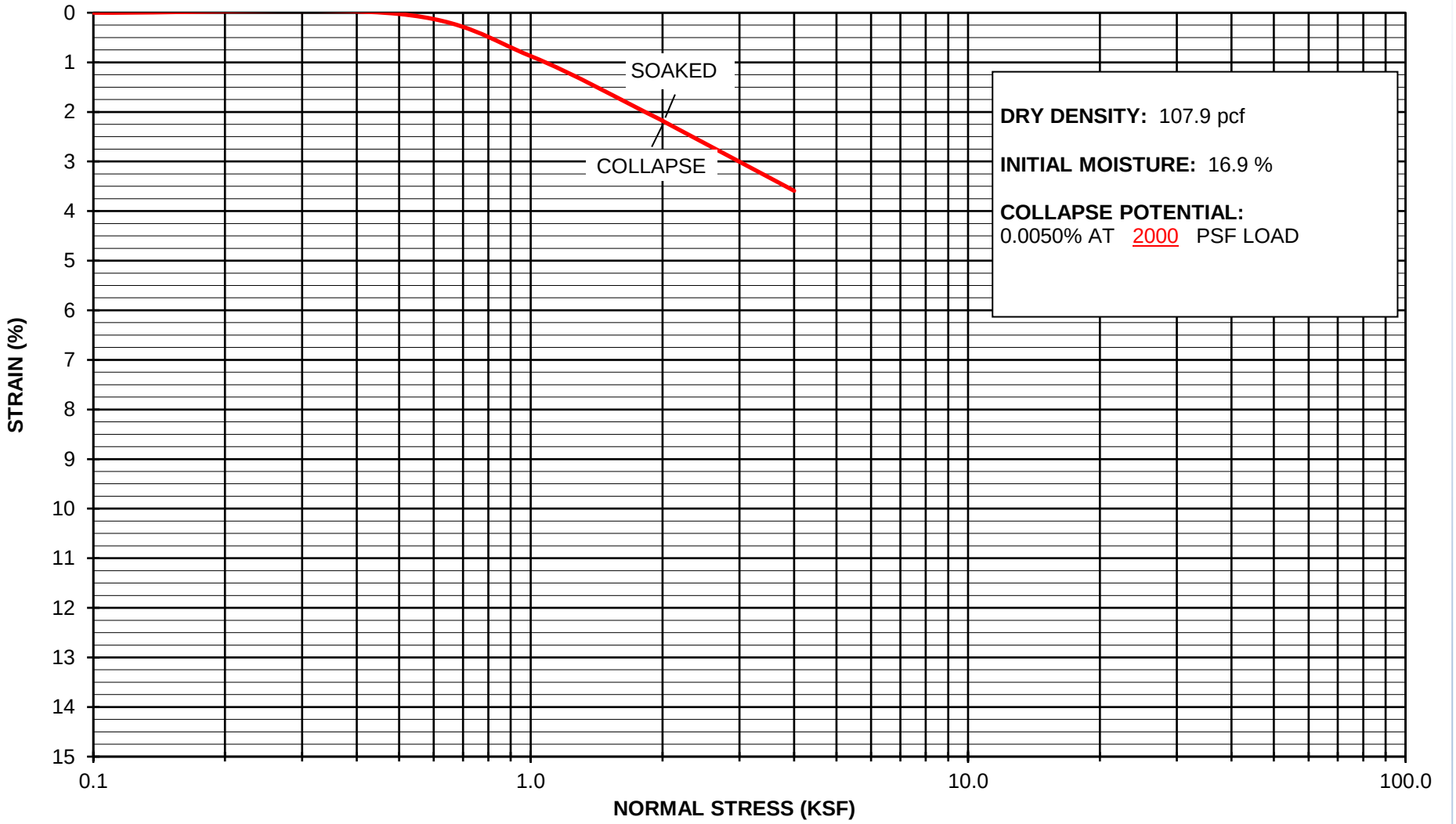


BSK ASSOCIATES
691 N. Laverne, Suite 101
Fresno, CA 93727
Ph: (559) 497-2880

COLLAPSE POTENTIAL
ASTM D-5333

FIGURE B-7

Project Name:	Los Banos Santa Fe Grade	**Sampled By:**	D.F	**Sample Date:**	11/1/23
		Tested By:	D.Messfin	**Test Date:**	11/13/23
Project Number:	G00001262	**Lab Tracking ID:**	N/A	**Report Date:**	11/17/23
Sample Location:	B-5 @ 11'	**Sample Description:**	Sandy Clay (CL) - brown, moist, fine to medium grained sand		



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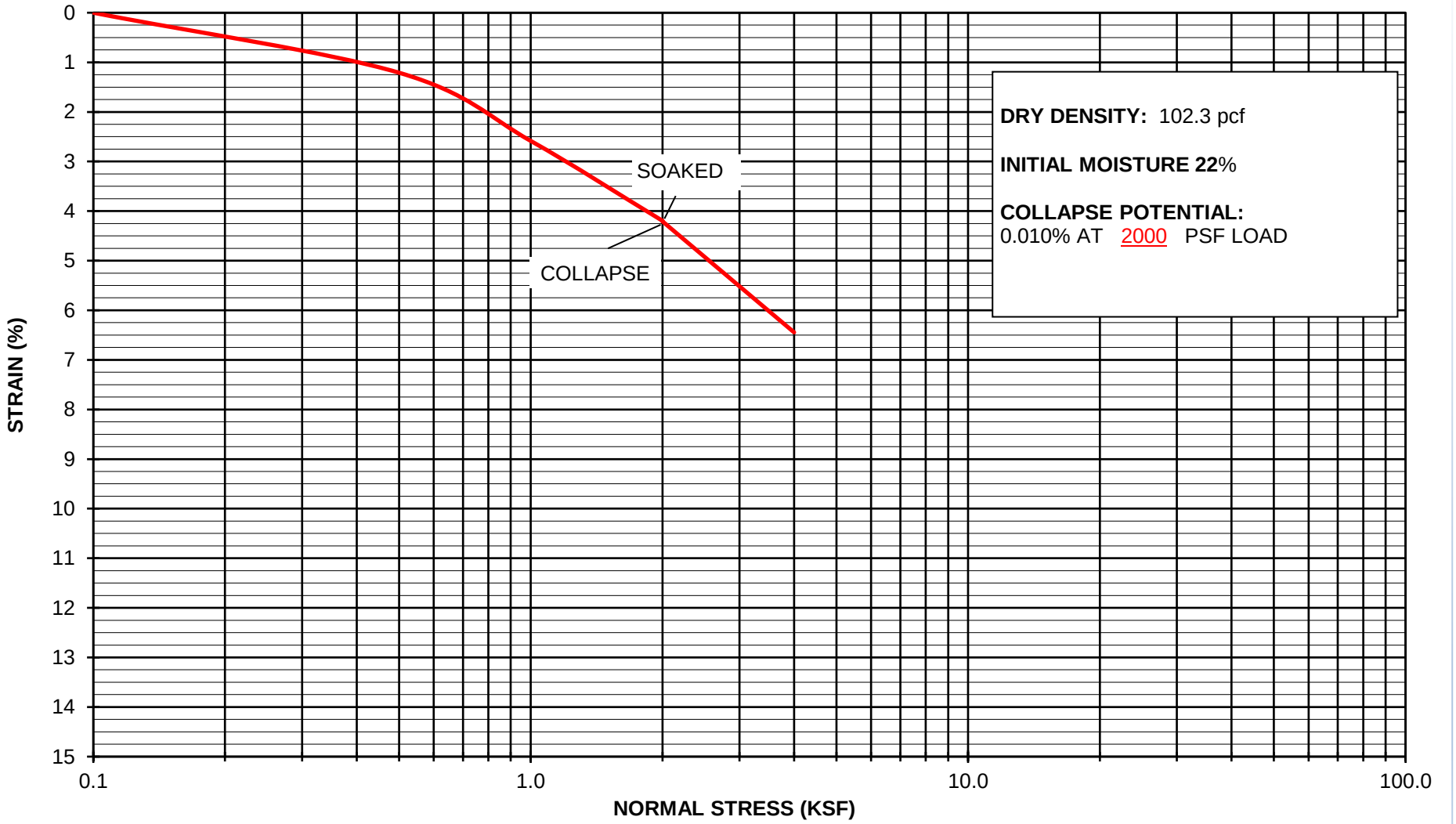
691 N. Laverne, Suite 101
Fresno, CA 93727
Ph: (559) 497-2880

FIGURE B-8

COLLAPSE POTENTIAL
ASTM D-5333

Project Name:	Los Banos Santa Fe Grade	**Sampled By:**	D.F	**Sample Date:**	11/3/23
		Tested By:	D.Messfin	**Test Date:**	11/13/23
Project Number:	G00001262	**Lab Tracking ID:**	N/A	**Report Date:**	11/17/23
Sample Location:	B-6 @ 11'	**Sample Description:**	Sandy Clay (CL) - yellow brown, moist, fine to medium grained sand, medium dense		



BSK ASSOCIATES
550 W. Locust Avenue
Fresno, CA 93650
Ph: (559) 497-2868
Fax: (559) 485-6140

Expansion Index of Soils

ASTM D 4829 / UBC Standard 18-2

FIGURE B-9

Project Name:	Los Banos Santa	**Report Date:**	11/22/23
Project Number:	G00001262	**Sample Date:**	11/1-3/23
Lab Tracking ID:	N/A	**Test Date:**	11/21/23
Sample Location:	B - 6 @ 0 - 5'		
Sample Source	Bulk		
Sampled By:	J. Leu	**Tested By:** D.Messfin	**Reviewed By:** N. Popenoe

TEST DATA

INITIAL SET-UP DATA			
Sample + Tare Weight (g)	752.1		
Tare Weight (g)	367.3	**FINAL TAKE-DOWN DATA**	
		Moisture Content Data	
Wet Weight + Tare	149.8	Wet Weight + Tare	437.6
Dry Weight + Tare	136.72	Dry Weight + Tare	360.1
Tare Weight (g)	20.64	Tare Weight (g)	16.3
Moisture Content (%)	11.3%	Moisture Content (%)	22.5%
Initial Volume (ft^3)	0.007272	Final Volume (ft^3)	0.007425
Remolded Wet Density (pcf)	116.7	Final Wet Density (pcf)	125.8
Remolded Dry Density (pcf)	104.8	Final Dry Density (pcf)	102.7
Degree of Saturation	**50**	**Degree of Saturation**	**95**

EXPANSION READINGS

Initial Gauge Reading (in)	0.3313
Final Gauge Reading (in)	0.35235
Expansion (in)	0.02105

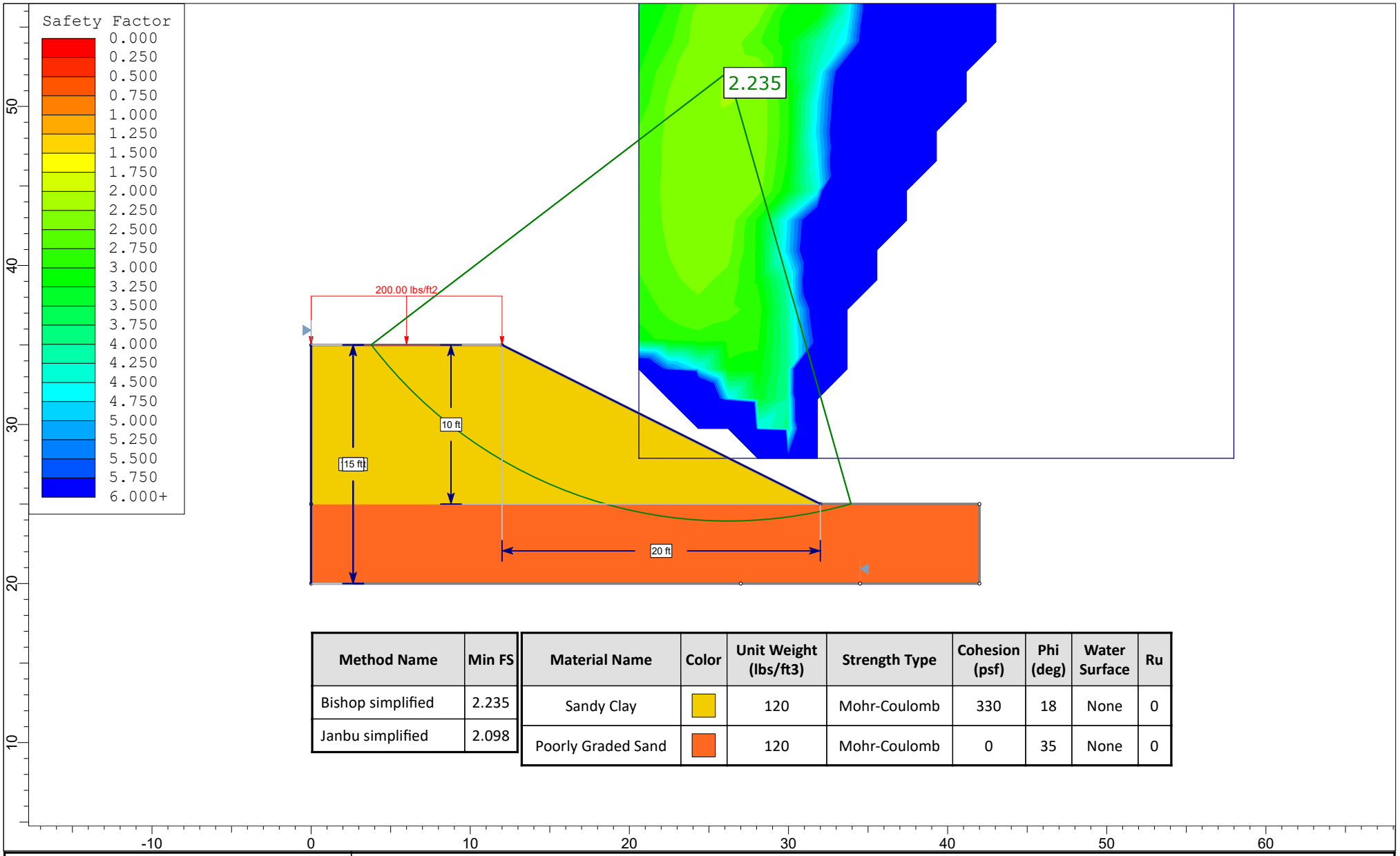
Uncorrected Expansion Index	**21**
Corrected Expansion Index, EI	**21**

Classification of Expansive Soil

EI	Potential Expansion
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

APPENDIX C

SLOPE STABILITY



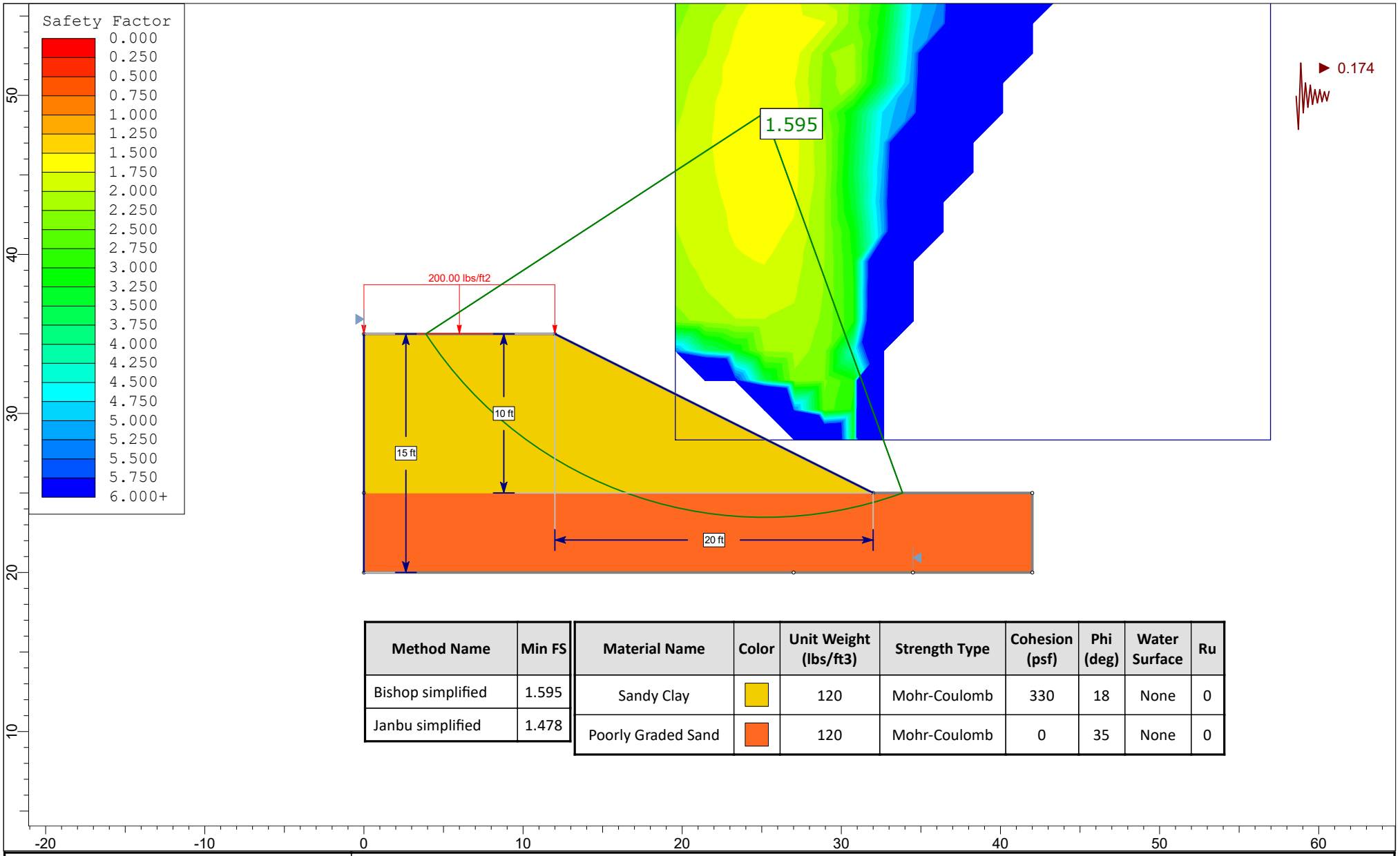
Method Name	Min FS
Bishop simplified	2.235
Janbu simplified	2.098

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
Sandy Clay		120	Mohr-Coulomb	330	18	None	0
Poorly Graded Sand		120	Mohr-Coulomb	0	35	None	0

rocscience

SLIDEINTERPRET 7.038

Project	Los Banos Basin		
Analysis Description	2:1 Static		
Drawn By	T. Gorham	Scale 1:100	Company BSK Associates
Date	11/28/23		File Name G00001262.slmd



Method Name	Min FS
Bishop simplified	1.595
Janbu simplified	1.478

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
Sandy Clay		120	Mohr-Coulomb	330	18	None	0
Poorly Graded Sand		120	Mohr-Coulomb	0	35	None	0

rocscience

SLIDEINTERPRET 7.038

Project	Los Banos Basin		
Analysis Description	2:1 Psuedo		
Drawn By	T. Gorham	Scale 1:100	Company BSK Associates
Date	11/28/23		File Name G00001262.slmd

APPENDIX D

WATER TESTING RESULTS

Case Narrative

Project and Report Details		Invoice Details	
Client:	BSK Associates - Fresno	**Invoice To:**	BSK Associates - Corporate
Report To:	Neva Popenoe	**Invoice Attn:**	BSK Associates-Corp
Project #:	G00001262	**Project PO#:**	-
Received:	11/01/2023 - 15:46		
Report Due:	11/20/2023		

Sample Receipt Conditions

Cooler: Default Cooler
Temperature on Receipt ºC: 1.0

Containers Intact
COC/Labels Agree
Received On Wet Ice
Sample(s) arrived at lab on same day sampled.
Packing Material - Other
Initial receipt at BSK-FAL

Data Qualifiers

The following qualifiers have been applied to one or more analytical results:

None applied

Report Distribution

Recipient(s)	Report Format	CC:
Neva Popenoe	FINAL.RPT	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Sample ID: AGK0204-01
Sampled By: Client
Sample Description: B8 @ 25'

Sample Date - Time: 11/01/2023 - 11:19
Matrix: Water
Sample Type: Grab

BSK Associates Laboratory Fresno

General Chemistry

Analyte	Method	Result	RL	Units	RL Mult	Batch	Prepared	Analyzed	Qual
Nitrate as N	EPA 300.0	**5.8**	1.2	mg/L	5	AGK0105	11/01/23 23:44	11/01/23	
Nitrate as NO3	EPA 300.0	**26**	5.0	mg/L	5	AGK0105	11/01/23 23:44	11/01/23	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Sample ID: AGK0204-01RE1
Sampled By: Client
Sample Description: B8 @ 25'

Sample Date - Time: 11/01/2023 - 11:19
Matrix: Water
Sample Type: Grab

BSK Associates Laboratory Fresno

General Chemistry

Analyte	Method	Result	RL	Units	RL Mult	Batch	Prepared	Analyzed	Qual
Hexavalent Chromium - Dissolved (1)	EPA 218.6	**19**	0.50	ug/L	10	AGK0984	11/15/23	11/15/23	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

BSK Associates Laboratory Fresno

General Chemistry Quality Control Report

Analyte	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Date Analyzed	Qual
EPA 218.6 - Quality Control											
Batch: AGK0921										Prepared: 11/14/2023	
Prep Method: Method Specific Preparation										Analyst: CTD	
Blank (AGK0921-BLK1)											
Hexavalent Chromium - Dissolved (1)	ND	0.050	ug/L							11/14/23	
Blank Spike (AGK0921-BS1)											
Hexavalent Chromium - Dissolved (1)	2.0	0.050	ug/L	2.0	ND	102	90-110			11/14/23	
Blank Spike Dup (AGK0921-BSD1)											
Hexavalent Chromium - Dissolved (1)	2.0	0.050	ug/L	2.0	ND	101	90-110	1	10	11/14/23	
Matrix Spike (AGK0921-MS1), Source: AGK1519-01											
Hexavalent Chromium - Dissolved (1)	2.0	0.050	ug/L	2.0	ND	99	90-110			11/14/23	
Matrix Spike Dup (AGK0921-MSD1), Source: AGK1519-01											
Hexavalent Chromium - Dissolved (1)	2.1	0.050	ug/L	2.0	ND	106	90-110	7	10	11/14/23	
EPA 218.6 - Quality Control											
Batch: AGK0984										Prepared: 11/15/2023	
Prep Method: Method Specific Preparation										Analyst: CTD	
Blank (AGK0984-BLK1)											
Hexavalent Chromium - Dissolved (1)	ND	0.050	ug/L							11/15/23	
Blank Spike (AGK0984-BS1)											
Hexavalent Chromium - Dissolved (1)	2.0	0.050	ug/L	2.0	ND	101	90-110			11/15/23	
Blank Spike Dup (AGK0984-BSD1)											
Hexavalent Chromium - Dissolved (1)	2.0	0.050	ug/L	2.0	ND	102	90-110	1	10	11/15/23	
Matrix Spike (AGK0984-MS1), Source: AGK0479-01RE1											
Hexavalent Chromium - Dissolved (1)	3.8	0.050	ug/L	2.0	1.9	95	90-110			11/15/23	
Matrix Spike Dup (AGK0984-MSD1), Source: AGK0479-01RE1											
Hexavalent Chromium - Dissolved (1)	3.9	0.050	ug/L	2.0	1.9	99	90-110	2	10	11/15/23	
EPA 300.0 - Quality Control											
Batch: AGK0105										Prepared: 11/1/2023	
Prep Method: Method Specific Preparation										Analyst: AAS	
Blank (AGK0105-BLK1)											
Nitrate as N	ND	0.23	mg/L							11/01/23	
Nitrate as NO3	ND	1.0	mg/L							11/01/23	
Blank Spike (AGK0105-BS1)											
Nitrate as N	23	0.23	mg/L	23	ND	100	90-110			11/01/23	
Nitrate as NO3	100	1.0	mg/L	100	ND	100	90-110			11/01/23	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

BSK Associates Laboratory Fresno

General Chemistry Quality Control Report

Analyte	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Date Analyzed	Qual
EPA 300.0 - Quality Control											
Batch: AGK0105										Prepared: 11/1/2023	
Prep Method: Method Specific Preparation										Analyst: AAS	
Matrix Spike (AGK0105-MS1), Source: AGK0104-04											
Nitrate as N	17	0.23	mg/L	11	5.6	105	80-120			11/01/23	
Nitrate as NO3	77	1.0	mg/L	50	25	105	80-120			11/01/23	
Matrix Spike Dup (AGK0105-MSD1), Source: AGK0104-04											
Nitrate as N	17	0.23	mg/L	11	5.6	104	80-120	1	20	11/01/23	
Nitrate as NO3	77	1.0	mg/L	50	25	104	80-120	1	20	11/01/23	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Notes:

- The Chain of Custody document and Sample Integrity Sheet are part of the analytical report.
- Any remaining sample(s) for testing will be disposed of according to BSK's sample retention policy unless other arrangements are made in advance.
- All positive results for EPA Methods 504.1 and 524.2 require the analysis of a Field Reagent Blank (FRB) to confirm that the results are not a contamination error from field sampling steps. If Field Reagent Blanks were not submitted with the samples, this method requirement has not been performed.
- Samples collected by BSK Analytical Laboratories were collected in accordance with the BSK Sampling and Collection Standard Operating Procedures.
- J-value is equivalent to DNQ (Detected, not quantified) which is a trace value. A trace value is an analyte detected between the MDL and the laboratory reporting limit. This result is of an unknown data quality and is only qualitative (estimated). Baseline noise, calibration curve extrapolation below the lowest calibrator, method blank detections, and integration artifacts can all produce apparent DNQ values, which contribute to the un-reliability of these values.
- (1) - Residual chlorine and pH analysis have a 15 minute holding time for both drinking and waste water samples as defined by the EPA and 40 CFR 136. Waste water and ground water (monitoring well) samples must be field filtered to meet the 15 minute holding time for dissolved metals.
- Field tests are outside the scope of laboratory accreditation and there is no certification available for field testing.
- Summations of analytes (i.e. Total Trihalomethanes) may appear to add individual amounts incorrectly, due to rounding of analyte values occurring before or after the total value is calculated, as well as rounding of the total value.
- RL Multiplier is the factor used to adjust the reporting limit (RL) due to variations in sample preparation procedures and dilutions required for matrix interferences.
- Due to the subjective nature of the Threshold Odor Method, all characterizations of the detected odor are the opinion of the panel of analysts. The characterizations can be found in Standard Methods 2170B Figure 2170:1.
- The MCLs provided in this report (if applicable) represent the primary MCLs for that analyte.
- (2) - Formerly known as Bis(2-Chloroisopropyl) ether.

Unless otherwise noted, TOC results by SM 5310C method do not include purgeable organic carbon, which is removed along with the inorganic carbon interference. The POC contribution to TOC is considered to be negligible.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Definitions

mg/L:	Milligrams/Liter (ppm)	MDL:	Method Detection Limit	MDA95:	Min. Detected Activity
mg/Kg:	Milligrams/Kilogram (ppm)	RL:	Reporting Limit: DL x Dilution	MPN:	Most Probable Number
µg/L:	Micrograms/Liter (ppb)	ND:	None Detected below MRL/MDL	CFU:	Colony Forming Unit
µg/Kg:	Micrograms/Kilogram (ppb)	pCi/L:	PicoCuries per Liter	Absent:	Less than 1 CFU/100mLs
%:	Percent	RL Mult:	RL Multiplier	Present:	1 or more CFU/100mLs
NR:	Non-Reportable	MCL:	Maximum Contaminant Limit	U:	The analyte was not detected at or above the reported sample quantitation limit.

Please see the individual Subcontract Lab's report for applicable certifications.

The following parameters are not available for certification through CA ELAP:

Odor Diisopropyl ether (DIPE) by EPA 524.2

The following parameters are calculated values and are outside the scope of our NELAP accreditation:

Total Nitrogen Aggressive Index Trivalent Chromium

BSK is not accredited under the NELAP program for the following additional parameters: **NA**

Certifications: **Please refer to our website for a copy of our Accredited Fields of Testing under each certification.**

Fresno

State of California - ELAP	1180	State of Hawaii	4021
Los Angeles CSD	9254479	NELAP certified	4021-022
State of Nevada	CA000792024-03	State of Oregon - NELAP	4021-022
EPA UCMR5	CA00079	State of Washington	C997-23

Sacramento

State of California - ELAP	1180-S1		

San Bernardino

State of California - ELAP	1180-S2	Los Angeles CSD	9254478
NELAP certified	4119-008	State of Oregon - NELAP	4119-008

Vancouver

NELAP certified	WA100008-016	State of Oregon - NELAP	WA100008-016
State of Washington	C824-23		

Sample Integrity

BSK Bottles: Yes No Page 1 of 1

COC Info

Was temperature within range? Chemistry ≤ 6°C Micro < 8°C	Yes No NA	Were correct containers and preservatives received for the tests requested?	Yes No NA
If samples were taken today, is there evidence that chilling has begun?	Yes No NA	Bubbles Present VOAs (524.2/TTHM/TCP)? TB Received? (Check Method Below)	Yes No NA Yes No NA
Did all bottles arrive unbroken and intact?	Yes No	Was a sufficient amount of sample received?	Yes No
Did all bottle labels agree with COC?	Yes No	Do samples have a hold time <72 hours?	Yes No
Was sodium thiosulfate added to CN sample(s) until chlorine was no longer present?	Yes NA	Was PM notified of discrepancies? PM: By/Time:	Yes No NA

Bottles Received

"—" means preservation/chlorine checks are either N/A or are performed in the lab

250ml(A) 500ml(B) 1Liter(C) 40mlVOA(V) 125ml(D)	Checks*	Passed?					
Bacti $Na_2S_2O_3$	—	—					
None (P) White Cap	—	—	1C 1B				
Cr6 (P) Lt. Green Label/Blue Cap NH4OH(NH4)2SO4 **DW**	Cl, pH > 8	P F					
Cr6 (P) Pink Label/Blue Cap NH4OH(NH4)2SO4 **WW**	pH 9.3-9.7	P F	1A				
Cr6 (P) Black Label/Blue Cap NH4OH(NH4)2SO4 **7199** ***24 HOUR HOLD TIME***	pH 9.0-9.5	P F					
HNO_3 (P) Red Cap or HCl (P) Purple Cap/Lt. Blue Label	—	—					
H_2SO_4 (P) or (AG) Yellow Cap/Label	pH < 2	P F					
NaOH (P) Green Cap	Cl, pH >10	P F					
NaOH + ZnAc (P)	pH > 9	P F					
Dissolved Oxygen 300ml (g)	—	—					
None (AG) 608/8081/8082, 625, 632/8321, 8151, 8270	—	—					
HCl (AG) Lt. Blue Label O&G, Diesel, **TCP**	—	—					
Ascorbic, EDTA, KH_2Ct (AG) Pink Label 525	—	—					
Na_2SO_3 250mL (AG) Neon Green Label 515	—	—					
$Na_2S_2O_3$ 1 Liter (Brown P) 549	—	—					
$Na_2S_2O_3$ (AG) Blue Label 548, THM, 524	—	—					
$Na_2S_2O_3$ (CG) Blue Label 504, 505, 547	—	—					
$Na_2S_2O_3$ + MCAA (CG) Orange Label 531	pH < 3	P F					
NH_4Cl (AG) Purple Label 552	—	—					
EDA (P) or (AG) Brown Label DBPs	—	—					
HCL (CG) 524.2,BTEX,Gas, MTBE, 8260/624	—	—					
Buffer pH 4 (CG)	—	—					
H_3PO_4 (CG) Salmon Label	—	—					
Trizma – EPA 537.1 Light Blue Label **FB**	---	---					
Ammonia Acetate - EPA 533 Purple Label **FB**	---	---					
Bottled Water	—	—					
Asbestos 1L (P) w/ Foil / LL Metals Bottle	—	—					
Clear Glass	—	—					
OTHER:	—	—					

JV 11/1/23

Split

	Container	Preservative	Lot #	Initials	Date/Time
S P					
S P					

Preservation Check
pH Lot # AGO89910
Cl Lot #

Comments

*Preservation check completed by lab performing analysis.

✓ **Indicates Blanks Received**

504 ___ 524.2 ___ TTHM ___ 537/533 ___ TCP___

✓ **MS/MSD Received Method:** _____

Labeled by: **Labels Checked by:**

Scanned: ___ Rush/Short HT Page: _____ Time:_____

77

BSK ASSOCIATES
687 N. Laverne Ave., Fresno, CA 93727
(559) 497-2888 CA ELAP No. 1180
www.bskassociates.com

Turnaround Time Request
- [x] Standard - 10 business days
- [ ] Rush (Surcharge may apply)
- Date needed:

AGK0204 BSKAs2880 11/01/2023 10

Temp: °C **Thermometer ID:** 1.0 ***Required Fields** 77

Company/Client Name*:	Report Attention*:	Invoice To*:	Phone*:	Fax:
BSK Associates - Fresno	Neva Popenoe Additional cc's:	BSK Associates - Corp PO#:	(559) 497-2880 E-mail*: npopenoe@bskassociates.com	

Address*:	City*:	State*:	Zip*:
691 N. Laverne Ave, Suite 101	Fresno	CA	93727

Project:	Project #:	Phase #	Task #:
Los Banos Santa Fe Grade Basin	G00001262		

Reporting Options: [ ] Trace (J-Flag) [ ] Swamp [ ] EDD Type: _____

Sampler Name (Printed/Signature)*:

Regulatory Carbon Copies: [ ] SWRCB (Drinking Water) [ ] Merced Co [ ] Fresno Co [ ] Madera Co [ ] Tulare Co [ ] Other: _____

Regulatory Compliance: [ ] EDT to California SWRCB (Drinking Water) System Number*: _____ [ ] Geotracker #: _____

Matrix Types: SW=Surface Water BW=Bottled Water GW=Ground Water WW=Waste Water STW=Storm Water DW=Drinking Water SO=Solid

#	Sample Description*	Sampled* Date	Sampled* Time	Matrix*	Comments / Station Code / WTRAX	Irrigation Water, Ag Suitability Dissolved	Dissolved: As, Se	Hex Chrom 218.6 Dissolved	SAR Pkg	Gypsum				
	B8@ 25'	11/1/23	1119	GW	Lab filter for dissolved metals	X	X	X	X	X				

Relinquished by: (Signature and Printed Name)	Company	Date	Time	Received by: (Signature and Printed Name)	Company
Jacob Lee		11/1/23	1546		
Relinquished by: (Signature and Printed Name)	Company	Date	Time	Received by: (Signature and Printed Name)	Company
Received for Lab by: (Signature and Printed Name)		Date	Time	Payment Received at Delivery: Date: Amount: PIA#: Check / Cash Init.	
Shirley Lee		11/1/23	1546		

Shipping Method: GLS UPS WALK-IN FED EX PMS Courier: _____ **Custody Seal:** Y / N

Cooling Method: Wet Blue None **Chilling Process Begun:** Y / N

Payment for services rendered as noted herein are due in full within 30 days from the date invoiced. If not so paid, account balances are deemed delinquent. Delinquent balances are subject to monthly service charges and interest specified in BSK's current Standard Terms and Conditions for Laboratory Services. The person signing for the Client/Company acknowledges that they are either the Client or an authorized agent to the Client, that the Client agrees to be responsible for payment for the services on this Chain of Custody, and agrees to BSK's terms and conditions for laboratory services unless contractually bound otherwise. BSK's current terms and conditions can be found at www.bskassociates.com/BSKLabTermsConditions.pdf

November 13, 2023

Lab No. : SP 2318471
Customer No. : 2022939

BSK Associates Engineers & Laboratories
687 N. Laverne Avenue
Fresno, CA 93727

Laboratory Report

Introduction: This report package contains a total of 6 pages divided into 3 sections:

Case Narrative	(2 pages)	: An overview of the work performed at FGL.
Sample Results	(1 page)	: Results for each sample submitted.
Quality Control	(3 pages)	: Supporting Quality Control (QC) results.

Case Narrative

This Case Narrative pertains to the following samples:

Sample Description	Date Sampled	Date Received	FGL Lab No.	Matrix
B8 @ 25	11/01/2023	11/03/2023	SP 2318471-001	W

Sampling and Receipt Information:

The Sample was received in acceptable condition and within temperature requirements, unless noted on the Condition Upon Receipt (CUR) form. The Sample was received, prepared and analyzed within the method specified holding times except those as listed in the table below. All samples arrived at 6 ° C. All samples were checked for pH if acid or base preservation is required (except for VOAs). For details of sample receipt information, please see the associated Chain of Custody and Condition Upon Receipt Form.

Samples Over Hold Time

Lab No	Analyte Method	Maximum Hold Time	Actual Hold Time
SP 2318471-001	Nitrate	48 hours	122.2 hours
SP 2318471-001	Nitrate Nitrogen	48 hours	122.2 hours
SP 2318471-001	pH	15 minutes	7,517.0 minutes
SP 2318471-001	Total Dissolved Solids (TFR)	7 days	8.0 days

Quality Control: All samples were prepared and analyzed according to established quality control criteria. Any exceptions are noted in the Quality Control Section of this report.

Test Summary	
EPA 200.7	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)
EPA 200.8	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)
EPA 300.0	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)
SM 2540 C	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)
SM 4500-H+B	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)

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Certification: I certify that this data package is in compliance with ELAP standards, both technically and for completeness, except for any conditions listed above and in the QC Section. Release of the data contained in this data package is authorized by the Laboratory Director or his designee, as verified by the following electronic signature. This report shall not be reproduced except in full, without the written approval of the laboratory.

KD: MKH

Approved By **Kelly A. Dunnahoo, B.S.** Digitally signed by Kelly A. Dunnahoo, B.S.
Title: Laboratory Director
Date: 2023-11-13

Page 2 of 6

November 13, 2023

BSK Associates Engineers & Laboratories
687 N. Laverne Avenue
Fresno, CA 93727

Description : B8 @ 25
Project : AGK0204

Lab No. : SP 2318471-001
Customer No. : 2022939

Sampled On : November 1, 2023 at 11:19
Sampled By : Client
Received On : November 3, 2023 at 11:00
Matrix : Water

Sample Results - Inorganic

Constituent	Result	RL	Units	Note	Dil.	DQF	Sample Preparation			Sample Analysis			
Irrigation Suit							Date	Time	Who	Method	Date	Time	Who
Total Hardness as CaCO3	774	2.5	mg/L		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:23	ac
Calcium	142	1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:23	ac
Magnesium	102	1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:23	ac
Potassium	10	1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:23	ac
Sodium	523	5*	mg/L		5		11/06/2023	09:00	ac	EPA 200.7	11/08/2023	12:25	ac
Total Cations	38.5	---	meq/L		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:23	ac
Boron	3.2	0.1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:23	ac
Copper	ND	10	ug/L		1	U	11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:23	ac
Iron	ND	30	ug/L		1	U	11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:23	ac
Manganese	20	10	ug/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:23	ac
Zinc	ND	20	ug/L		1	U	11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:23	ac
Gypsum Requirement	0.9	0.01	Tons/AF		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:23	ac
SAR	8.2	0.1	--		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:23	ac
Total Alkalinity	40	10	mg/L		1		11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:30	amm
Hydroxide	10	10	mg/L		1		11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:30	amm
Carbonate	10	10	mg/L		1		11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:30	amm
Bicarbonate	30	10	mg/L		1		11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:30	amm
Sulfate	941	6*	mg/L		10		11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	09:00	ldm
Chloride	570	12*	mg/L		10		11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	09:00	ldm
Nitrate	34.0	0.4	mg/L		1	T	11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	03:24	ldm
Nitrate Nitrogen	7.7	0.1	mg/L		1	T	11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	03:24	ldm
Fluoride	0.2	0.1	mg/L		1		11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	03:24	ldm
Total Anions	37.6	---	meq/L		1		11/06/2023	16:36	amm	Calc.	11/06/2023	20:30	amm
pH	8.84	---	units		1	T	11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:30	amm
E. C.	3610	1	umhos/cm		1		11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:30	amm
TDS by Summation	2370	0	mg/L		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:23	ac
Metals, Diss													
Arsenic	9	1	ug/L		1	h	11/09/2023	10:00	ac	EPA 200.8	11/10/2023	14:01	ac
Selenium	9	1	ug/L		1	h	11/09/2023	10:00	ac	EPA 200.8	11/09/2023	11:40	ac
Wet Chemistry													
Total Dissolved Solids (TFR)	2600	20	mg/L		1	T	11/09/2023	11:45	ctl	SM 2540 C	11/10/2023	11:00	ctl

DQF Flags Definition:
U Constituent results were non-detect.
T Exceeded method/regulatory-specific holding time.
h The MS/MSD did not meet QC criteria.

ND=Non-Detected, RL=Reporting Level * RL adjusted for dilution, Dil.=Dilution

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November 13, 2023
BSK Associates

Lab No. : SP 2318471
Customer No. : 2022939

Quality Control - Metals

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Metals								
Boron	200.7	11/06/2023:212572AC	MS	mg/L	4.000	91.9%	75-125	
		(SP 2318527-006)	MSD	mg/L	4.000	98.6%	75-125	
			MSRPD	mg/L		6.1%	≤20.0	
Calcium	200.7	11/06/2023:212572AC	MS	mg/L	12.00	46.9%	<¼	406
		(SP 2318527-006)	MSD	mg/L	12.00	69.8%	<1/4	
			MSRPD	mg/L		2.1%	≤20.0	
Copper	200.7	11/06/2023:212572AC	MS	ug/L	800.0	93.9%	75-125	
		(SP 2318527-006)	MSD	ug/L	800.0	101%	75-125	
			MSRPD	ug/L		7.6%	≤20.0	
Iron	200.7	11/06/2023:212572AC	MS	ug/L	4000	83.2%	75-125	
		(SP 2318527-006)	MSD	ug/L	4000	92.8%	75-125	
			MSRPD	ug/L		10.9%	≤20.0	
Magnesium	200.7	11/06/2023:212572AC	MS	mg/L	12.00	76.7%	75-125	
		(SP 2318527-006)	MSD	mg/L	12.00	87.7%	75-125	
			MSRPD	mg/L		2.7%	≤20.0	
Manganese	200.7	11/06/2023:212572AC	MS	ug/L	800.0	95.5%	75-125	
		(SP 2318527-006)	MSD	ug/L	800.0	103%	75-125	
			MSRPD	ug/L		5.9%	≤20.0	
Potassium	200.7	11/06/2023:212572AC	MS	mg/L	12.00	91.1%	75-125	
		(SP 2318527-006)	MSD	mg/L	12.00	99.2%	75-125	
			MSRPD	mg/L		5.6%	≤20.0	
Sodium	200.7	11/06/2023:212572AC	MS	mg/L	12.00	55.4%	<¼	406
		(SP 2318527-006)	MSD	mg/L	12.00	77.2%	75-125	
			MSRPD	mg/L		2.6%	≤20.0	
Zinc	200.7	11/06/2023:212572AC	MS	ug/L	800.0	87.9%	75-125	
		(SP 2318527-006)	MSD	ug/L	800.0	92.5%	75-125	
			MSRPD	ug/L		4.9%	≤20.0	
Arsenic	200.8	11/09/2023:212732AC	MS	ug/L	5.000	553%	75-125	435
		(CH 2379204-001)	MSD	ug/L	5.000	638%	75-125	435
			MSRPD	ug/L		14.2%	≤20	
Selenium	200.8	11/09/2023:212732AC	MS	ug/L	5.000	578%	75-125	435
		(CH 2379204-001)	MSD	ug/L	5.000	603%	75-125	435
			MSRPD	ug/L		4.2%	≤20	

Definition

DQO : Data Quality Objective - This is the criteria against which the quality control data is compared.

MS : Matrix Spikes - A random sample is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.

MSD : Matrix Spike Duplicate of MS/MSD pair - A random sample duplicate is spiked with a known amount of analyted. The recoveries are an indication of how that sample matrix affects analyte recovery.

MSRPD : MS/MSD Relative Percent Difference (RPD) - The MS relative percent difference is an indication of precision for the preparation and analysis.

ND : Non-detect - Result was below the DQO listed for the analyte.

Explanation

406 : Matrix Spike (MS) not within the Acceptance Range (AR) because of high analyte concentration in the sample. Data was accepted based on the LCS or CCV recovery.

435 : Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.

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November 13, 2023
BSK Associates

Lab No. : SP 2318471
Customer No. : 2022939

Quality Control - Wet Chem

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Wet Chem								
Alkalinity (as CaCO3)	2320B	11/06/2023:212619AMM	ND	mg/L		1.25%	10	435
Bicarbonate	2320B	(SP 2318491-001)	Dup	mg/L		1.25%	10	
E. C.	2320B	(SP 2318491-001)	Dup	umhos/cm		0.2%	5	
pH	2320B	(SP 2318491-001)	Dup	units		1.11%	4.80	
Solids, Total Dissolved	2540CE	11/09/2023:212748CTL	Blank	mg/L		ND	<20	
			LCS	mg/L	991.5	101%	90-110	
		(SP 2318698-001)	Dup	mg/L		0.2%	5	
		(SP 2318698-001)	Dup	mg/L		1.16%	5	
Chloride	300.0	11/06/2023:212615LDM	Blank	mg/L		ND	<1	
			LCS	mg/L	25.00	102%	90-110	
			MS	mg/L	50.00	102%	67-117	
		(CH 2379032-008)	MSD	mg/L	50.00	102%	67-117	
			MSRPD	mg/L		0.0%	≤7	
			MS	mg/L	50.00	103%	67-117	
		(STK2354964-004)	MSD	mg/L	50.00	103%	67-117	
			MSRPD	mg/L		0.2%	≤7	
Fluoride	300.0	11/06/2023:212615LDM	Blank	mg/L		ND	<0.1	
			LCS	mg/L	2.500	102%	90-110	
			MS	mg/L	5.000	99.6%	89-111	
		(CH 2379032-008)	MSD	mg/L	5.000	97.2%	89-111	
			MSRPD	mg/L		1.7%	≤9	
			MS	mg/L	5.000	103%	89-111	
		(STK2354964-004)	MSD	mg/L	5.000	101%	89-111	
			MSRPD	mg/L		1.7%	≤9	
Nitrate	300.0	11/06/2023:212615LDM	Blank	mg/L		ND	<0.4	
			LCS	mg/L	20.00	100%	90-110	
			MS	mg/L	40.00	103%	86-112	
		(CH 2379032-008)	MSD	mg/L	40.00	103%	86-112	
			MSRPD	mg/L		0.0%	≤7	
			MS	mg/L	40.00	103%	86-112	
		(STK2354964-004)	MSD	mg/L	40.00	103%	86-112	
			MSRPD	mg/L		0.0%	≤7	
Nitrate Nitrogen	300.0	11/06/2023:212615LDM	Blank	mg/L		ND	<0.4	
			LCS	mg/L	20.00	100%	90-110	
			MS	mg/L	40.00	103%	86-112	
		(CH 2379032-008)	MSD	mg/L	40.00	103%	86-112	
			MSRPD	mg/L		0.0%	≤7	
			MS	mg/L	40.00	103%	86-112	
		(STK2354964-004)	MSD	mg/L	40.00	103%	86-112	
			MSRPD	mg/L		0.0%	≤7	
Sulfate	300.0	11/06/2023:212615LDM	Blank	mg/L		ND	<0.5	
			LCS	mg/L	50.00	103%	90-110	
			MS	mg/L	100.0	102%	18-165	
		(CH 2379032-008)	MSD	mg/L	100.0	103%	18-165	
			MSRPD	mg/L		0.1%	≤7	
			MS	mg/L	100.0	104%	18-165	
		(STK2354964-004)	MSD	mg/L	100.0	104%	18-165	
			MSRPD	mg/L		0.3%	≤7	

Page 5 of 6

Definition

Blank	:	Method Blank - Prepared to verify that the preparation process is not contributing contamination to the samples.
Dup	:	Duplicate Sample - A random sample with each batch is prepared and analyzed in duplicate. The relative percent difference is an indication of precision for the preparation and analysis.
LCS	:	Laboratory Control Standard/Sample - Prepared to verify that the preparation process is not affecting analyte recovery.
MS	:	Matrix Spikes - A random sample is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.
MSD	:	Matrix Spike Duplicate of MS/MSD pair - A random sample duplicate is spiked with a known amount of analyted. The recoveries are an indication of how that sample matrix affects analyte recovery.
MSRPD	:	MS/MSD Relative Percent Difference (RPD) - The MS relative percent difference is an indication of precision for the preparation and analysis.
ND	:	Non-detect - Result was below the DQO listed for the analyte.

Explanation

435	:	Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.

Page 6 of 6

November 9, 2023

BSK Associates Engineers & Laboratories
687 N. Laverne Avenue
Fresno, CA 93727

Description : B8 @ 25
Project : AGK0204

Lab ID : SP 2318471-001
Customer : 2022939

Sampled On : November 1, 2023
Sampled By : Client
Received On : November 3, 2023
Matrix : Water

General Irrigation Suitability Analysis

Test Description	Result				Graphical Results Presentation				
Cations	mg/L	Meq/L	% Meq	Lbs/AF	Good	Possible Problem	Moderate Problem	Increasing Problem	Severe Problem
Calcium	142	7.1	18	390	**				
Magnesium	102	8.4	22	280	**				
Potassium	10	0.26	1	27	**				
Sodium	523	23	59	1400					
Anions									
Carbonate	10	0.33	1	27					
Bicarbonate	30	0.49	1	82	**				
Sulfate	941	20	53	2600	**				
Chloride	570	16	43	1600					
Nitrate	34.0	0.55	1	92					
Nitrate Nitrogen	7.7			21					
Fluoride	0.2	0.011	0	0.5					
Minor Elements									
Boron	3.2			8.7					
Copper	<0.01			0					
Iron	<0.03			0					
Manganese	0.020			0.054					
Zinc	<0.02			0					
TDS by Summation	2370			6400					
Other									
pH	8.84	units							
E. C.	3.61	dS/m							
SAR	8.20								
Crop Suitability									
No Amendments	Poor								
With Amendments	Poor								
Amendments									
Gypsum Requirement	0.9	Tons/AF			Or 0.507 Tons/AF if Sulfuric Acid amendment applied.				
Sulfuric Acid (98%)	2.80	oz/1000Gal			Or 6.8 oz/1000Gal of urea Sulfuric Acid(15/49)				
Leaching Requirement	35	%							

Good — Problem

Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.
** Used in various calculations; mg/L = Milligrams Per Liter (ppm) meq/L = Milliequivalents Per Liter.

November 9, 2023

BSK Associates Engineers & Laboratories

Description : B8 @ 25
Project : AGK0204

Lab ID : SP 2318471-001
Customer : 2022939

Sampled By : Client
Matrix : Water

Micro Irrigation System Plugging Hazard

Test Description	Result		Graphical Results Presentation
Chemical			Slight / Moderate / Severe
Manganese	0.02	mg/L	
Iron	<0.03	mg/L	
TDS by Summation	2370	mg/L	
No Amendments			
pH	8.84	units	
Alkalinity (As CaCO3)	40	mg/L	
Total Hardness	774	mg/L	
With Amendments			
Alkalinity (As CaCO3)	10	mg/L	
Total Hardness	8	mg/L	
pH	5.4 - 6.7	units	

Good — Problem

Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.

Water Amendments Application Notes:
The Amendments recommended on the previous pages include:

Gypsum:
This should be applied at least once a year to the irrigated soil surface area. Gypsum can also be applied in smaller quantities in the irrigation water.Apply the smaller (bracketed) amount of gypsum when also applying the recommended amount of Sulfuric Acid and the larger amount when applying only Gypsum.

Sulfuric Acid:
These products should be applied as needed to prevent emitter plugging in micro irrigation systems and/or as a soil amendment to adjust soil pH to improve nutrient availability and to facilitate leaching of salts. Please exercise caution when using this material as excesses may be harmful to the system and/or the plants being irrigated. The reported Acid requirement is intended to remove approximately 80 % of the alkalinity. The final pH should range from 5.4 to 6.7. We recommend a field pH determination to confirm that the pH you designate is being achieved. This application is based upon the use of a 98% Sulfuric Acid product. The application of Urea Sulfuric Acid is based upon the use of a product that contains 15% Urea (1.89 lbs Nitrogen), 49% Sulfuric Acid and has a specific gravity of 1.52 at 68 °F.
Please contact us if you have any questions.

BRW:EHB

Reviewed and Approved By **Ben Waddell**
Digitally signed by Ben Waddell
Title: Director of Ag. Services
Date: 2023-11-09

BSK ASSOCIATES

SUBCONTRACT ORDER

AGK0204

2314171

SENDING LABORATORY:

BSK Associates Laboratory Fresno
687 N. Laverne Avenue
Fresno, CA 93727
Phone: 559-497-2888
Fax: 559-485-6935
Project Manager: Elaine M. Phillips
E-mail: ephillips@bskassociates.com

RECEIVING LABORATORY:

FGL Environmental
P.O. Box 272 / 853 Corporation
Santa Paula, CA 93060
Phone :(805) 392-2000
Fax: (805) 525-4172
Turnaround (Days): 7
QC Deliverables: I Std III IV

Lab Filter for dissolved metals please!

Sample ID	Samp Desc		Sample Date
AGK0204-01	B8 @ 25'	Client Matrix: Water Sampled By: Client	11/01/2023 11:19

Lab Matrix: Water

Analysis:

Alkalinity as CaCO3
Arsenic, CA DW ICPMS Dissolved
Boron, CA DW ICP Dissolved
Calcium, CA DW ICP Dissolved
Copper, CA DW ICPMS Dissolved
EC, Conductivity
Fluoride, Wastewater
Iron, CA DW ICP Dissolved
Magnesium, CA DW ICP Dissolved
Percent Sodium
pH, Drinking and Wastewaters
Potassium, CA DW ICP Dissolved
Sodium Absorption Ratio
Sodium, CA DW ICP Dissolved
TDS, Total Dissolved Solids
Zinc, CA DW ICPMS Dissolved

} Irrigation Suitability*

Known

State Forms: **No** System Name: _____

*BSK analyzed Nitrate in house to meet H.T. will provide results for calculation.

Released By	Date	Received By	Date
[signature] 11.2.23			
[signature]	11/3/23 11:00	[signature]	11/3/23 11:00
Released By	Date	Received By	Date

Condition Upon Receipt (Attach to COC) SP 2318471

Sample Receipt at SP:

1. Number of ice chests/packages received: **1**
2. Shipper tracking numbers _____
3. Were samples received in a chilled condition?
   Temps: **6** /_____/_____/_____/_____/_____/_____/_____

4. Surface water (SWTR) bact samples: A sample that has a temperature upon receipt of >10C, whether iced or not, should be flagged unless the time since sample collection has been less than two hours.

5. Do the number of bottles received agree with the COC?	**Yes**	**No**	**N/A**
6. Verify sample date, time, sampler	**Yes**	**No**	**N/A**
7. Were the samples received intact? (i.e. no broken bottles, leaks, etc.)	**Yes**	**No**	
8. Were sample custody seals intact?	**Yes**	**No**	**N/A**

Sample Verification, Labeling and Distribution:

1. Were all requested analyses understood and acceptable?	**Yes**	**No**		
2. Did bottle labels correspond with the client's ID's?	**Yes**	**No**		
3. Were all bottles requiring sample preservation properly preserved? [Exception: Oil & Grease, VOA and CrVI verified in lab]	**Yes**	**No**	**N/A**	**FGL**
4. VOAs checked for Headspace?	**Yes**	**No**	**N/A**	
5. Were all analyses within holding times at time of receipt?	**Yes**	**No**		
6. Have rush or project due dates been checked and accepted?	**Yes**	**No**	**N/A**	

Include a copy of the COC for lab delivery. (Bacti. Inorganics and Radio)

Sample Receipt, Login and Verification completed by: Reviewed and Approved By **Inez Covarrubias** Digitally signed by Inez Covarrubias Title: Sample Receiving Date: 11/06/2023-09:31:12

Discrepency Documentation:

Any items above which are "No" or do not meet specifications (i.e. temps) must be resolved.

1. Person Contacted: _____ Phone Number: _____
   Initiated By: _____ Date: _____
   Problem:

   Resolution: **Client aware of NO3 hold time**

2. Person Contacted: _____ Phone Number: _____
   Initiated By: _____ Date: _____
   Problem:

   Resolution:

(2022939)
BSK Associates
SP 2318471
IV/CDA-11/06/2023-09:31:12

Case Narrative

Project and Report Details		Invoice Details	
Client:	BSK Associates - Fresno	**Invoice To:**	BSK Associates - Corporate
Report To:	Neva Popenoe	**Invoice Attn:**	BSK Associates-Corp
Project #:	G00001262	**Project PO#:**	-
Received:	11/02/2023 - 16:00		
Report Due:	11/20/2023		

Sample Receipt Conditions

Cooler: Default Cooler

Temperature on Receipt ºC: 0.9

Containers Intact
COC/Labels Agree
Preservation Confirmed
Received On Wet Ice
Sample(s) arrived at lab on same day sampled.
Packing Material - Other
Sample(s) were received in temperature range.
Initial receipt at BSK-FAL

Data Qualifiers

The following qualifiers have been applied to one or more analytical results:

None applied

Report Distribution

Recipient(s)	Report Format	CC:
Neva Popenoe	FINAL.RPT	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Sample ID: AGK0331-01RE1
Sampled By: Darren Ferrer
Sample Description: B-1 @ 20'

Sample Date - Time: 11/02/2023 - 09:00
Matrix: Ground Water
Sample Type: Grab

BSK Associates Laboratory Fresno

General Chemistry

Analyte	Method	Result	RL	Units	RL Mult	Batch	Prepared	Analyzed	Qual
Hexavalent Chromium - Dissolved (1)	EPA 218.6	**6.0**	0.050	ug/L	1	AGK0984	11/15/23	11/15/23	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Sample ID: AGK0331-02RE1
Sampled By: Darren Ferrer
Sample Description: B-3 @ 30'

Sample Date - Time: 11/02/2023 - 12:30
Matrix: Ground Water
Sample Type: Grab

BSK Associates Laboratory Fresno

General Chemistry

Analyte	Method	Result	RL	Units	RL Mult	Batch	Prepared	Analyzed	Qual
Hexavalent Chromium - Dissolved (1)	EPA 218.6	**44**	0.50	ug/L	10	AGK0984	11/15/23	11/15/23	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Sample ID: AGK0331-03RE1
Sampled By: Darren Ferrer
Sample Description: B-5 @ 20'

Sample Date - Time: 11/02/2023 - 11:00
Matrix: Ground Water
Sample Type: Grab

BSK Associates Laboratory Fresno

General Chemistry

Analyte	Method	Result	RL	Units	RL Mult	Batch	Prepared	Analyzed	Qual
Hexavalent Chromium - Dissolved (1)	EPA 218.6	**60**	0.50	ug/L	10	AGK0984	11/15/23	11/15/23	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

BSK Associates Laboratory Fresno

General Chemistry Quality Control Report

Analyte	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Date Analyzed	Qual
EPA 218.6 - Quality Control											
Batch: AGK0921										Prepared: 11/14/2023	
Prep Method: Method Specific Preparation										Analyst: CTD	
Blank (AGK0921-BLK1)											
Hexavalent Chromium - Dissolved (1)	ND	0.050	ug/L							11/14/23	
Blank Spike (AGK0921-BS1)											
Hexavalent Chromium - Dissolved (1)	2.0	0.050	ug/L	2.0	ND	102	90-110			11/14/23	
Blank Spike Dup (AGK0921-BSD1)											
Hexavalent Chromium - Dissolved (1)	2.0	0.050	ug/L	2.0	ND	101	90-110	1	10	11/14/23	
Matrix Spike (AGK0921-MS1), Source: AGK1519-01											
Hexavalent Chromium - Dissolved (1)	2.0	0.050	ug/L	2.0	ND	99	90-110			11/14/23	
Matrix Spike Dup (AGK0921-MSD1), Source: AGK1519-01											
Hexavalent Chromium - Dissolved (1)	2.1	0.050	ug/L	2.0	ND	106	90-110	7	10	11/14/23	
EPA 218.6 - Quality Control											
Batch: AGK0984										Prepared: 11/15/2023	
Prep Method: Method Specific Preparation										Analyst: CTD	
Blank (AGK0984-BLK1)											
Hexavalent Chromium - Dissolved (1)	ND	0.050	ug/L							11/15/23	
Blank Spike (AGK0984-BS1)											
Hexavalent Chromium - Dissolved (1)	2.0	0.050	ug/L	2.0	ND	101	90-110			11/15/23	
Blank Spike Dup (AGK0984-BSD1)											
Hexavalent Chromium - Dissolved (1)	2.0	0.050	ug/L	2.0	ND	102	90-110	1	10	11/15/23	
Matrix Spike (AGK0984-MS1), Source: AGK0479-01RE1											
Hexavalent Chromium - Dissolved (1)	3.8	0.050	ug/L	2.0	1.9	95	90-110			11/15/23	
Matrix Spike Dup (AGK0984-MSD1), Source: AGK0479-01RE1											
Hexavalent Chromium - Dissolved (1)	3.9	0.050	ug/L	2.0	1.9	99	90-110	2	10	11/15/23	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Notes:

- The Chain of Custody document and Sample Integrity Sheet are part of the analytical report.
- Any remaining sample(s) for testing will be disposed of according to BSK's sample retention policy unless other arrangements are made in advance.
- All positive results for EPA Methods 504.1 and 524.2 require the analysis of a Field Reagent Blank (FRB) to confirm that the results are not a contamination error from field sampling steps. If Field Reagent Blanks were not submitted with the samples, this method requirement has not been performed.
- Samples collected by BSK Analytical Laboratories were collected in accordance with the BSK Sampling and Collection Standard Operating Procedures.
- J-value is equivalent to DNQ (Detected, not quantified) which is a trace value. A trace value is an analyte detected between the MDL and the laboratory reporting limit. This result is of an unknown data quality and is only qualitative (estimated). Baseline noise, calibration curve extrapolation below the lowest calibrator, method blank detections, and integration artifacts can all produce apparent DNQ values, which contribute to the un-reliability of these values.
- (1) - Residual chlorine and pH analysis have a 15 minute holding time for both drinking and waste water samples as defined by the EPA and 40 CFR 136. Waste water and ground water (monitoring well) samples must be field filtered to meet the 15 minute holding time for dissolved metals.
- Field tests are outside the scope of laboratory accreditation and there is no certification available for field testing.
- Summations of analytes (i.e. Total Trihalomethanes) may appear to add individual amounts incorrectly, due to rounding of analyte values occurring before or after the total value is calculated, as well as rounding of the total value.
- RL Multiplier is the factor used to adjust the reporting limit (RL) due to variations in sample preparation procedures and dilutions required for matrix interferences.
- Due to the subjective nature of the Threshold Odor Method, all characterizations of the detected odor are the opinion of the panel of analysts. The characterizations can be found in Standard Methods 2170B Figure 2170:1.
- The MCLs provided in this report (if applicable) represent the primary MCLs for that analyte.
- (2) - Formerly known as Bis(2-Chloroisopropyl) ether.

Unless otherwise noted, TOC results by SM 5310C method do not include purgeable organic carbon, which is removed along with the inorganic carbon interference. The POC contribution to TOC is considered to be negligible.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Definitions

mg/L:	Milligrams/Liter (ppm)	MDL:	Method Detection Limit	MDA95:	Min. Detected Activity
mg/Kg:	Milligrams/Kilogram (ppm)	RL:	Reporting Limit: DL x Dilution	MPN:	Most Probable Number
µg/L:	Micrograms/Liter (ppb)	ND:	None Detected below MRL/MDL	CFU:	Colony Forming Unit
µg/Kg:	Micrograms/Kilogram (ppb)	pCi/L:	PicoCuries per Liter	Absent:	Less than 1 CFU/100mLs
%:	Percent	RL Mult:	RL Multiplier	Present:	1 or more CFU/100mLs
NR:	Non-Reportable	MCL:	Maximum Contaminant Limit	U:	The analyte was not detected at or above the reported sample quantitation limit.

Please see the individual Subcontract Lab's report for applicable certifications.

The following parameters are not available for certification through CA ELAP:

Odor Diisopropyl ether (DIPE) by EPA 524.2

The following parameters are calculated values and are outside the scope of our NELAP accreditation:

Total Nitrogen Aggressive Index Trivalent Chromium

BSK is not accredited under the NELAP program for the following additional parameters: **NA**

Certifications: **Please refer to our website for a copy of our Accredited Fields of Testing under each certification.**

Fresno

State of California - ELAP	1180	State of Hawaii	4021
Los Angeles CSD	9254479	NELAP certified	4021-022
State of Nevada	CA000792024-03	State of Oregon - NELAP	4021-022
EPA UCMR5	CA00079	State of Washington	C997-23

Sacramento

State of California - ELAP	1180-S1		

San Bernardino

State of California - ELAP	1180-S2	Los Angeles CSD	9254478
NELAP certified	4119-008	State of Oregon - NELAP	4119-008

Vancouver

NELAP certified	WA100008-016	State of Oregon - NELAP	WA100008-016
State of Washington	C824-23		

Sample Integrity

BSK Bottles: Yes No Page 1 of 1

COC Info

Was temperature within range? Chemistry ≤ 6°C Micro < 8°C	Yes No NA	Were correct containers and preservatives received for the tests requested?	Yes No NA
If samples were taken today, is there evidence that chilling has begun?	Yes No NA	Bubbles Present VOAs (524.2/TTHM/TCP)? TB Received? (Check Method Below)	Yes No NA Yes No NA
Did all bottles arrive unbroken and intact?	Yes No	Was a sufficient amount of sample received?	Yes No
Did all bottle labels agree with COC?	Yes No	Do samples have a hold time <72 hours?	Yes No
Was sodium thiosulfate added to CN sample(s) until chlorine was no longer present?	Yes NA	Was PM notified of discrepancies? PM: By/Time:	Yes No NA

Bottles Received

"—" means preservation/chlorine checks are either N/A or are performed in the lab

250ml(A) 500ml(B) 1Liter(C) 40mlVOA(V) 125ml(D)	Checks*	Passed?	1-3				
Bacti $Na_2S_2O_3$	—	—					
None (P) White Cap	—	—	1C, 1B				
Cr6 (P) Lt. Green Label/Blue Cap $NH_4OH(NH_4)_2SO_4$ **DW**	Cl, pH > 8	P F					
Cr6 (P) Pink Label/Blue Cap $NH_4OH(NH_4)_2SO_4$ **WW**	pH 9.3-9.7	P F	1A				
Cr6 (P) Black Label/Blue Cap $NH_4OH(NH_4)_2SO_4$ **7199** ***24 HOUR HOLD TIME***	pH 9.0-9.5	P F					
HNO_3 (P) Red Cap or HCl (P) Purple Cap/Lt. Blue Label	—	—					
H_2SO_4 (P) or (AG) Yellow Cap/Label	pH < 2	P F					
NaOH (P) Green Cap	Cl, pH >10	P F					
NaOH + ZnAc (P)	pH > 9	P F					
Dissolved Oxygen 300ml (g)	—	—					
None (AG) 608/8081/8082, 625, 632/8321, 8151, 8270	—	—					
HCl (AG) Lt. Blue Label O&G, Diesel, **TCP**	—	—					
Ascorbic, EDTA, KH_2Ct (AG) Pink Label 525	—	—					
Na_2SO_3 250mL (AG) Neon Green Label 515	—	—					
$Na_2S_2O_3$ 1 Liter (Brown P) 549	—	—					
$Na_2S_2O_3$ (AG) Blue Label 548, THM, 524	—	—					
$Na_2S_2O_3$ (CG) Blue Label 504, 505, 547	—	—					
$Na_2S_2O_3$ + MCAA (CG) Orange Label 531	pH < 3	P F					
NH_4Cl (AG) Purple Label 552	—	—					
EDA (P) or (AG) Brown Label DBPs	—	—					
HCL (CG) 524.2,BTEX,Gas, MTBE, 8260/624	—	—					
Buffer pH 4 (CG)	—	—					
H_3PO_4 (CG) Salmon Label	—	—					
Trizma – EPA 537.1 Light Blue Label **FB**	---	---					
Ammonia Acetate - EPA 533 Purple Label **FB**	---	---					
Bottled Water	—	—					
Asbestos 1L (P) w/ Foil / LL Metals Bottle	—	—					
Clear Glass	—	—					
OTHER:	—	—					

Split

	Container	Preservative	Lot #	Initials	Date/Time
S P					
S P					

Preservation Check
pH Lot # AG04915
Cl Lot # AG09231

Comments

*Preservation check completed by lab performing analysis.

✓ **Indicates Blanks Received**

504 ___ 524.2 ___ TTHM ___ 537/533 ___ TCP___

✓ **MS/MSD Received Method:** _____

Labeled by: **Labels Checked by:**

Scanned: SB Rush/Short HT Page: _____ Time: _____

BSK ASSOCIATES
687 N. Laverne Ave., Fresno, CA 93727
(559) 497-2888 CA ELAP No. 1180
www.bskassociates.com

Turnaround Time Request
☒ Standard - 10 business days
☐ Rush (Surcharge may apply)
Date needed:

Temp: 0.9 °C Thermometer ID: 77

*Required Fields

Company/Client Name*:	Report Attention*:	Invoice To*:	Phone*:	Fax:
BSK Associates - Fresno	Neva Popenoe Additional cc's:	BSK Associates - Corp PO#:	(559) 497-2880 E-mail*: npopenoe@bskassociates.com	

Address*:	City*:	State*:	Zip*:
691 N. Laverne Ave, Suite 101	Fresno	CA	93727

Project:	Project #:	Phase #	Task #:
Los Banos Santa Fe Grade Basin	G00001262		

Reporting Options: ☐ Trace (J-Flag) ☐ Swamp ☐ EDD Type: _____

Sampler Name (Printed/Signature)*: Darren Ferrer

Regulatory Carbon Copies: ☐ SWRCB (Drinking Water) ☐ Merced Co ☐ Fresno Co ☐ Madera Co ☐ Tulare Co ☐ Other: _____

Regulatory Compliance: ☐ EDT to California SWRCB (Drinking Water) System Number*: _____ ☐ Geotracker #: _____

Matrix Types: SW=Surface Water BW=Bottled Water GW=Ground Water WW=Waste Water STW=Storm Water DW=Drinking Water SO=Solid

#	Sample Description*	Sampled* Date	Sampled* Time	Matrix*	Comments / Station Code / WTRAX	Irrigation Water, Ag Suitability Dissolved	Dissolved: As, Se	Hex Chrom 218.6 Dissolved	Gypsum					
	B-1 @ 20'	11/2/23	9:00a	GW		X	X	X	X					
	B-3 @ 30'	11/2/23	12:30p	GW		X	X	X	X					
	B-5 @ 20'	11/2/23	11:00a	GW		X	X	X	X					

Relinquished by: (Signature and Printed Name)	Company	Date	Time	Received by: (Signature and Printed Name)	Company
Darren Ferrer	BSK	11/2/23	4:00p		
Relinquished by: (Signature and Printed Name)	Company	Date	Time	Received by: (Signature and Printed Name)	Company
Received for Lab by: (Signature and Printed Name)		Date	Time	Payment Received at Delivery: Check / Cash Date: Amount: PIA#: Init.	
		11/2/23	1650		

Shipping Method: GLS UPS WALK-IN FED EX PMS Courier: BSK

Cooling Method: Wet Blue None

Custody Seal: Y / N

Chilling Process Begun: Y / N

Payment for services rendered as noted herein are due in full within 30 days from the date invoiced. If not so paid, account balances are deemed delinquent. Delinquent balances are subject to monthly service charges and interest specified in BSK's current Standard Terms and Conditions for Laboratory Services. The person signing for the Client/Company acknowledges that they are either the Client or an authorized agent to the Client, that the Client agrees to be responsible for payment for the services on this Chain of Custody, and agrees to BSK's terms and conditions for laboratory services unless contractually bound otherwise. BSK's current terms and conditions can be found at www.bskassociates.com/BSKLabTermsConditions.pdf

November 13, 2023

Lab No. : SP 2318473
Customer No. : 2022939

BSK Associates Engineers & Laboratories
687 N. Laverne Avenue
Fresno, CA 93727

Laboratory Report

Introduction: This report package contains a total of 8 pages divided into 3 sections:

Case Narrative	(2 pages)	: An overview of the work performed at FGL.
Sample Results	(3 pages)	: Results for each sample submitted.
Quality Control	(3 pages)	: Supporting Quality Control (QC) results.

Case Narrative

This Case Narrative pertains to the following samples:

Sample Description	Date Sampled	Date Received	FGL Lab No.	Matrix
B-1 @ 20'	11/02/2023	11/03/2023	SP 2318473-001	GW
B-3 @ 30'	11/02/2023	11/03/2023	SP 2318473-002	GW
B-5 @ 20'	11/02/2023	11/03/2023	SP 2318473-003	GW

Sampling and Receipt Information:

All samples were received in acceptable condition and within temperature requirements, unless noted on the Condition Upon Receipt (CUR) form. All samples were received, prepared and analyzed within the method specified holding times except those as listed in the table below. All samples arrived at 6 ° C. All samples were checked for pH if acid or base preservation is required (except for VOAs). For details of sample receipt information, please see the associated Chain of Custody and Condition Upon Receipt Form.

Samples Over Hold Time

Lab No	Analyte Method	Maximum Hold Time	Actual Hold Time
SP 2318473-001	Nitrate	48 hours	100.5 hours
SP 2318473-001	Nitrate Nitrogen	48 hours	100.5 hours
SP 2318473-001	pH	15 minutes	6,216.0 minutes
SP 2318473-002	Nitrate	48 hours	97.0 hours
SP 2318473-002	Nitrate Nitrogen	48 hours	97.0 hours
SP 2318473-002	pH	15 minutes	6,006.0 minutes
SP 2318473-003	Nitrate	48 hours	98.5 hours
SP 2318473-003	Nitrate Nitrogen	48 hours	98.5 hours
SP 2318473-003	pH	15 minutes	6,096.0 minutes

Quality Control: All samples were prepared and analyzed according to established quality control criteria. Any exceptions are noted in the Quality Control Section of this report.

Test Summary

EPA 200.7	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)
EPA 200.8	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)
EPA 300.0	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)

Corporate Offices & Laboratory
853 Corporation Street
Santa Paula, CA 93060
TEL: (805)392-2000
Env FAX: (805)525-4172 / Ag FAX: (805)392-2063
CA ELAP Certification No. 1573

Office & Laboratory
2500 Stagecoach Road
Stockton, CA 95215
TEL: (209)942-0182
FAX: (209)942-0423
CA ELAP Certification No. 1563

Office & Laboratory
563 E. Lindo Avenue
Chico, CA 95926
TEL: (530)343-5818
FAX: (530)343-3807
CA ELAP Certification No. 2670

Office & Laboratory
3442 Empresa Drive, Suite D
San Luis Obispo, CA 93401
TEL: (805)783-2940
FAX: (805)783-2912
CA ELAP Certification No. 2775

Office & Laboratory
9415 W. Goshen Avenue
Visalia, CA 93291
TEL: (559)734-9473
FAX: (559)734-8435
CA ELAP Certification No. 2810

SM 2540 C	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)
SM 4500-H+B	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)

Certification: I certify that this data package is in compliance with ELAP standards, both technically and for completeness, except for any conditions listed above and in the QC Section. Release of the data contained in this data package is authorized by the Laboratory Director or his designee, as verified by the following electronic signature. This report shall not be reproduced except in full, without the written approval of the laboratory.

KD: MKH

Approved By **Kelly A. Dunnahoo, B.S.** Digitally signed by Kelly A. Dunnahoo, B.S.
Title: Laboratory Director
Date: 2023-11-13

Page 2 of 8

November 13, 2023

BSK Associates Engineers & Laboratories
687 N. Laverne Avenue
Fresno, CA 93727

Description : B-1 @ 20'
Project : AGK0331

Lab No. : SP 2318473-001
Customer No. : 2022939

Sampled On : November 2, 2023 at 09:00
Sampled By : Darren Ferrer
Received On : November 3, 2023 at 11:00
Matrix : Ground Water

Sample Results - Inorganic

Constituent	Result	RL	Units	Note	Dil.	DQF	Sample Preparation			Sample Analysis			
Irrigation Suit							Date	Time	Who	Method	Date	Time	Who
Total Hardness as CaCO3	352	2.5	mg/L		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:30	ac
Calcium	72	1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:30	ac
Magnesium	42	1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:30	ac
Potassium	3	1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:30	ac
Sodium	192	1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:30	ac
Total Cations	15.5	---	meq/L		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:30	ac
Boron	1.0	0.1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:30	ac
Copper	ND	10	ug/L		1	U	11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:30	ac
Iron	ND	30	ug/L		1	U	11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:30	ac
Manganese	ND	10	ug/L		1	U	11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:30	ac
Zinc	ND	20	ug/L		1	U	11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:30	ac
Gypsum Requirement	0.5	0.01	Tons/AF		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:30	ac
SAR	4.4	0.1	--		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:30	ac
Total Alkalinity	150	10	mg/L		1		11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	21:24	amm
Hydroxide	ND	10	mg/L		1	U	11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	21:24	amm
Carbonate	ND	10	mg/L		1	U	11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	21:24	amm
Bicarbonate	190	10	mg/L		1		11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	21:24	amm
Sulfate	346	2.5*	mg/L		5		11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	08:01	ldm
Chloride	220	5*	mg/L		5		11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	08:01	ldm
Nitrate	7.4	0.4	mg/L		1	T	11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	01:44	ldm
Nitrate Nitrogen	1.7	0.1	mg/L		1	T	11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	01:44	ldm
Fluoride	0.2	0.1	mg/L		1		11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	01:44	ldm
Total Anions	16.7	---	meq/L		1		11/06/2023	16:36	amm	Calc.	11/06/2023	21:24	amm
pH	8.3	---	units		1	T	11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	21:24	amm
E. C.	1680	1	umhos/cm		1		11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	21:24	amm
TDS by Summation	1070	0	mg/L		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:30	ac
Metals, Diss													
Arsenic	11	1	ug/L		1	h	11/09/2023	10:00	ac	EPA 200.8	11/10/2023	14:07	ac
Selenium	4	1	ug/L		1	h	11/09/2023	10:00	ac	EPA 200.8	11/09/2023	11:47	ac
Wet Chemistry													
Total Dissolved Solids (TFR)	1120	20	mg/L		1		11/09/2023	11:45	ctl	SM 2540 C	11/10/2023	11:00	ctl

DQF Flags Definition:
U Constituent results were non-detect.
T Exceeded method/regulatory-specific holding time.
h The MS/MSD did not meet QC criteria.

ND=Non-Detected, RL=Reporting Level * RL adjusted for dilution, Dil.=Dilution

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November 13, 2023

BSK Associates Engineers & Laboratories
687 N. Laverne Avenue
Fresno, CA 93727

Description : B-3 @ 30'
Project : AGK0331

Lab No. : SP 2318473-002
Customer No. : 2022939

Sampled On : November 2, 2023 at 12:30
Sampled By : Darren Ferrer
Received On : November 3, 2023 at 11:00
Matrix : Ground Water

Sample Results - Inorganic

Constituent	Result	RL	Units	Note	Dil.	DQF	Sample Preparation			Sample Analysis			
Irrigation Suit							Date	Time	Who	Method	Date	Time	Who
Total Hardness as CaCO3	1370	2.5	mg/L		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:37	ac
Calcium	236	1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:37	ac
Magnesium	190	1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:37	ac
Potassium	11	1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:37	ac
Sodium	1040	5*	mg/L		5		11/06/2023	09:00	ac	EPA 200.7	11/08/2023	12:32	ac
Total Cations	72.9	---	meq/L		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:37	ac
Boron	8.9	0.1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:37	ac
Copper	ND	10	ug/L		1	U	11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:37	ac
Iron	ND	30	ug/L		1	U	11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:37	ac
Manganese	40	10	ug/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:37	ac
Zinc	ND	20	ug/L		1	U	11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:37	ac
Gypsum Requirement	3.8	0.01	Tons/AF		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:37	ac
SAR	12.2	0.1	--		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:37	ac
Total Alkalinity	730	10	mg/L		1		11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:51	amm
Hydroxide	ND	10	mg/L		1	U	11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:51	amm
Carbonate	ND	10	mg/L		1	U	11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:51	amm
Bicarbonate	900	10	mg/L		1		11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:51	amm
Sulfate	1760	10.5*	mg/L		20		11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	08:20	ldm
Chloride	960	21*	mg/L		20		11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	08:20	ldm
Nitrate	31.0	0.4	mg/L		1	T	11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	02:44	ldm
Nitrate Nitrogen	7.0	0.1	mg/L		1	T	11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	02:44	ldm
Fluoride	0.2	0.1	mg/L		1		11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	02:44	ldm
Total Anions	79.0	---	meq/L		1		11/06/2023	16:36	amm	Calc.	11/06/2023	20:51	amm
pH	7.82	---	units		1	T	11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:51	amm
E. C.	6780	1	umhos/cm		1		11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:51	amm
TDS by Summation	5130	0	mg/L		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:37	ac
Metals, Diss													
Arsenic	13	1	ug/L		1	h	11/09/2023	10:00	ac	EPA 200.8	11/10/2023	14:14	ac
Selenium	22	1	ug/L		1	h	11/09/2023	10:00	ac	EPA 200.8	11/09/2023	11:54	ac
Wet Chemistry													
Total Dissolved Solids (TFR)	5370	20	mg/L		1		11/09/2023	11:45	ctl	SM 2540 C	11/10/2023	11:00	ctl

DQF Flags Definition:
U Constituent results were non-detect.
T Exceeded method/regulatory-specific holding time.
h The MS/MSD did not meet QC criteria.

ND=Non-Detected, RL=Reporting Level * RL adjusted for dilution, Dil.=Dilution

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November 13, 2023

BSK Associates Engineers & Laboratories
687 N. Laverne Avenue
Fresno, CA 93727

Description : B-5 @ 20'
Project : AGK0331

Lab No. : SP 2318473-003
Customer No. : 2022939

Sampled On : November 2, 2023 at 11:00
Sampled By : Darren Ferrer
Received On : November 3, 2023 at 11:00
Matrix : Ground Water

Sample Results - Inorganic

Constituent	Result	RL	Units	Note	Dil.	DQF	Sample Preparation			Sample Analysis			
Irrigation Suit							Date	Time	Who	Method	Date	Time	Who
Total Hardness as CaCO3	764	2.5	mg/L		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:44	ac
Calcium	123	1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:44	ac
Magnesium	111	1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:44	ac
Potassium	7	1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:44	ac
Sodium	797	5*	mg/L		5		11/06/2023	09:00	ac	EPA 200.7	11/08/2023	12:39	ac
Total Cations	50.1	---	meq/L		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:44	ac
Boron	5.0	0.1	mg/L		1		11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:44	ac
Copper	ND	10	ug/L		1	U	11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:44	ac
Iron	ND	30	ug/L		1	U	11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:44	ac
Manganese	ND	10	ug/L		1	U	11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:44	ac
Zinc	ND	20	ug/L		1	U	11/06/2023	09:00	ac	EPA 200.7	11/06/2023	13:44	ac
Gypsum Requirement	3.1	0.01	Tons/AF		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:44	ac
SAR	12.5	0.1	--		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:44	ac
Total Alkalinity	330	10	mg/L		1		11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:39	amm
Hydroxide	ND	10	mg/L		1	U	11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:39	amm
Carbonate	ND	10	mg/L		1	U	11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:39	amm
Bicarbonate	400	10	mg/L		1		11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:39	amm
Sulfate	926	6.5*	mg/L		10		11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	08:40	ldm
Chloride	600	13*	mg/L		10		11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	08:40	ldm
Nitrate	30.7	0.4	mg/L		1	T	11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	03:04	ldm
Nitrate Nitrogen	6.9	0.1	mg/L		1	T	11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	03:04	ldm
Fluoride	0.2	0.1	mg/L		1		11/06/2023	13:31	ldm	EPA 300.0	11/07/2023	03:04	ldm
Total Anions	43.3	---	meq/L		1		11/06/2023	16:36	amm	Calc.	11/06/2023	20:39	amm
pH	8.17	---	units		1	T	11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:39	amm
E. C.	4070	1	umhos/cm		1		11/06/2023	16:36	amm	SM 4500-H+B	11/06/2023	20:39	amm
TDS by Summation	2990	0	mg/L		1		11/06/2023	09:00	ac	Calc.	11/06/2023	13:44	ac
Metals, Diss													
Arsenic	16	1	ug/L		1	h	11/09/2023	10:00	ac	EPA 200.8	11/10/2023	14:21	ac
Selenium	13	1	ug/L		1	h	11/09/2023	10:00	ac	EPA 200.8	11/09/2023	12:00	ac
Wet Chemistry													
Total Dissolved Solids (TFR)	2870	20	mg/L		1		11/09/2023	11:45	ctl	SM 2540 C	11/10/2023	11:00	ctl

DQF Flags Definition:
U Constituent results were non-detect.
T Exceeded method/regulatory-specific holding time.
h The MS/MSD did not meet QC criteria.

ND=Non-Detected, RL=Reporting Level * RL adjusted for dilution, Dil.=Dilution

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November 13, 2023
BSK Associates

Lab No. : SP 2318473
Customer No. : 2022939

Quality Control - Metals

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Metals								
Boron	200.7	11/06/2023:212572AC	MS	mg/L	4.000	91.9%	75-125	
		(SP 2318527-006)	MSD	mg/L	4.000	98.6%	75-125	
			MSRPD	mg/L		6.1%	≤20.0	
Calcium	200.7	11/06/2023:212572AC	MS	mg/L	12.00	46.9%	<¼	406
		(SP 2318527-006)	MSD	mg/L	12.00	69.8%	<1/4	
			MSRPD	mg/L		2.1%	≤20.0	
Copper	200.7	11/06/2023:212572AC	MS	ug/L	800.0	93.9%	75-125	
		(SP 2318527-006)	MSD	ug/L	800.0	101%	75-125	
			MSRPD	ug/L		7.6%	≤20.0	
Iron	200.7	11/06/2023:212572AC	MS	ug/L	4000	83.2%	75-125	
		(SP 2318527-006)	MSD	ug/L	4000	92.8%	75-125	
			MSRPD	ug/L		10.9%	≤20.0	
Magnesium	200.7	11/06/2023:212572AC	MS	mg/L	12.00	76.7%	75-125	
		(SP 2318527-006)	MSD	mg/L	12.00	87.7%	75-125	
			MSRPD	mg/L		2.7%	≤20.0	
Manganese	200.7	11/06/2023:212572AC	MS	ug/L	800.0	95.5%	75-125	
		(SP 2318527-006)	MSD	ug/L	800.0	103%	75-125	
			MSRPD	ug/L		5.9%	≤20.0	
Potassium	200.7	11/06/2023:212572AC	MS	mg/L	12.00	91.1%	75-125	
		(SP 2318527-006)	MSD	mg/L	12.00	99.2%	75-125	
			MSRPD	mg/L		5.6%	≤20.0	
Sodium	200.7	11/06/2023:212572AC	MS	mg/L	12.00	55.4%	<¼	406
		(SP 2318527-006)	MSD	mg/L	12.00	77.2%	75-125	
			MSRPD	mg/L		2.6%	≤20.0	
Zinc	200.7	11/06/2023:212572AC	MS	ug/L	800.0	87.9%	75-125	
		(SP 2318527-006)	MSD	ug/L	800.0	92.5%	75-125	
			MSRPD	ug/L		4.9%	≤20.0	
Arsenic	200.8	11/09/2023:212732AC	MS	ug/L	5.000	553%	75-125	435
		(CH 2379204-001)	MSD	ug/L	5.000	638%	75-125	435
			MSRPD	ug/L		14.2%	≤20	
Selenium	200.8	11/09/2023:212732AC	MS	ug/L	5.000	578%	75-125	435
		(CH 2379204-001)	MSD	ug/L	5.000	603%	75-125	435
			MSRPD	ug/L		4.2%	≤20	

Definition

DQO : Data Quality Objective - This is the criteria against which the quality control data is compared.

MS : Matrix Spikes - A random sample is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.

MSD : Matrix Spike Duplicate of MS/MSD pair - A random sample duplicate is spiked with a known amount of analyted. The recoveries are an indication of how that sample matrix affects analyte recovery.

MSRPD : MS/MSD Relative Percent Difference (RPD) - The MS relative percent difference is an indication of precision for the preparation and analysis.

ND : Non-detect - Result was below the DQO listed for the analyte.

Explanation

406 : Matrix Spike (MS) not within the Acceptance Range (AR) because of high analyte concentration in the sample. Data was accepted based on the LCS or CCV recovery.

435 : Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.

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November 13, 2023
BSK Associates

Lab No. : SP 2318473
Customer No. : 2022939

Quality Control - Wet Chem

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Wet Chem								
Alkalinity (as CaCO3)	2320B	11/06/2023:212619AMM	ND	mg/L		1.25%	10	435
Bicarbonate	2320B	(SP 2318491-001)	Dup	mg/L		1.25%	10	
E. C.	2320B	(SP 2318491-001)	Dup	umhos/cm		0.2%	5	
pH	2320B	(SP 2318491-001)	Dup	units		1.11%	4.80	
Solids, Total Dissolved	2540CE	11/09/2023:212748CTL	Blank	mg/L		ND	<20	
			LCS	mg/L	991.5	101%	90-110	
		(SP 2318698-001)	Dup	mg/L		0.2%	5	
		(SP 2318698-001)	Dup	mg/L		1.16%	5	
Chloride	300.0	11/06/2023:212615LDM	Blank	mg/L		ND	<1	
			LCS	mg/L	25.00	102%	90-110	
			MS	mg/L	50.00	102%	67-117	
		(CH 2379032-008)	MSD	mg/L	50.00	102%	67-117	
			MSRPD	mg/L		0.0%	≤7	
			MS	mg/L	50.00	103%	67-117	
		(STK2354964-004)	MSD	mg/L	50.00	103%	67-117	
			MSRPD	mg/L		0.2%	≤7	
Fluoride	300.0	11/06/2023:212615LDM	Blank	mg/L		ND	<0.1	
			LCS	mg/L	2.500	102%	90-110	
			MS	mg/L	5.000	99.6%	89-111	
		(CH 2379032-008)	MSD	mg/L	5.000	97.2%	89-111	
			MSRPD	mg/L		1.7%	≤9	
			MS	mg/L	5.000	103%	89-111	
		(STK2354964-004)	MSD	mg/L	5.000	101%	89-111	
			MSRPD	mg/L		1.7%	≤9	
Nitrate	300.0	11/06/2023:212615LDM	Blank	mg/L		ND	<0.4	
			LCS	mg/L	20.00	100%	90-110	
			MS	mg/L	40.00	103%	86-112	
		(CH 2379032-008)	MSD	mg/L	40.00	103%	86-112	
			MSRPD	mg/L		0.0%	≤7	
			MS	mg/L	40.00	103%	86-112	
		(STK2354964-004)	MSD	mg/L	40.00	103%	86-112	
			MSRPD	mg/L		0.0%	≤7	
Nitrate Nitrogen	300.0	11/06/2023:212615LDM	Blank	mg/L		ND	<0.4	
			LCS	mg/L	20.00	100%	90-110	
			MS	mg/L	40.00	103%	86-112	
		(CH 2379032-008)	MSD	mg/L	40.00	103%	86-112	
			MSRPD	mg/L		0.0%	≤7	
			MS	mg/L	40.00	103%	86-112	
		(STK2354964-004)	MSD	mg/L	40.00	103%	86-112	
			MSRPD	mg/L		0.0%	≤7	
Sulfate	300.0	11/06/2023:212615LDM	Blank	mg/L		ND	<0.5	
			LCS	mg/L	50.00	103%	90-110	
			MS	mg/L	100.0	102%	18-165	
		(CH 2379032-008)	MSD	mg/L	100.0	103%	18-165	
			MSRPD	mg/L		0.1%	≤7	
			MS	mg/L	100.0	104%	18-165	
		(STK2354964-004)	MSD	mg/L	100.0	104%	18-165	
			MSRPD	mg/L		0.3%	≤7	

Page 7 of 8

Definition

Blank	:	Method Blank - Prepared to verify that the preparation process is not contributing contamination to the samples.
Dup	:	Duplicate Sample - A random sample with each batch is prepared and analyzed in duplicate. The relative percent difference is an indication of precision for the preparation and analysis.
LCS	:	Laboratory Control Standard/Sample - Prepared to verify that the preparation process is not affecting analyte recovery.
MS	:	Matrix Spikes - A random sample is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.
MSD	:	Matrix Spike Duplicate of MS/MSD pair - A random sample duplicate is spiked with a known amount of analyted. The recoveries are an indication of how that sample matrix affects analyte recovery.
MSRPD	:	MS/MSD Relative Percent Difference (RPD) - The MS relative percent difference is an indication of precision for the preparation and analysis.
ND	:	Non-detect - Result was below the DQO listed for the analyte.

Explanation

435	:	Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.

Page 8 of 8

November 9, 2023

BSK Associates Engineers & Laboratories
687 N. Laverne Avenue
Fresno, CA 93727

Description : B-1 @ 20'
Project : AGK0331

Lab ID : SP 2318473-001
Customer : 2022939

Sampled On : November 2, 2023
Sampled By : Darren Ferrer
Received On : November 3, 2023
Matrix : Ground Water

General Irrigation Suitability Analysis

Test Description	Result				Graphical Results Presentation				
Cations	mg/L	Meq/L	% Meq	Lbs/AF	Good	Possible Problem	Moderate Problem	Increasing Problem	Severe Problem
Calcium	72	3.6	23	200	**				
Magnesium	42	3.5	22	110	**				
Potassium	3	0.077	0	8	**				
Sodium	192	8.4	54	520					
Anions									
Carbonate	<10	0	0	0					
Bicarbonate	190	3.1	19	520	**				
Sulfate	346	7.2	43	940	**				
Chloride	220	6.2	37	600					
Nitrate	7.4	0.12	1	20					
Nitrate Nitrogen	1.7			5					
Fluoride	0.2	0.011	0	0.5					
Minor Elements									
Boron	1.0			2.7					
Copper	<0.01			0					
Iron	<0.03			0					
Manganese	<0.01			0					
Zinc	<0.02			0					
TDS by Summation	1070			2900					
Other									
pH	8.3	units							
E. C.	1.68	dS/m							
SAR	4.40								
Crop Suitability									
No Amendments	Poor								
With Amendments	Poor								
Amendments									
Gypsum Requirement	0.5	Tons/AF							
Sulfuric Acid (98%)	10.0	oz/1000Gal			Or 25 oz/1000Gal of urea Sulfuric Acid(15/49)				
Leaching Requirement	14	%							

Good — Problem

Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.
** Used in various calculations; mg/L = Milligrams Per Liter (ppm) meq/L = Milliequivalents Per Liter.

November 9, 2023

BSK Associates Engineers & Laboratories

Description : B-1 @ 20'
Project : AGK0331

Lab ID : SP 2318473-001
Customer : 2022939

Sampled By : Darren Ferrer
Matrix : Ground Water

Micro Irrigation System Plugging Hazard

Test Description	Result		Graphical Results Presentation
Chemical			Slight / Moderate / Severe
Manganese	<0.01	mg/L	
Iron	<0.03	mg/L	
TDS by Summation	1070	mg/L	
No Amendments			
pH	8.3	units	
Alkalinity (As CaCO3)	150	mg/L	
Total Hardness	352	mg/L	
With Amendments			
Alkalinity (As CaCO3)	30	mg/L	
Total Hardness	30	mg/L	
pH	5.4 - 6.7	units	



Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.

Water Amendments Application Notes:
The Amendments recommended on the previous pages include:

Gypsum:
This should be applied at least once a year to the irrigated soil surface area. Gypsum can also be applied in smaller quantities in the irrigation water.Apply the smaller (bracketed) amount of gypsum when also applying the recommended amount of Sulfuric Acid and the larger amount when applying only Gypsum.

Sulfuric Acid:
These products should be applied as needed to prevent emitter plugging in micro irrigation systems and/or as a soil amendment to adjust soil pH to improve nutrient availability and to facilitate leaching of salts. Please exercise caution when using this material as excesses may be harmful to the system and/or the plants being irrigated. The reported Acid requirement is intended to remove approximately 80 % of the alkalinity. The final pH should range from 5.4 to 6.7. We recommend a field pH determination to confirm that the pH you designate is being achieved. This application is based upon the use of a 98% Sulfuric Acid product. The application of Urea Sulfuric Acid is based upon the use of a product that contains 15% Urea (1.89 lbs Nitrogen), 49% Sulfuric Acid and has a specific gravity of 1.52 at 68 °F.
Please contact us if you have any questions.

BRW:EHB

Reviewed and Approved By **Ben Waddell**
Digitally signed by Ben Waddell
Title: Director of Ag. Services
Date: 2023-11-09

November 9, 2023

BSK Associates Engineers & Laboratories
687 N. Laverne Avenue
Fresno, CA 93727

Description : B-3 @ 30'
Project : AGK0331

Lab ID : SP 2318473-002
Customer : 2022939

Sampled On : November 2, 2023
Sampled By : Darren Ferrer
Received On : November 3, 2023
Matrix : Ground Water

General Irrigation Suitability Analysis

Test Description	Result				Graphical Results Presentation				
Cations	mg/L	Meq/L	% Meq	Lbs/AF	Good	Possible Problem	Moderate Problem	Increasing Problem	Severe Problem
Calcium	236	12	16	640	**				
Magnesium	190	16	21	520	**				
Potassium	11	0.28	0	30	**				
Sodium	1040	45	62	2800					
Anions									
Carbonate	<10	0	0	0					
Bicarbonate	900	15	19	2400	**				
Sulfate	1760	37	46	4800	**				
Chloride	960	27	34	2600					
Nitrate	31.0	0.5	1	84					
Nitrate Nitrogen	7.0			19					
Fluoride	0.2	0.011	0	0.5					
Minor Elements									
Boron	8.9			24					
Copper	<0.01			0					
Iron	<0.03			0					
Manganese	0.040			0.11					
Zinc	<0.02			0					
TDS by Summation	5130			14000					
Other									
pH	7.82	units							
E. C.	6.78	dS/m							
SAR	12.2								
Crop Suitability									
No Amendments	Poor								
With Amendments	Poor								
Amendments									
Gypsum Requirement	3.8	Tons/AF							
Sulfuric Acid (98%)	51.0	oz/1000Gal			Or 120 oz/1000Gal of urea Sulfuric Acid(15/49)				
Leaching Requirement	94	%							

Good  Problem

Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.
** Used in various calculations; mg/L = Milligrams Per Liter (ppm) meq/L = Milliequivalents Per Liter.

November 9, 2023

BSK Associates Engineers & Laboratories

Description : B-3 @ 30'
Project : AGK0331

Lab ID : SP 2318473-002
Customer : 2022939

Sampled By : Darren Ferrer
Matrix : Ground Water

Micro Irrigation System Plugging Hazard

Test Description	Result		Graphical Results Presentation
Chemical			Slight / Moderate / Severe
Manganese	0.04	mg/L	
Iron	<0.03	mg/L	
TDS by Summation	5130	mg/L	
No Amendments			
pH	7.82	units	
Alkalinity (As CaCO3)	730	mg/L	
Total Hardness	1370	mg/L	
With Amendments			
Alkalinity (As CaCO3)	150	mg/L	
Total Hardness	150	mg/L	
pH	5.4 - 6.7	units	



Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.

Water Amendments Application Notes:
The Amendments recommended on the previous pages include:

Gypsum:
This should be applied at least once a year to the irrigated soil surface area. Gypsum can also be applied in smaller quantities in the irrigation water.Apply the smaller (bracketed) amount of gypsum when also applying the recommended amount of Sulfuric Acid and the larger amount when applying only Gypsum.

Sulfuric Acid:
These products should be applied as needed to prevent emitter plugging in micro irrigation systems and/or as a soil amendment to adjust soil pH to improve nutrient availability and to facilitate leaching of salts. Please exercise caution when using this material as excesses may be harmful to the system and/or the plants being irrigated. The reported Acid requirement is intended to remove approximately 80 % of the alkalinity. The final pH should range from 5.4 to 6.7. We recommend a field pH determination to confirm that the pH you designate is being achieved. This application is based upon the use of a 98% Sulfuric Acid product. The application of Urea Sulfuric Acid is based upon the use of a product that contains 15% Urea (1.89 lbs Nitrogen), 49% Sulfuric Acid and has a specific gravity of 1.52 at 68 °F.
Please contact us if you have any questions.

BRW:EHB

Reviewed and Approved By **Ben Waddell**
Digitally signed by Ben Waddell
Title: Director of Ag. Services
Date: 2023-11-09

November 9, 2023

BSK Associates Engineers & Laboratories
687 N. Laverne Avenue
Fresno, CA 93727

Description : B-5 @ 20'
Project : AGK0331

Lab ID : SP 2318473-003
Customer : 2022939

Sampled On : November 2, 2023
Sampled By : Darren Ferrer
Received On : November 3, 2023
Matrix : Ground Water

General Irrigation Suitability Analysis

Test Description	Result				Graphical Results Presentation				
Cations	mg/L	Meq/L	% Meq	Lbs/AF	Good	Possible Problem	Moderate Problem	Increasing Problem	Severe Problem
Calcium	123	6.1	12	330	**				
Magnesium	111	9.1	18	300	**				
Potassium	7	0.18	0	19	**				
Sodium	797	35	69	2200					
Anions									
Carbonate	<10	0	0	0					
Bicarbonate	400	6.6	15	1100	**				
Sulfate	926	19	45	2500	**				
Chloride	600	17	39	1600					
Nitrate	30.7	0.5	1	83					
Nitrate Nitrogen	6.9			19					
Fluoride	0.2	0.011	0	0.5					
Minor Elements									
Boron	5.0			14					
Copper	<0.01			0					
Iron	<0.03			0					
Manganese	<0.01			0					
Zinc	<0.02			0					
TDS by Summation	2990			8100					
Other									
pH	8.17	units							
E. C.	4.07	dS/m							
SAR	12.5								
Crop Suitability									
No Amendments	Poor								
With Amendments	Poor								
Amendments									
Gypsum Requirement	3.1	Tons/AF							
Sulfuric Acid (98%)	23.0	oz/1000Gal			Or 56 oz/1000Gal of urea Sulfuric Acid(15/49)				
Leaching Requirement	41	%							

Good — Problem

Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.
** Used in various calculations; mg/L = Milligrams Per Liter (ppm) meq/L = Milliequivalents Per Liter.

November 9, 2023

BSK Associates Engineers & Laboratories

Description : B-5 @ 20'
Project : AGK0331

Lab ID : SP 2318473-003
Customer : 2022939

Sampled By : Darren Ferrer
Matrix : Ground Water

Micro Irrigation System Plugging Hazard

Test Description	Result		Graphical Results Presentation
Chemical			Slight / Moderate / Severe
Manganese	<0.01	mg/L	
Iron	<0.03	mg/L	
TDS by Summation	2990	mg/L	
No Amendments			
pH	8.17	units	
Alkalinity (As CaCO3)	330	mg/L	
Total Hardness	764	mg/L	
With Amendments			
Alkalinity (As CaCO3)	66	mg/L	
Total Hardness	66	mg/L	
pH	5.4 - 6.7	units	



Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.

Water Amendments Application Notes:
The Amendments recommended on the previous pages include:

Gypsum:
This should be applied at least once a year to the irrigated soil surface area. Gypsum can also be applied in smaller quantities in the irrigation water.Apply the smaller (bracketed) amount of gypsum when also applying the recommended amount of Sulfuric Acid and the larger amount when applying only Gypsum.

Sulfuric Acid:
These products should be applied as needed to prevent emitter plugging in micro irrigation systems and/or as a soil amendment to adjust soil pH to improve nutrient availability and to facilitate leaching of salts. Please exercise caution when using this material as excesses may be harmful to the system and/or the plants being irrigated. The reported Acid requirement is intended to remove approximately 80 % of the alkalinity. The final pH should range from 5.4 to 6.7. We recommend a field pH determination to confirm that the pH you designate is being achieved. This application is based upon the use of a 98% Sulfuric Acid product. The application of Urea Sulfuric Acid is based upon the use of a product that contains 15% Urea (1.89 lbs Nitrogen), 49% Sulfuric Acid and has a specific gravity of 1.52 at 68 °F.
Please contact us if you have any questions.

BRW:EHB

Reviewed and Approved By **Ben Waddell**
Digitally signed by Ben Waddell
Title: Director of Ag. Services
Date: 2023-11-09

BSK ASSOCIATES

SUBCONTRACT ORDER

AGK0331

11/4/23

Lab filter for Dissolved metals please!

SENDING LABORATORY:

BSK Associates Laboratory Fresno
687 N. Laverne Avenue
Fresno, CA 93727
Phone: 559-497-2888
Fax: 559-485-6935
Project Manager: Elaine M. Phillips
E-mail: ephillips@bskassociates.com

RECEIVING LABORATORY:

FGL Environmental
P.O. Box 272 / 853 Corporation
Santa Paula, CA 93060
Phone :(805) 392-2000
Fax: (805) 525-4172
Turnaround (Days): 7
QC Deliverables: I Std III IV

Sample ID	Samp Desc			Sample Date
AGK0331-01	B-1 @ 20'	Client Matrix:	Ground Water	11/02/2023 09:00
		Sampled By:	Darren Ferrer	

Lab Matrix: Water

Analysis:

Alkalinity as CaCO3
Arsenic, CA DW ICPMS Dissolved
Boron, CA DW ICP Dissolved
Calcium, CA DW ICP Dissolved
Chloride
Copper, CA DW ICPMS Dissolved
EC, Conductivity
Fluoride, Wastewater
Iron, CA DW ICP Dissolved
Magnesium, CA DW ICP Dissolved
Manganese, CA DW ICP Dissolved
Nitrate-N
Nitrate-NO3
Percent Sodium
pH, Drinking and Wastewaters
Potassium, CA DW ICP Dissolved
Selenium, CA DW ICPMS Dissolved
Sodium Absorption Ratio
Sodium, CA DW ICP Dissolved
Sulfate
TDS, Total Dissolved Solids
Zinc, CA DW ICPMS Dissolved

RUSH
*Irrigation Suitability

AGK0331-02	B-3 @ 30'	Client Matrix:	Ground Water	11/02/2023 12:30
		Sampled By:	Darren Ferrer	

Lab Matrix: Water

Analysis:

Alkalinity as CaCO3
Arsenic, CA DW ICPMS Dissolved
Boron, CA DW ICP Dissolved
Calcium, CA DW ICP Dissolved
Chloride
Copper, CA DW ICPMS Dissolved
EC, Conductivity
Fluoride, Wastewater
Iron, CA DW ICP Dissolved
Magnesium, CA DW ICP Dissolved
Manganese, CA DW ICP Dissolved
Nitrate-N

ASSOCIATES

SUBCONTRACT ORDER

AGK0331

Sample ID	Samp Desc			Sample Date
	Nitrate-NO3			
	Percent Sodium			
	pH, Drinking and Wastewaters			
	Potassium, CA DW ICP Dissolved			
	Selenium, CA DW ICPMS Dissolved			
	Sodium Absorption Ratio			
	Sodium, CA DW ICP Dissolved			
	Sulfate			
	TDS, Total Dissolved Solids			
	Zinc, CA DW ICPMS Dissolved			
AGK0331-03	**B-5 @ 20'**	**Client Matrix:**	Ground Water	**11/02/2023 11:00**
		Sampled By:	Darren Ferrer	

Lab Matrix: Water

Analysis:

Alkalinity as CaCO3
Arsenic, CA DW ICPMS Dissolved
Boron, CA DW ICP Dissolved
Calcium, CA DW ICP Dissolved
Chloride
Copper, CA DW ICPMS Dissolved
EC, Conductivity
Fluoride, Wastewater
Iron, CA DW ICP Dissolved
Magnesium, CA DW ICP Dissolved
Manganese, CA DW ICP Dissolved
Nitrate-N
Nitrate-NO3
Percent Sodium
pH, Drinking and Wastewaters
Potassium, CA DW ICP Dissolved
Selenium, CA DW ICPMS Dissolved
Sodium Absorption Ratio
Sodium, CA DW ICP Dissolved
Sulfate
TDS, Total Dissolved Solids
Zinc, CA DW ICPMS Dissolved

RUSH

State Forms: **No** System Name: _____

11.2.23

Released By	Date	Received By	Date
	11/3/23 1110		11/3/23 1110
Released By	Date	Received By	Date

Condition Upon Receipt (Attach to COC) SP 2318473

Sample Receipt at SP:

1. Number of ice chests/packages received: **1**
2. Shipper tracking numbers _____
3. Were samples received in a chilled condition?
   Temps: **6** /_____/_____/_____/_____/_____/_____

4. Surface water (SWTR) bact samples: A sample that has a temperature upon receipt of >10C, whether iced or not, should be flagged unless the time since sample collection has been less than two hours.

5. Do the number of bottles received agree with the COC?	**Yes**	**No**	**N/A**
6. Verify sample date, time, sampler	**Yes**	**No**	**N/A**
7. Were the samples received intact? (i.e. no broken bottles, leaks, etc.)	**Yes**	**No**	
8. Were sample custody seals intact?	**Yes**	**No**	**N/A**

Sample Verification, Labeling and Distribution:

1. Were all requested analyses understood and acceptable?	**Yes**	**No**		
2. Did bottle labels correspond with the client's ID's?	**Yes**	**No**		
3. Were all bottles requiring sample preservation properly preserved? [Exception: Oil & Grease, VOA and CrVI verified in lab]	**Yes**	**No**	**N/A**	**FGL**
4. VOAs checked for Headspace?	**Yes**	**No**	**N/A**	
5. Were all analyses within holding times at time of receipt?	**Yes**	**No**		
6. Have rush or project due dates been checked and accepted?	**Yes**	**No**	**N/A**	

Include a copy of the COC for lab delivery. (Bacti. Inorganics and Radio)

Sample Receipt, Login and Verification completed by: Reviewed and Approved By **Inez Covarrubias** Digitally signed by Inez Covarrubias Title: Sample Receiving Date: 11/06/2023-09:28:45

Discrepency Documentation:

Any items above which are "No" or do not meet specifications (i.e. temps) must be resolved.

1. Person Contacted: _____ Phone Number: _____
   Initiated By: _____ Date: _____
   Problem:

   Resolution:

2. Person Contacted: _____ Phone Number: _____
   Initiated By: _____ Date: _____
   Problem:

   Resolution:

(2022939)
BSK Associates
SP 2318473
IV/CDA-11/06/2023-09:28:45

Case Narrative

Project and Report Details		Invoice Details	
Client:	BSK Associates - Fresno	**Invoice To:**	BSK Associates - Corporate
Report To:	Neva Popenoe	**Invoice Attn:**	BSK Associates-Corp
Project #:	G00001262	**Project PO#:**	-
Received:	11/03/2023 - 17:26		
Report Due:	11/20/2023		

Sample Receipt Conditions

Cooler: Default Cooler

Temperature on Receipt ºC: 0.9

Containers Intact
COC/Labels Agree
Preservation Confirmed
Received On Wet Ice
Sample(s) arrived at lab on same day sampled.
Packing Material - Other
Sample(s) were received in temperature range.
Initial receipt at BSK-FAL

Data Qualifiers

The following qualifiers have been applied to one or more analytical results:

None applied

Report Distribution

Recipient(s)	Report Format	CC:
Neva Popenoe	FINAL.RPT	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Sample ID: AGK0479-01
Sampled By: Jacob Leu
Sample Description: B-6 @ 25'

Sample Date - Time: 11/03/2023 - 11:00
Matrix: Ground Water
Sample Type: Grab

BSK Associates Laboratory Fresno

General Chemistry

Analyte	Method	Result	RL	Units	RL Mult	Batch	Prepared	Analyzed	Qual
Nitrate as N	EPA 300.0	**9.3**	1.2	mg/L	5	AGK0210	11/03/23 20:59	11/03/23	
Nitrate as NO3	EPA 300.0	**41**	5.0	mg/L	5	AGK0210	11/03/23 20:59	11/03/23	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Sample ID: AGK0479-01RE1
Sampled By: Jacob Leu
Sample Description: B-6 @ 25'

Sample Date - Time: 11/03/2023 - 11:00
Matrix: Ground Water
Sample Type: Grab

BSK Associates Laboratory Fresno

General Chemistry

Analyte	Method	Result	RL	Units	RL Mult	Batch	Prepared	Analyzed	Qual
Hexavalent Chromium - Dissolved (1)	EPA 218.6	**1.9**	0.050	ug/L	1	AGK0984	11/15/23	11/15/23	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Sample ID: AGK0479-02
Sampled By: Jacob Leu
Sample Description: B-7 @ 25'

Sample Date - Time: 11/03/2023 - 08:36
Matrix: Ground Water
Sample Type: Grab

BSK Associates Laboratory Fresno

General Chemistry

Analyte	Method	Result	RL	Units	RL Mult	Batch	Prepared	Analyzed	Qual
Hexavalent Chromium - Dissolved (1)	EPA 218.6	**0.61**	0.050	ug/L	1	AGK0921	11/14/23	11/14/23	
Nitrate as N	EPA 300.0	**6.2**	1.2	mg/L	5	AGK0210	11/03/23 20:43	11/03/23	
Nitrate as NO3	EPA 300.0	**28**	5.0	mg/L	5	AGK0210	11/03/23 20:43	11/03/23	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

BSK Associates Laboratory Fresno

General Chemistry Quality Control Report

Analyte	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Date Analyzed	Qual
EPA 218.6 - Quality Control											
Batch: AGK0921										Prepared: 11/14/2023	
Prep Method: Method Specific Preparation										Analyst: CTD	
Blank (AGK0921-BLK1)											
Hexavalent Chromium - Dissolved (1)	ND	0.050	ug/L							11/14/23	
Blank Spike (AGK0921-BS1)											
Hexavalent Chromium - Dissolved (1)	2.0	0.050	ug/L	2.0	ND	102	90-110			11/14/23	
Blank Spike Dup (AGK0921-BSD1)											
Hexavalent Chromium - Dissolved (1)	2.0	0.050	ug/L	2.0	ND	101	90-110	1	10	11/14/23	
Matrix Spike (AGK0921-MS1), Source: AGK1519-01											
Hexavalent Chromium - Dissolved (1)	2.0	0.050	ug/L	2.0	ND	99	90-110			11/14/23	
Matrix Spike Dup (AGK0921-MSD1), Source: AGK1519-01											
Hexavalent Chromium - Dissolved (1)	2.1	0.050	ug/L	2.0	ND	106	90-110	7	10	11/14/23	
EPA 218.6 - Quality Control											
Batch: AGK0984										Prepared: 11/15/2023	
Prep Method: Method Specific Preparation										Analyst: CTD	
Blank (AGK0984-BLK1)											
Hexavalent Chromium - Dissolved (1)	ND	0.050	ug/L							11/15/23	
Blank Spike (AGK0984-BS1)											
Hexavalent Chromium - Dissolved (1)	2.0	0.050	ug/L	2.0	ND	101	90-110			11/15/23	
Blank Spike Dup (AGK0984-BSD1)											
Hexavalent Chromium - Dissolved (1)	2.0	0.050	ug/L	2.0	ND	102	90-110	1	10	11/15/23	
Matrix Spike (AGK0984-MS1), Source: AGK0479-01RE1											
Hexavalent Chromium - Dissolved (1)	3.8	0.050	ug/L	2.0	1.9	95	90-110			11/15/23	
Matrix Spike Dup (AGK0984-MSD1), Source: AGK0479-01RE1											
Hexavalent Chromium - Dissolved (1)	3.9	0.050	ug/L	2.0	1.9	99	90-110	2	10	11/15/23	
EPA 300.0 - Quality Control											
Batch: AGK0210										Prepared: 11/3/2023	
Prep Method: Method Specific Preparation										Analyst: IDM	
Blank (AGK0210-BLK1)											
Nitrate as N	ND	0.23	mg/L							11/03/23	
Nitrate as NO3	ND	1.0	mg/L							11/03/23	
Blank Spike (AGK0210-BS1)											
Nitrate as N	22	0.23	mg/L	23	ND	100	90-110			11/03/23	
Nitrate as NO3	100	1.0	mg/L	100	ND	100	90-110			11/03/23	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

BSK Associates Laboratory Fresno

General Chemistry Quality Control Report

Analyte	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Date Analyzed	Qual
EPA 300.0 - Quality Control											
Batch: AGK0210										Prepared: 11/3/2023	
Prep Method: Method Specific Preparation										Analyst: AAS	
Matrix Spike (AGK0210-MS1), Source: AGK0369-01											
Nitrate as N	11	0.23	mg/L	11	ND	100	80-120			11/03/23	
Nitrate as NO3	51	1.0	mg/L	50	ND	100	80-120			11/03/23	
Matrix Spike (AGK0210-MS2), Source: AGK0436-02											
Nitrate as N	18	0.23	mg/L	11	6.1	105	80-120			11/03/23	
Nitrate as NO3	80	1.0	mg/L	50	27	105	80-120			11/03/23	
Matrix Spike Dup (AGK0210-MSD1), Source: AGK0369-01											
Nitrate as N	12	0.23	mg/L	11	ND	101	80-120	1	20	11/03/23	
Nitrate as NO3	51	1.0	mg/L	50	ND	101	80-120	1	20	11/03/23	
Matrix Spike Dup (AGK0210-MSD2), Source: AGK0436-02											
Nitrate as N	18	0.23	mg/L	11	6.1	105	80-120	0	20	11/03/23	
Nitrate as NO3	80	1.0	mg/L	50	27	105	80-120	0	20	11/03/23	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Notes:

- The Chain of Custody document and Sample Integrity Sheet are part of the analytical report.
- Any remaining sample(s) for testing will be disposed of according to BSK's sample retention policy unless other arrangements are made in advance.
- All positive results for EPA Methods 504.1 and 524.2 require the analysis of a Field Reagent Blank (FRB) to confirm that the results are not a contamination error from field sampling steps. If Field Reagent Blanks were not submitted with the samples, this method requirement has not been performed.
- Samples collected by BSK Analytical Laboratories were collected in accordance with the BSK Sampling and Collection Standard Operating Procedures.
- J-value is equivalent to DNQ (Detected, not quantified) which is a trace value. A trace value is an analyte detected between the MDL and the laboratory reporting limit. This result is of an unknown data quality and is only qualitative (estimated). Baseline noise, calibration curve extrapolation below the lowest calibrator, method blank detections, and integration artifacts can all produce apparent DNQ values, which contribute to the un-reliability of these values.
- (1) - Residual chlorine and pH analysis have a 15 minute holding time for both drinking and waste water samples as defined by the EPA and 40 CFR 136. Waste water and ground water (monitoring well) samples must be field filtered to meet the 15 minute holding time for dissolved metals.
- Field tests are outside the scope of laboratory accreditation and there is no certification available for field testing.
- Summations of analytes (i.e. Total Trihalomethanes) may appear to add individual amounts incorrectly, due to rounding of analyte values occurring before or after the total value is calculated, as well as rounding of the total value.
- RL Multiplier is the factor used to adjust the reporting limit (RL) due to variations in sample preparation procedures and dilutions required for matrix interferences.
- Due to the subjective nature of the Threshold Odor Method, all characterizations of the detected odor are the opinion of the panel of analysts. The characterizations can be found in Standard Methods 2170B Figure 2170:1.
- The MCLs provided in this report (if applicable) represent the primary MCLs for that analyte.
- (2) - Formerly known as Bis(2-Chloroisopropyl) ether.

Unless otherwise noted, TOC results by SM 5310C method do not include purgeable organic carbon, which is removed along with the inorganic carbon interference. The POC contribution to TOC is considered to be negligible.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Definitions

mg/L:	Milligrams/Liter (ppm)	MDL:	Method Detection Limit	MDA95:	Min. Detected Activity
mg/Kg:	Milligrams/Kilogram (ppm)	RL:	Reporting Limit: DL x Dilution	MPN:	Most Probable Number
µg/L:	Micrograms/Liter (ppb)	ND:	None Detected below MRL/MDL	CFU:	Colony Forming Unit
µg/Kg:	Micrograms/Kilogram (ppb)	pCi/L:	PicoCuries per Liter	Absent:	Less than 1 CFU/100mLs
%:	Percent	RL Mult:	RL Multiplier	Present:	1 or more CFU/100mLs
NR:	Non-Reportable	MCL:	Maximum Contaminant Limit	U:	The analyte was not detected at or above the reported sample quantitation limit.

Please see the individual Subcontract Lab's report for applicable certifications.

The following parameters are not available for certification through CA ELAP:

Odor Diisopropyl ether (DIPE) by EPA 524.2

The following parameters are calculated values and are outside the scope of our NELAP accreditation:

Total Nitrogen Aggressive Index Trivalent Chromium

BSK is not accredited under the NELAP program for the following additional parameters: **NA**

Certifications: **Please refer to our website for a copy of our Accredited Fields of Testing under each certification.**

Fresno

State of California - ELAP	1180	State of Hawaii	4021
Los Angeles CSD	9254479	NELAP certified	4021-022
State of Nevada	CA000792024-03	State of Oregon - NELAP	4021-022
EPA UCMR5	CA00079	State of Washington	C997-23

Sacramento

State of California - ELAP	1180-S1		

San Bernardino

State of California - ELAP	1180-S2	Los Angeles CSD	9254478
NELAP certified	4119-008	State of Oregon - NELAP	4119-008

Vancouver

NELAP certified	WA100008-016	State of Oregon - NELAP	WA100008-016
State of Washington	C824-23		

AGK0479 BSKAs2880 11/02/2023

BSK Associates SR-FL-0002-24

Sample Integrity

BSK Bottles: Yes No Page 1 of 1

COC Info						
Was temperature within range? Chemistry ≤ 6°C Micro < 8°C	Yes	No	NA	Were correct containers and preservatives received for the tests requested?	Yes	No	NA
If samples were taken today, is there evidence that chilling has begun?	Yes	No	NA	Bubbles Present VOAs (524.2/TTHM/TCP)? TB Received? (Check Method Below)	Yes Yes	No No	NA NA
Did all bottles arrive unbroken and intact?	Yes	No		Was a sufficient amount of sample received?	Yes	No	
Did all bottle labels agree with COC?	Yes	No		Do samples have a hold time <72 hours?	Yes	No	
Was sodium thiosulfate added to CN sample(s) until chlorine was no longer present?	Yes	NA		Was PM notified of discrepancies? PM: By/Time:	Yes	No	NA

Bottles Received (— means preservation/chlorine checks are either N/A or are performed in the lab)

250ml(A) 500ml(B) 1Liter(C) 40mlVOA(V) 125ml(D)	Checks*	Passed?	1	2			
Bacti $Na_2S_2O_3$	—	—					
None (P) White Cap	—	—	IC	IB	IC	B	
Cr6 (P) Lt. Green Label/Blue Cap $NH_4OH(NH_4)_2SO_4$ **DW**	Cl, pH > 8	P F					
Cr6 (P) Pink Label/Blue Cap $NH_4OH(NH_4)_2SO_4$ **WW**	pH 9.3-9.7	P F	IA		IA		
Cr6 (P) Black Label/Blue Cap $NH_4OH(NH_4)_2SO_4$ **7199** ***24 HOUR HOLD TIME***	pH 9.0-9.5	P F					
HNO_3 (P) Red Cap or HCl (P) Purple Cap/Lt. Blue Label	—	—					
H_2SO_4 (P) or (AG) Yellow Cap/Label	pH < 2	P F					
NaOH (P) Green Cap	Cl, pH >10	P F					
NaOH + ZnAc (P)	pH > 9	P F					
Dissolved Oxygen 300ml (g)	—	—					
None (AG) 608/8081/8082, 625, 632/8321, 8151, 8270	—	—					
HCl (AG) Lt. Blue Label O&G, Diesel, **TCP**	—	—					
Ascorbic, EDTA, KH_2Ct (AG) Pink Label 525	—	—					
Na_2SO_3 250mL (AG) Neon Green Label 515	—	—					
$Na_2S_2O_3$ 1 Liter (Brown P) 549	—	—					
$Na_2S_2O_3$ (AG) Blue Label 548, THM, 524	—	—					
$Na_2S_2O_3$ (CG) Blue Label 504, 505, 547	—	—					
$Na_2S_2O_3$ + MCAA (CG) Orange Label 531	pH < 3	P F					
NH_4Cl (AG) Purple Label 552	—	—					
EDA (P) or (AG) Brown Label DBPs	—	—					
HCL (CG) 524.2,BTEX,Gas, MTBE, 8260/624	—	—					
Buffer pH 4 (CG)	—	—					
H_3PO_4 (CG) Salmon Label	—	—					
Trizma – EPA 537.1 Light Blue Label **FB**	---	---					
Ammonia Acetate - EPA 533 Purple Label **FB**	---	---					
Bottled Water	—	—					
Asbestos 1L (P) w/ Foil / LL Metals Bottle	—	—					
Clear Glass	—	—					
OTHER:	—	—					

11/3/23

Split

	Container	Preservative	Lot #	Initials	Date/Time
S P					
S P					

Preservation Check
pH Lot # AG04945
Cl Lot # AG09232

Comments

*Preservation check completed by lab performing analysis.

✓ **Indicates Blanks Received**

504 ___ 524.2 ___ TTHM ___ 537/533 ___ TCP___

✓ **MS/MSD Received Method:** _____

Labeled by: **Labels Checked by:**

Scanned: _____ Rush/Short HT Page: _____ Time:_____

BSK ASSOCIATES
687 N. Laverne Ave., Fresno, CA 93727
(559) 497-2888 CA ELAP No. 1180
www.bskassociates.com

Turnaround Time Request
☒ Standard - 10 business days
☐ Rush (Surcharge may apply)
Date needed:

AGK0479 BSKAs2880 11/02/2023 7

Temp: 0.9 °C **Thermometer ID:** 77

*Required Fields

Company/Client Name*:	Report Attention*:	Invoice To*:	Phone*:	Fax:
BSK Associates - Fresno	Neva Popenoe Additional cc's:	BSK Associates - Corp PO#:	(559) 497-2880 E-mail*: npopenoe@bskassociates.com	

Address*:	City*:	State*:	Zip*:
691 N. Laverne Ave, Suite 101	Fresno	CA	93727

Project:	Project #:	Phase #	Task #:
Los Banos Santa Fe Grade Basin	G00001262		

Reporting Options: ☐ Trace (J-Flag) ☐ Swamp ☐ EDD Type: _____

Sampler Name (Printed/Signature)*:

Regulatory Carbon Copies: ☐ SWRCB (Drinking Water) ☐ Merced Co ☐ Fresno Co ☐ Madera Co ☐ Tulare Co ☐ Other: _____

Regulatory Compliance: ☐ EDT to California SWRCB (Drinking Water) System Number*: _____ ☐ Geotracker #: _____

Matrix Types: SW=Surface Water BW=Bottled Water GW=Ground Water WW=Waste Water STW=Storm Water DW=Drinking Water SO=Solid

#	Sample Description*	Sampled* Date	Sampled* Time	Matrix*	Comments / Station Code / WTRAX	Irrigation Water, Ag Suitability Dissolved	Dissolved: As, Se	Hex Chrom 218.6 Dissolved	SAR Pkg
				GW	Lab filter for dissolved metals	X	X	X	X
	B-6 @ 25'	11/3	11:00	GW		X	X	X	X
	B-7 @ 25'	11/3	8:36	GW		X	X	X	X

11/3/23

Relinquished by: (Signature and Printed Name)	Company	Date	Time	Received by: (Signature and Printed Name)	Company
Relinquished by: (Signature and Printed Name) Jacob Lee	Company BSK	Date 11/3	Time 17:26	Received by: (Signature and Printed Name)	Company
Received for Lab by: (Signature and Printed Name) Joel Gorgin		Date 11/3/23	Time 1724	Payment Received at Delivery: Date: Amount: PIA#:	Check / Cash Init.

Shipping Method: GLS UPS ~~WALK-IN~~ FED EX PMS Courier: _____
Cooling Method: ~~Wet~~ Blue None

Custody Seal: Y / N
Chilling Process Begun: Y / N

Payment for services rendered as noted herein are due in full within 30 days from the date invoiced. If not so paid, account balances are deemed delinquent. Delinquent balances are subject to monthly service charges and interest specified in BSK's current Standard Terms and Conditions for Laboratory Services. The person signing for the Client/Company acknowledges that they are either the Client or an authorized agent to the Client, that the Client agrees to be responsible for payment for the services on this Chain of Custody, and agrees to BSK's terms and conditions for laboratory services unless contractually bound otherwise. BSK's current terms and conditions can be found at www.bskassociates.com/BSKLabTermsConditions.pdf

November 13, 2023

Lab No. : SP 2318633
Customer No. : 2022939

BSK Associates Engineers & Laboratories
687 N. Laverne Avenue
Fresno, CA 93727

Laboratory Report

Introduction: This report package contains a total of 7 pages divided into 3 sections:

Case Narrative	(2 pages)	: An overview of the work performed at FGL.
Sample Results	(2 pages)	: Results for each sample submitted.
Quality Control	(3 pages)	: Supporting Quality Control (QC) results.

Case Narrative

This Case Narrative pertains to the following samples:

Sample Description	Date Sampled	Date Received	FGL Lab No.	Matrix
B-6 @ 25'	11/03/2023	11/07/2023	SP 2318633-001	GW
B-7 @ 25'	11/03/2023	11/07/2023	SP 2318633-002	GW

Sampling and Receipt Information:

All samples were received in acceptable condition and within temperature requirements, unless noted on the Condition Upon Receipt (CUR) form. All samples were received, prepared and analyzed within the method specified holding times except those as listed in the table below. All samples arrived at 6 ° C. All samples were checked for pH if acid or base preservation is required (except for VOAs). For details of sample receipt information, please see the associated Chain of Custody and Condition Upon Receipt Form.

Samples Over Hold Time

Lab No	Analyte Method	Maximum Hold Time	Actual Hold Time
SP 2318633-001	Nitrate	48 hours	97.3 hours
SP 2318633-001	Nitrate Nitrogen	48 hours	97.3 hours
SP 2318633-001	pH	15 minutes	12,131.0 minutes
SP 2318633-002	Nitrate	48 hours	99.7 hours
SP 2318633-002	Nitrate Nitrogen	48 hours	99.7 hours
SP 2318633-002	pH	15 minutes	12,275.0 minutes

Quality Control: All samples were prepared and analyzed according to established quality control criteria. Any exceptions are noted in the Quality Control Section of this report.

Test Summary	
EPA 200.7	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)
EPA 200.8	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)
EPA 300.0	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)
SM 2540 C	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)
SM 4500-H+B	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)

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CA ELAP Certification No. 2810

Certification: I certify that this data package is in compliance with ELAP standards, both technically and for completeness, except for any conditions listed above and in the QC Section. Release of the data contained in this data package is authorized by the Laboratory Director or his designee, as verified by the following electronic signature. This report shall not be reproduced except in full, without the written approval of the laboratory.

KD: MKH

Approved By **Kelly A. Dunnahoo, B.S.** Digitally signed by Kelly A. Dunnahoo, B.S.
Title: Laboratory Director
Date: 2023-11-13

Page 2 of 7

November 13, 2023

BSK Associates Engineers & Laboratories
687 N. Laverne Avenue
Fresno, CA 93727

Description : B-6 @ 25'
Project : AGK0479

Lab No. : SP 2318633-001
Customer No. : 2022939

Sampled On : November 3, 2023 at 11:00
Sampled By : Jacob Leu
Received On : November 7, 2023 at 11:30
Matrix : Ground Water

Sample Results - Inorganic

Constituent	Result	RL	Units	Note	Dil.	DQF	Sample Preparation			Sample Analysis			
Irrigation Suit							Date	Time	Who	Method	Date	Time	Who
Total Hardness as CaCO3	872	2.5	mg/L		1		11/09/2023	06:00	ac	Calc.	11/09/2023	10:09	ac
Calcium	163	1	mg/L		1		11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:09	ac
Magnesium	113	1	mg/L		1		11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:09	ac
Potassium	5	1	mg/L		1		11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:09	ac
Sodium	644	5*	mg/L		5		11/09/2023	06:00	ac	EPA 200.7	11/09/2023	11:28	ac
Total Cations	45.6	---	meq/L		1		11/09/2023	06:00	ac	Calc.	11/09/2023	10:09	ac
Boron	4.2	0.1	mg/L		1		11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:09	ac
Copper	ND	10	ug/L		1	U	11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:09	ac
Iron	ND	30	ug/L		1	U	11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:09	ac
Manganese	380	10	ug/L		1		11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:09	ac
Zinc	ND	20	ug/L		1	U	11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:09	ac
Gypsum Requirement	2.2	0.01	Tons/AF		1		11/09/2023	06:00	ac	Calc.	11/09/2023	10:09	ac
SAR	9.5	0.1	--		1		11/09/2023	06:00	ac	Calc.	11/09/2023	10:09	ac
Total Alkalinity	410	10	mg/L		1		11/11/2023	21:11	amm	SM 4500-H+B	11/12/2023	10:56	amm
Hydroxide	ND	10	mg/L		1	U	11/11/2023	21:11	amm	SM 4500-H+B	11/12/2023	10:56	amm
Carbonate	ND	10	mg/L		1	U	11/11/2023	21:11	amm	SM 4500-H+B	11/12/2023	10:56	amm
Bicarbonate	500	10	mg/L		1		11/11/2023	21:11	amm	SM 4500-H+B	11/12/2023	10:56	amm
Sulfate	902	6.5*	mg/L		10		11/07/2023	12:16	ldm	EPA 300.0	11/08/2023	00:00	ldm
Chloride	580	13*	mg/L		10		11/07/2023	12:16	ldm	EPA 300.0	11/08/2023	00:00	ldm
Nitrate	48.8	0.4	mg/L		1	Th	11/07/2023	12:16	ldm	EPA 300.0	11/07/2023	19:41	ldm
Nitrate Nitrogen	11.0	0.1	mg/L		1	Th	11/07/2023	12:16	ldm	EPA 300.0	11/07/2023	19:41	ldm
Fluoride	0.2	0.1	mg/L		1		11/07/2023	12:16	ldm	EPA 300.0	11/07/2023	19:41	ldm
Total Anions	44.1	---	meq/L		1	h	11/11/2023	21:11	amm	Calc.	11/12/2023	10:56	amm
pH	8.02	---	units		1	T	11/11/2023	21:11	amm	SM 4500-H+B	11/12/2023	10:56	amm
E. C.	4130	1	umhos/cm		1		11/11/2023	21:11	amm	SM 4500-H+B	11/12/2023	10:56	amm
TDS by Summation	2960	0	mg/L		1	h	11/09/2023	06:00	ac	Calc.	11/09/2023	10:09	ac
Metals, Diss													
Arsenic	5	1	ug/L		1	h	11/09/2023	10:00	ac	EPA 200.8	11/10/2023	14:28	ac
Selenium	13	1	ug/L		1	h	11/09/2023	10:00	ac	EPA 200.8	11/09/2023	12:07	ac
Wet Chemistry													
Total Dissolved Solids (TFR)	3030	20	mg/L		1		11/09/2023	11:45	ctl	SM 2540 C	11/10/2023	11:00	ctl

DQF Flags Definition:
U Constituent results were non-detect.
T Exceeded method/regulatory-specific holding time.
h The MS/MSD did not meet QC criteria.

ND=Non-Detected, RL=Reporting Level * RL adjusted for dilution, Dil.=Dilution

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CA ELAP Certification No. 2810

November 13, 2023

BSK Associates Engineers & Laboratories
687 N. Laverne Avenue
Fresno, CA 93727

Description : B-7 @ 25'
Project : AGK0479

Lab No. : SP 2318633-002
Customer No. : 2022939

Sampled On : November 3, 2023 at 08:36
Sampled By : Jacob Leu
Received On : November 7, 2023 at 11:30
Matrix : Ground Water

Sample Results - Inorganic

Constituent	Result	RL	Units	Note	Dil.	DQF	Sample Preparation			Sample Analysis			
Irrigation Suit							Date	Time	Who	Method	Date	Time	Who
Total Hardness as CaCO3	658	2.5	mg/L		1		11/09/2023	06:00	ac	Calc.	11/09/2023	10:16	ac
Calcium	130	1	mg/L		1		11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:16	ac
Magnesium	81	1	mg/L		1		11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:16	ac
Potassium	4	1	mg/L		1		11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:16	ac
Sodium	589	5*	mg/L		5		11/09/2023	06:00	ac	EPA 200.7	11/09/2023	11:35	ac
Total Cations	38.9	---	meq/L		1		11/09/2023	06:00	ac	Calc.	11/09/2023	10:16	ac
Boron	3.8	0.1	mg/L		1		11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:16	ac
Copper	ND	10	ug/L		1	U	11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:16	ac
Iron	ND	30	ug/L		1	U	11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:16	ac
Manganese	350	10	ug/L		1		11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:16	ac
Zinc	ND	20	ug/L		1	U	11/09/2023	06:00	ac	EPA 200.7	11/09/2023	10:16	ac
Gypsum Requirement	2.5	0.01	Tons/AF		1		11/09/2023	06:00	ac	Calc.	11/09/2023	10:16	ac
SAR	10	0.1	--		1		11/09/2023	06:00	ac	Calc.	11/09/2023	10:16	ac
Total Alkalinity	440	10	mg/L		1		11/11/2023	21:11	amm	SM 4500-H+B	11/12/2023	11:09	amm
Hydroxide	ND	10	mg/L		1	U	11/11/2023	21:11	amm	SM 4500-H+B	11/12/2023	11:09	amm
Carbonate	ND	10	mg/L		1	U	11/11/2023	21:11	amm	SM 4500-H+B	11/12/2023	11:09	amm
Bicarbonate	530	10	mg/L		1		11/11/2023	21:11	amm	SM 4500-H+B	11/12/2023	11:09	amm
Sulfate	773	5*	mg/L		10		11/07/2023	12:16	ldm	EPA 300.0	11/08/2023	01:00	ldm
Chloride	470	10*	mg/L		10		11/07/2023	12:16	ldm	EPA 300.0	11/08/2023	01:00	ldm
Nitrate	33.8	0.4	mg/L		1	Th	11/07/2023	12:16	ldm	EPA 300.0	11/07/2023	20:01	ldm
Nitrate Nitrogen	7.6	0.1	mg/L		1	Th	11/07/2023	12:16	ldm	EPA 300.0	11/07/2023	20:01	ldm
Fluoride	0.1	0.1	mg/L		1		11/07/2023	12:16	ldm	EPA 300.0	11/07/2023	20:01	ldm
Total Anions	38.6	---	meq/L		1	h	11/11/2023	21:11	amm	Calc.	11/12/2023	11:09	amm
pH	8.08	---	units		1	T	11/11/2023	21:11	amm	SM 4500-H+B	11/12/2023	11:09	amm
E. C.	3530	1	umhos/cm		1		11/11/2023	21:11	amm	SM 4500-H+B	11/12/2023	11:09	amm
TDS by Summation	2610	0	mg/L		1	h	11/09/2023	06:00	ac	Calc.	11/09/2023	10:16	ac
Metals, Diss													
Arsenic	7	1	ug/L		1	h	11/09/2023	10:00	ac	EPA 200.8	11/10/2023	14:34	ac
Selenium	10	1	ug/L		1	h	11/09/2023	10:00	ac	EPA 200.8	11/09/2023	12:14	ac
Wet Chemistry													
Total Dissolved Solids (TFR)	2320	20	mg/L		1		11/09/2023	11:45	ctl	SM 2540 C	11/10/2023	11:00	ctl

DQF Flags Definition:
U Constituent results were non-detect.
T Exceeded method/regulatory-specific holding time.
h The MS/MSD did not meet QC criteria.

ND=Non-Detected, RL=Reporting Level * RL adjusted for dilution, Dil.=Dilution

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November 13, 2023
BSK Associates

Lab No. : SP 2318633
Customer No. : 2022939

Quality Control - Metals

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Metals								
Boron	200.7	11/09/2023:212718AC	MS	mg/L	4.000	95.7%	75-125	
		(SP 2318807-001)	MSD	mg/L	4.000	93.5%	75-125	
			MSRPD	mg/L		1.6%	≤20.0	
Calcium	200.7	11/09/2023:212718AC	MS	mg/L	12.00	59.9%	<¼	406
		(SP 2318807-001)	MSD	mg/L	12.00	36.0%	<1/4	
			MSRPD	mg/L		1.6%	≤20.0	
Copper	200.7	11/09/2023:212718AC	MS	ug/L	800.0	123%	75-125	
		(SP 2318807-001)	MSD	ug/L	800.0	121%	75-125	
			MSRPD	ug/L		1.3%	≤20.0	
Iron	200.7	11/09/2023:212718AC	MS	ug/L	4000	92.8%	75-125	
		(SP 2318807-001)	MSD	ug/L	4000	89.7%	75-125	
			MSRPD	ug/L		3.4%	≤20.0	
Magnesium	200.7	11/09/2023:212718AC	MS	mg/L	12.00	83.9%	75-125	
		(SP 2318807-001)	MSD	mg/L	12.00	76.2%	75-125	
			MSRPD	mg/L		1.5%	≤20.0	
Manganese	200.7	11/09/2023:212718AC	MS	ug/L	800.0	98.4%	75-125	
		(SP 2318807-001)	MSD	ug/L	800.0	95.5%	75-125	
			MSRPD	ug/L		3.0%	≤20.0	
Potassium	200.7	11/09/2023:212718AC	MS	mg/L	12.00	100%	75-125	
		(SP 2318807-001)	MSD	mg/L	12.00	97.9%	75-125	
			MSRPD	mg/L		1.8%	≤20.0	
Sodium	200.7	11/09/2023:212718AC	MS	mg/L	12.00	70.3%	<¼	406
		(SP 2318807-001)	MSD	mg/L	12.00	42.5%	<1/4	
			MSRPD	mg/L		1.6%	≤20.0	
Zinc	200.7	11/09/2023:212718AC	MS	ug/L	800.0	103%	75-125	
		(SP 2318807-001)	MSD	ug/L	800.0	101%	75-125	
			MSRPD	ug/L		1.5%	≤20.0	
Arsenic	200.8	11/09/2023:212732AC	MS	ug/L	5.000	553%	75-125	435
		(CH 2379204-001)	MSD	ug/L	5.000	638%	75-125	435
			MSRPD	ug/L		14.2%	≤20	
Selenium	200.8	11/09/2023:212732AC	MS	ug/L	5.000	578%	75-125	435
		(CH 2379204-001)	MSD	ug/L	5.000	603%	75-125	435
			MSRPD	ug/L		4.2%	≤20	

Definition

DQO : Data Quality Objective - This is the criteria against which the quality control data is compared.

MS : Matrix Spikes - A random sample is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.

MSD : Matrix Spike Duplicate of MS/MSD pair - A random sample duplicate is spiked with a known amount of analyted. The recoveries are an indication of how that sample matrix affects analyte recovery.

MSRPD : MS/MSD Relative Percent Difference (RPD) - The MS relative percent difference is an indication of precision for the preparation and analysis.

ND : Non-detect - Result was below the DQO listed for the analyte.

Explanation

406 : Matrix Spike (MS) not within the Acceptance Range (AR) because of high analyte concentration in the sample. Data was accepted based on the LCS or CCV recovery.

435 : Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.

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November 13, 2023
BSK Associates

Lab No. : SP 2318633
Customer No. : 2022939

Quality Control - Wet Chem

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Wet Chem								
Alkalinity (as CaCO3)	2320B	11/11/2023:212846AMM	ND	mg/L		0.06%	10	435
Bicarbonate	2320B	(SP 2318735-002)	Dup	mg/L		0.1%	10	
E. C.	2320B	(SP 2318735-002)	Dup	umhos/cm		0.2%	5	
pH	2320B	(SP 2318735-002)	Dup	units		0.1%	4.80	
Solids, Total Dissolved	2540CE	11/09/2023:212748CTL	Blank	mg/L		ND	<20	
			LCS	mg/L	991.5	101%	90-110	
		(SP 2318698-001)	Dup	mg/L		0.2%	5	
		(SP 2318698-001)	Dup	mg/L		1.16%	5	
Chloride	300.0	11/07/2023:212665LDM	Blank	mg/L		ND	<1	
			LCS	mg/L	25.00	101%	90-110	
			MS	mg/L	50.00	89.7%	67-117	
		(SP 2318353-002)	MSD	mg/L	50.00	90.2%	67-117	
			MSRPD	mg/L		0.3%	≤7	
			MS	mg/L	50.00	90.7%	67-117	
		(CC 2383822-005)	MSD	mg/L	50.00	91.1%	67-117	
			MSRPD	mg/L		0.2%	≤7	
Fluoride	300.0	11/07/2023:212665LDM	Blank	mg/L		ND	<0.1	
			LCS	mg/L	2.500	101%	90-110	
			MS	mg/L	5.000	108%	89-111	
		(SP 2318353-002)	MSD	mg/L	5.000	109%	89-111	
			MSRPD	mg/L		1.3%	≤9	
			MS	mg/L	5.000	104%	89-111	
		(CC 2383822-005)	MSD	mg/L	5.000	104%	89-111	
			MSRPD	mg/L		0.2%	≤9	
Nitrate	300.0	11/07/2023:212665LDM	Blank	mg/L		ND	<0.4	
			LCS	mg/L	20.00	99.6%	90-110	
			MS	mg/L	40.00	113%	86-112	435
		(SP 2318353-002)	MSD	mg/L	40.00	113%	86-112	435
			MSRPD	mg/L		0.4%	≤7	
			MS	mg/L	40.00	103%	86-112	
		(CC 2383822-005)	MSD	mg/L	40.00	103%	86-112	
			MSRPD	mg/L		0.1%	≤7	
Nitrate Nitrogen	300.0	11/07/2023:212665LDM	Blank	mg/L		ND	<0.4	
			LCS	mg/L	20.00	99.6%	90-110	
			MS	mg/L	40.00	113%	86-112	435
		(SP 2318353-002)	MSD	mg/L	40.00	113%	86-112	435
			MSRPD	mg/L		0.4%	≤7	
			MS	mg/L	40.00	103%	86-112	
		(CC 2383822-005)	MSD	mg/L	40.00	103%	86-112	
			MSRPD	mg/L		0.1%	≤7	
Sulfate	300.0	11/07/2023:212665LDM	Blank	mg/L		ND	<0.5	
			LCS	mg/L	50.00	102%	90-110	
			MS	mg/L	100.0	94.2%	18-165	
		(SP 2318353-002)	MSD	mg/L	100.0	94.3%	18-165	
			MSRPD	mg/L		0.1%	≤7	
			MS	mg/L	100.0	104%	18-165	
		(CC 2383822-005)	MSD	mg/L	100.0	105%	18-165	
			MSRPD	mg/L		0.2%	≤7	

Page 6 of 7

Definition

Blank	:	Method Blank - Prepared to verify that the preparation process is not contributing contamination to the samples.
Dup	:	Duplicate Sample - A random sample with each batch is prepared and analyzed in duplicate. The relative percent difference is an indication of precision for the preparation and analysis.
LCS	:	Laboratory Control Standard/Sample - Prepared to verify that the preparation process is not affecting analyte recovery.
MS	:	Matrix Spikes - A random sample is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.
MSD	:	Matrix Spike Duplicate of MS/MSD pair - A random sample duplicate is spiked with a known amount of analyted. The recoveries are an indication of how that sample matrix affects analyte recovery.
MSRPD	:	MS/MSD Relative Percent Difference (RPD) - The MS relative percent difference is an indication of precision for the preparation and analysis.
ND	:	Non-detect - Result was below the DQO listed for the analyte.

Explanation

435	:	Sample matrix may be affecting this analyte. Data was accepted based on the LCS or CCV recovery.

Page 7 of 7

November 13, 2023

BSK Associates Engineers & Laboratories
687 N. Laverne Avenue
Fresno, CA 93727

Description : B-6 @ 25'
Project : AGK0479

Lab ID : SP 2318633-001
Customer : 2022939

Sampled On : November 3, 2023
Sampled By : Jacob Leu
Received On : November 7, 2023
Matrix : Ground Water

General Irrigation Suitability Analysis

Test Description	Result				Graphical Results Presentation				
Cations	mg/L	Meq/L	% Meq	Lbs/AF	Good	Possible Problem	Moderate Problem	Increasing Problem	Severe Problem
Calcium	163	8.1	18	440	**				
Magnesium	113	9.3	20	310	**				
Potassium	5	0.13	0	14	**				
Sodium	644	28	61	1800					
Anions									
Carbonate	<10	0	0	0					
Bicarbonate	500	8.2	19	1400	**				
Sulfate	902	19	43	2500	**				
Chloride	580	16	37	1600					
Nitrate	48.8	0.79	2	130					
Nitrate Nitrogen	11.0			30					
Fluoride	0.2	0.011	0	0.5					
Minor Elements									
Boron	4.2			11					
Copper	<0.01			0					
Iron	<0.03			0					
Manganese	0.38			1					
Zinc	<0.02			0					
TDS by Summation	2960			8000					
Other									
pH	8.02	units							
E. C.	4.13	dS/m							
SAR	9.50								
Crop Suitability									
No Amendments	Poor								
With Amendments	Poor								
Amendments									
Gypsum Requirement	2.2	Tons/AF							
Sulfuric Acid (98%)	29.0	oz/1000Gal			Or 69 oz/1000Gal of urea Sulfuric Acid(15/49)				
Leaching Requirement	42	%							

Good — Problem

Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.
** Used in various calculations; mg/L = Milligrams Per Liter (ppm) meq/L = Milliequivalents Per Liter.

November 13, 2023

BSK Associates Engineers & Laboratories

Description : B-6 @ 25'
Project : AGK0479

Lab ID : SP 2318633-001
Customer : 2022939

Sampled By : Jacob Leu
Matrix : Ground Water

Micro Irrigation System Plugging Hazard

Test Description	Result		Graphical Results Presentation
Chemical			Slight / Moderate / Severe
Manganese	0.38	mg/L	
Iron	<0.03	mg/L	
TDS by Summation	2960	mg/L	
No Amendments			
pH	8.02	units	
Alkalinity (As CaCO3)	410	mg/L	
Total Hardness	872	mg/L	
With Amendments			
Alkalinity (As CaCO3)	82	mg/L	
Total Hardness	82	mg/L	
pH	5.4 - 6.7	units	



Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.

Water Amendments Application Notes:
The Amendments recommended on the previous pages include:

Gypsum:
This should be applied at least once a year to the irrigated soil surface area. Gypsum can also be applied in smaller quantities in the irrigation water.Apply the smaller (bracketed) amount of gypsum when also applying the recommended amount of Sulfuric Acid and the larger amount when applying only Gypsum.

Sulfuric Acid:
These products should be applied as needed to prevent emitter plugging in micro irrigation systems and/or as a soil amendment to adjust soil pH to improve nutrient availability and to facilitate leaching of salts. Please exercise caution when using this material as excesses may be harmful to the system and/or the plants being irrigated. The reported Acid requirement is intended to remove approximately 80 % of the alkalinity. The final pH should range from 5.4 to 6.7. We recommend a field pH determination to confirm that the pH you designate is being achieved. This application is based upon the use of a 98% Sulfuric Acid product. The application of Urea Sulfuric Acid is based upon the use of a product that contains 15% Urea (1.89 lbs Nitrogen), 49% Sulfuric Acid and has a specific gravity of 1.52 at 68 °F.
Please contact us if you have any questions.

BRW:EHB

Reviewed and Approved By **Ben Waddell**
Digitally signed by Ben Waddell
Title: Director of Ag. Services
Date: 2023-11-13

November 13, 2023

BSK Associates Engineers & Laboratories
687 N. Laverne Avenue
Fresno, CA 93727

Description : B-7 @ 25'
Project : AGK0479

Lab ID : SP 2318633-002
Customer : 2022939

Sampled On : November 3, 2023
Sampled By : Jacob Leu
Received On : November 7, 2023
Matrix : Ground Water

General Irrigation Suitability Analysis

Test Description	Result				Graphical Results Presentation				
Cations	mg/L	Meq/L	% Meq	Lbs/AF	Good	Possible Problem	Moderate Problem	Increasing Problem	Severe Problem
Calcium	130	6.5	17	350	**				
Magnesium	81	6.7	17	220	**				
Potassium	4	0.1	0	11	**				
Sodium	589	26	66	1600					
Anions									
Carbonate	<10	0	0	0					
Bicarbonate	530	8.7	23	1400	**				
Sulfate	773	16	42	2100	**				
Chloride	470	13	34	1300					
Nitrate	33.8	0.55	1	92					
Nitrate Nitrogen	7.6			21					
Fluoride	0.1	0.0053	0	0.3					
Minor Elements									
Boron	3.8			10					
Copper	<0.01			0					
Iron	<0.03			0					
Manganese	0.35			0.95					
Zinc	<0.02			0					
TDS by Summation	2610			7100					
Other									
pH	8.08	units							
E. C.	3.53	dS/m							
SAR	10.0								
Crop Suitability									
No Amendments	Poor								
With Amendments	Poor								
Amendments									
Gypsum Requirement	2.5	Tons/AF							
Sulfuric Acid (98%)	31.0	oz/1000Gal			Or 74 oz/1000Gal of urea Sulfuric Acid(15/49)				
Leaching Requirement	34	%							

Good — Problem

Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.
** Used in various calculations; mg/L = Milligrams Per Liter (ppm) meq/L = Milliequivalents Per Liter.

November 13, 2023

BSK Associates Engineers & Laboratories

Description : B-7 @ 25'
Project : AGK0479

Lab ID : SP 2318633-002
Customer : 2022939

Sampled By : Jacob Leu
Matrix : Ground Water

Micro Irrigation System Plugging Hazard

Test Description	Result		Graphical Results Presentation
Chemical			Slight / Moderate / Severe
Manganese	0.35	mg/L	
Iron	<0.03	mg/L	
TDS by Summation	2610	mg/L	
No Amendments			
pH	8.08	units	
Alkalinity (As CaCO3)	440	mg/L	
Total Hardness	658	mg/L	
With Amendments			
Alkalinity (As CaCO3)	88	mg/L	
Total Hardness	88	mg/L	
pH	5.4 - 6.7	units	



Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.

Water Amendments Application Notes:
The Amendments recommended on the previous pages include:

Gypsum:
This should be applied at least once a year to the irrigated soil surface area. Gypsum can also be applied in smaller quantities in the irrigation water.Apply the smaller (bracketed) amount of gypsum when also applying the recommended amount of Sulfuric Acid and the larger amount when applying only Gypsum.

Sulfuric Acid:
These products should be applied as needed to prevent emitter plugging in micro irrigation systems and/or as a soil amendment to adjust soil pH to improve nutrient availability and to facilitate leaching of salts. Please exercise caution when using this material as excesses may be harmful to the system and/or the plants being irrigated. The reported Acid requirement is intended to remove approximately 80 % of the alkalinity. The final pH should range from 5.4 to 6.7. We recommend a field pH determination to confirm that the pH you designate is being achieved. This application is based upon the use of a 98% Sulfuric Acid product. The application of Urea Sulfuric Acid is based upon the use of a product that contains 15% Urea (1.89 lbs Nitrogen), 49% Sulfuric Acid and has a specific gravity of 1.52 at 68 °F.
Please contact us if you have any questions.

BRW:EHB

Reviewed and Approved By **Ben Waddell**
Digitally signed by Ben Waddell
Title: Director of Ag. Services
Date: 2023-11-13

BSK ASSOCIATES

SUBCONTRACT ORDER

AGK0479

23/8433

Lab filter for dissolved metals please

SENDING LABORATORY:

BSK Associates Laboratory Fresno
687 N. Laverne Avenue
Fresno, CA 93727
Phone: 559-497-2888
Fax: 559-485-6935
Project Manager: Elaine M. Phillips
E-mail: ephillips@bskassociates.com

RECEIVING LABORATORY:

FGL Environmental
P.O. Box 272 / 853 Corporation
Santa Paula, CA 93060
Phone :(805) 392-2000
Fax: (805) 525-4172
Turnaround (Days): 7
QC Deliverables: I Std III IV

Sample ID	Samp Desc		Sample Date
AGK0479-01	B-6 @ 25'	Client Matrix: Ground Water Sampled By: Jacob Leu	11/03/2023 11:00

Lab Matrix: Water

Analysis: 1 L +500

Alkalinity as CaCO3
Arsenic, CA DW ICPMS Dissolved
Boron, CA DW ICP Dissolved
Calcium, CA DW ICP Dissolved
Chloride
Copper, CA DW ICPMS Dissolved
EC, Conductivity
Fluoride, Wastewater
Iron, CA DW ICP Dissolved
Magnesium, CA DW ICP Dissolved
Manganese, CA DW ICP Dissolved
Percent Sodium
Potassium, CA DW ICP Dissolved
Selenium, CA DW ICPMS Dissolved
Sodium Absorption Ratio
Sodium, CA DW ICP Dissolved
Sulfate
TDS, Total Dissolved Solids
Zinc, CA DW ICPMS Dissolved

*Please analyzed both samples for Irrigation Suitability package.

BSK Analyzed Nitrate in house to meet Hold times. Will provide results for calculation.

RUSH

AGK0479-02	B-7 @ 25'	Client Matrix: Ground Water Sampled By: Jacob Leu	11/03/2023 08:36

Lab Matrix: Water

Analysis:

Alkalinity as CaCO3
Arsenic, CA DW ICPMS Dissolved
Boron, CA DW ICP Dissolved
Calcium, CA DW ICP Dissolved
Chloride
Copper, CA DW ICPMS Dissolved
EC, Conductivity
Fluoride, Wastewater
Iron, CA DW ICP Dissolved
Magnesium, CA DW ICP Dissolved
Manganese, CA DW ICP Dissolved
Percent Sodium
Potassium, CA DW ICP Dissolved
Selenium, CA DW ICPMS Dissolved
Sodium Absorption Ratio

ESK ASSOCIATES

SUBCONTRACT ORDER

AGK0479

2318633

Sample ID	Samp Desc	Sample Date
	Sodium, CA DW ICP Dissolved	
	Sulfate	
	TDS, Total Dissolved Solids	
	Zinc, CA DW ICPMS Dissolved	

State Forms: **No** System Name: _____

RUSH

Released By	Date	Received By	Date
[signature]	11.6.23		
[signature]	11/7/23 1130	[signature]	11/7/23 1130
Released By	Date	Received By	Date

Condition Upon Receipt (Attach to COC) SP 2318633

Sample Receipt at SP:

1. Number of ice chests/packages received: **1**
2. Shipper tracking numbers _____
3. Were samples received in a chilled condition?
   Temps: **6** /_____/_____/_____/_____/_____/_____/_____

4. Surface water (SWTR) bact samples: A sample that has a temperature upon receipt of >10C, whether iced or not, should be flagged unless the time since sample collection has been less than two hours.

5. Do the number of bottles received agree with the COC?	**Yes**	**No**	**N/A**
6. Verify sample date, time, sampler	**Yes**	**No**	**N/A**
7. Were the samples received intact? (i.e. no broken bottles, leaks, etc.)	**Yes**	**No**	
8. Were sample custody seals intact?	**Yes**	**No**	**N/A**

Sample Verification, Labeling and Distribution:

1. Were all requested analyses understood and acceptable?	**Yes**	**No**		
2. Did bottle labels correspond with the client's ID's?	**Yes**	**No**		
3. Were all bottles requiring sample preservation properly preserved? [Exception: Oil & Grease, VOA and CrVI verified in lab]	**Yes**	**No**	**N/A**	**FGL**
4. VOAs checked for Headspace?	**Yes**	**No**	**N/A**	
5. Were all analyses within holding times at time of receipt?	**Yes**	**No**		
6. Have rush or project due dates been checked and accepted?	**Yes**	**No**	**N/A**	

Include a copy of the COC for lab delivery. (Bacti. Inorganics and Radio)

Sample Receipt, Login and Verification completed by: Reviewed and Approved By **Inez Covarrubias** Digitally signed by Inez Covarrubias Title: Sample Receiving Date: 11/09/2023-11:17:14

Discrepency Documentation:

Any items above which are "No" or do not meet specifications (i.e. temps) must be resolved.

1. Person Contacted: _____ Phone Number: _____
   Initiated By: _____ Date: _____
   Problem:

   Resolution:

2. Person Contacted: _____ Phone Number: _____
   Initiated By: _____ Date: _____
   Problem:

   Resolution:

(2022939)
BSK Associates
SP 2318633
IV/CDA-11/09/2023-11:17:14

APPENDIX G

STORMWATER POLLUTION PREVENTION PLAN
(BIDDING PURPOSES ONLY)

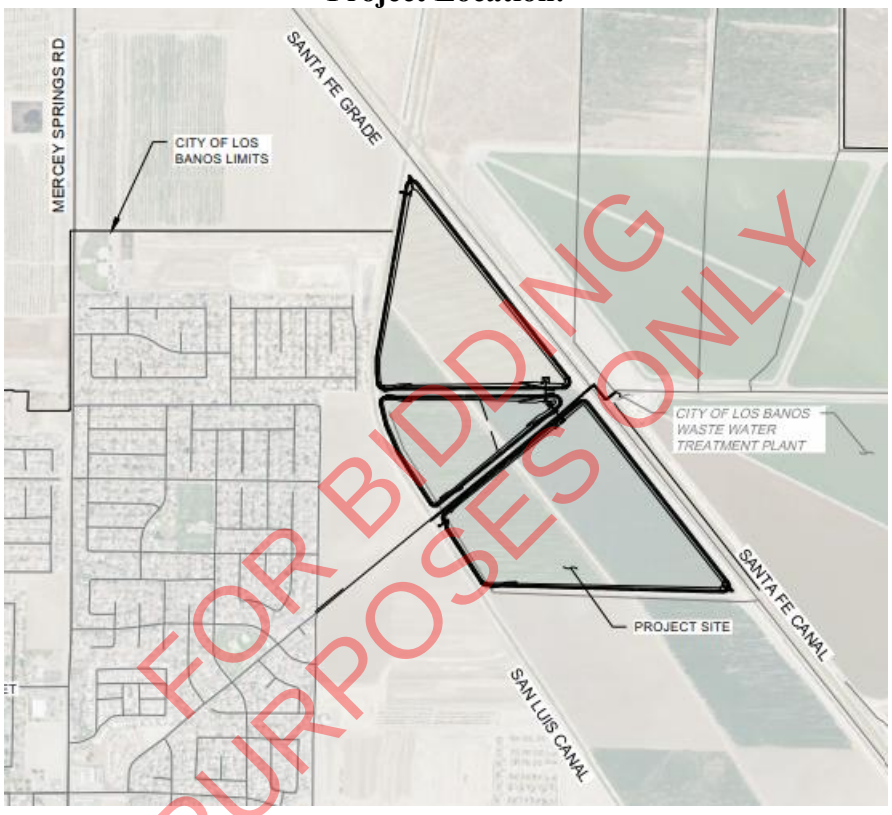
STORMWATER POLLUTION PREVENTION PLAN

for

Basins and Stormwater Capture Project

WDID: _____
RISK LEVEL: 1

Project Location:



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Legally Responsible Person (LRP):
City of Los Banos
411 Madison Ave
Los Banos, CA 93635

Duly Authorized Representative (DAR):
Jelene de Melo
(209) 827-7056
jelene.demelo@losbanos.org

Project Address:
Across from City of Los Banos Wastewater Treatment Plant
17963 Henry Miller Ave, Los Banos, CA 93635
37.085017, -120.819628

Site Operating Hours:
Monday – Friday, 7:00 am – 5:00 pm

Estimated Project Dates:
Start of Construction: 10/1/2025
Completion of Construction: 9/30/2026

SWPPP Prepared by:
Provost & Pritchard Consulting Group
455 W Fir Ave., Clovis, CA 93611
(559) 449-2700

SWPPP Preparation Date:
August 2025

QSD Name and Signature:

Gretchen Heisdorf

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Contact Information

Role	Name & License/ Certification Number	Address & Phone Number	Email
Qualified SWPPP Developer (QSD)	Gretchen Heisdorf CASQA QSD/P 00485	455 W Fir Ave Clovis, CA 93611 (559) 449-2700	gheisdorf@ppeng.com
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Qualified SWPPP Practitioner (QSP)			
QSP Delegate			
QSP Delegate			
QSP Delegate			
QSP Delegate			

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Appendix B:	Permit Registration Documents
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Appendix F:	Construction Activities, Materials Used, and Associated Pollutants
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Appendix Q:	Supplemental Information
Appendix R:	Active Treatment System and Passive Treatment Plans
Appendix S:	Construction General Permit

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Abbreviations

ac ..... acre
ac-ft ..... acre feet
AS, DAS ..... Assigned Signatory, Duly Assigned Signatory
ATS ..... Active Treatment System
bgs ..... below ground surface
BMP ..... Best Management Practice
CGP ..... Construction General Permit
CoC ..... Chain of Custody
CSMP ..... Construction Site Monitoring Plan
K ..... Erodibility Factor
LS ..... Land-Slope Factor
LRP ..... Legally Responsible Person
MS4 ..... Municipal Separate Storm Sewer System
msl ..... mean sea level
MSRP ..... Monitoring and Sampling Plan
NAL ..... Numeric Action Level
NEL ..... Numeric Effluent Level
NOAA ..... National Oceanic Atmospheric Administration
NOI ..... Notice of Intent
NOT ..... Notice of Termination
NPDES ..... National Pollutant Discharge Elimination System
NTU ..... Nephelometric Turbidity Units
PRD ..... Permit Registration Document
QAPrP ..... Quality Assurance Program Plan
QA/QC ..... Quality Assurance and Quality Control
QSD ..... Qualified SWPPP Developer
QSP ..... Qualified SWPPP Practioner
R ..... Erosivity Value
REAP ..... Rain Event Action Plan
RWQCB ..... Regional Water Quality Control Board
SDS ..... Safety Data Sheets
SMARTS ..... Stormwater Multi Application and Report Tracking System
SWAMP ..... Surface Water Ambient Monitoring Program
SWPPP ..... Stormwater Pollution Prevention Plan
SWRCB ..... State Water Resources Control Board
USEPA ..... United States Environmental Protection Agency
WDID ..... Waste Discharge Identification
WQO ..... Water Quality Order

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Qualified SWPPP Developer

Approval and Certification of the Stormwater Pollution Prevention Plan

Project Name: Basins and Stormwater Capture Project

WDID No.

"This Stormwater Pollution Prevention Plan and its appendices were prepared under my direction to meet the requirements of the California Construction Stormwater General Permit (*Order No. 2022-0057-DWQ*). I certify that I am a Qualified SWPPP Developer in good standing as of the date signed below and will maintain up to date credentials for the duration of the project."

QSD Signature	Date
Gretchen Heisdorf	00485
QSD Name	QSD Certificate Number
Principal Engineer, Provost & Pritchard Consulting Group	(559) 449-2700
Title and Affiliation	Telephone Number
gheisdorf@ppeng.com	
Email	

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Amendment Log

Project Name: Basins and Stormwater Capture Project

WDID No. _____

Amendment No.	Date	Brief Description of Amendment (include section and page number)	Prepared and Approved By
			Name: QSD#
			Name: QSD#
			Name: QSD#

The SWPPP will be revised when:

- There is a 2022 CGP violation (2022 CGP Section VI.Q.1);
- There is a reduction or increase in total disturbed acreage (2022 CGP Section III.F.2. and F.4);
- BMPs are not effective and are not resulting in a reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges (2022 CGP Section VI.Q.1 and Attachment E Section III.C.5);
- There is a change in the project duration that changes the project Risk Type (2022 CGP Section III.F.1);
- Dischargers with projects where all construction activities (including passive treatment, active treatment systems, and/or active equipment) will be suspended for 30 days or more (2022 CGP Section III.G);
- There is a change in construction or operations that may affect the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system (MS4) (2022 CGP Sections IV.O. and VI.Q.1); or

When deemed necessary by the QSD. The QSD has determined that the changes listed in Table 1-1 can be field determined by the QSP. All other changes will be made by the QSD as formal amendments to the SWPPP. Note that the 2022 CGP requires that the QSD "revise the SWPPP to address potential problems identified by visual inspections, sampling data, comments from a QSP, or their own site observations (2022 CGP Section V.C.2.).

SWPPP Amendment QSD Certifications are located in Appendix C.

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Section 1 SWPPP Requirements

1.1 INTRODUCTION

This Stormwater Pollution Prevention Plan (SWPPP) is designed to comply with California's *General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (2022 CGP),* State Water Resources Control Board (State Water Board) *Order No. 2022-0057-DWQ (NPDES No. CAS000002)* (Appendix S). This SWPPP has been prepared following the 2022 CGP SWPPP Template for Traditional Projects provided in the California Stormwater Quality Association (CASQA) Stormwater *Best Management Practice (BMP) Handbook: Construction* (CASQA 2024).

This project is considered a traditional construction project.

In accordance with the 2022 CGP, Section IV.O, this SWPPP is designed to address the following:

- Identification of all pollutants, their sources, and control mechanisms, including sources of sediment associated with all construction activities (e.g., sediment, paint, cement, stucco, cleaners, site erosion);
- Pollutant source assessments, including a list of potential pollutant sources and identification of site areas where additional BMPs are necessary to reduce or prevent pollutants in stormwater and authorized non-stormwater discharges, per the minimum requirements when developing the pollutant source assessment;
- Description of site-specific BMPs implemented to reduce or eliminate stormwater pollution;
- Where not otherwise required to be under a Regional Water Quality Control Board (Regional Water Board) permit, all non-stormwater discharges are identified and either eliminated, controlled, or treated;
- Site BMPs are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges from construction activity to the Best Available Technology/Best Control Technology (BAT/BCT) standard; and;
- Stabilization BMPs are installed to reduce or eliminate pollutants after construction is completed are effective and maintained; and
- Calculations and design details, as well as BMP controls, are complete and correct.

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The Basins and Stormwater Capture Project (Project, or Site) comprises approximately 180 acres. The Project is located adjacent to the City of Los Banos Wastewater Treatment Plant (address 17963 Henry Miller Ave, Los Banos, CA) between the San Luis Canal and San Luis Drain. The property is owned by the City of Los Banos and is being developed by the City of Los Banos and Grasslands Water District. The project's location is shown on the Site Maps in Appendix A.

1.2 PERMIT REGISTRATION DOCUMENTS

Required Permit Registration Documents (PRDs) shall be submitted to the State Water Board via the Stormwater Multi Application and Report Tracking System (SMARTS) by the LRP or DAR. The project-specific PRDs include (2022 CGP Section III.A):

1. Notice of Intent (NOI);
2. Risk Level Determination (Construction Site Sediment and Receiving Water Risk Determination);
3. Site Drawings and Map;
4. SWPPP;
5. Applicable plans, calculations, and other supporting documentation for compliance with the Phase I or Phase II municipal separate storm sewer system (MS4) post construction requirements or the post-construction standards of the 2022 CGP.
6. Annual Fee per the current 23 CA CCR Chapter 9 fee schedule for NPDES Stormwater permits;

7. Signed Certification State (LRP Certification is provided electronically with SMARTS PRD submittal)
8. Post-construction water balance calculation;
9. Dewatering Plan, if applicable;

Site Maps can be found in Appendix A. A copy of the submitted PRDs shall also be kept in Appendix B along with the Waste Discharge Identification (WDID) confirmation.

1.3 SWPPP AVAILABILITY AND IMPLEMENTATION

The SWPPP will be available at the construction site during working hours list on the title sheet and Section 7.5, while construction is occurring and shall be made available upon request by a federal, state, or municipal inspector. A current copy of the site-specific SWPPP and any site inspection reports required by the 2022 CGP may be kept in electronic format at the site so long as the information requested by a federal, state, or municipal inspector can be made available during an inspection. Legible maps in hard copy must be available at the site (2022 CGP Section IV.O.1.).
The SWPPP must be implemented at the appropriate level to protect water quality at all times throughout the life of the project. The SWPPP must remain on the site during construction activities, commencing with the initial mobilization and ending with the termination of coverage under the 2022 CGP.

1.4 SWPPP AMENDMENTS

The 2022 CGP requires the SWPPP to be amended or revised by a QSD (SectionIV.O.1). Amendments should also include a listing of the date of initial SWPPP preparation and the date of each amendment. SWPPP changes or amendments will be uploaded through SMARTS within 30 calendar days. Amendments must be signed by a QSD (Section VI.H.). In addition, the 2022 CGP specifies that the SWPPP shall be amended under the following circumstances:

The SWPPP will be revised when:

- If there is a 2022 CGP violation (2022 CGP Section VI.Q.1);
- There is a reduction or increase in total disturbed acreage (2022 CGP Section III.F.2 and F.4.);
- BMPs are not effective and are not resulting in a reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges (2022 CGP Section VI.Q.1 and Attachment D Section III.C.5);
- There is a change in the project duration that changes the project's risk level (2022 CGP Section III.F.1); or
- Dischargers with projects where all construction activities (including passive treatment, active treatment systems, and/or active equipment) will be suspended for 30 days or more (2022 CGP Section III.G.).

Additionally, the SWPPP will be amended when:

- There is a change in construction or operations that may affect the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system (MS4) (2022 CGP Sections IV.O. and VI.Q.1); or

When deemed necessary by the QSD. The QSD has determined that the changes listed in Table 1-1 can be field determined by the QSP. All other changes will be made by the QSD as formal amendments to the SWPPP. Note that the 2022 CGP requires that the QSD revise the SWPPP to address potential problems identified by visual inspections, sampling data, comments from a QSP, or their own site observations (2022 CGP Section V.C.2.).

The following items shall be included in each amendment:

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- Who requested the amendment;
- The location of proposed change;
- The reason for change;
- The original BMP(s) proposed, if any;
- The new BMP(s) proposed; and
- QSD certification.

SWPPP amendments will be logged at the front of the SWPPP and SWPPP Amendment QSD certifications will be located in Appendix C. The SWPPP text will be revised, replaced and/or hand annotated as necessary to properly convey the amendment. SWPPP amendments must be made by a QSD. The following changes have been designated by the QSD as "to be field determined" and constitute minor changes that the QSP may implement based on field conditions.

Table 1-1 List of Changes to be Field Determined

Candidate changes for field location or determination by QSP (1)	Check changes that can be field located or field determined by QSP
Increase quantity of an Erosion or Sediment Control Measure	X
Relocate/add stockpiles or stored materials	X
Relocate or add toilets	X
Relocate vehicle storage and/or fueling locations	X
Relocate areas for waste storage	X
Relocate water storage and/or water transfer location	X
Changes to access points (entrance/exits)	X
Change type or location of Erosion or Sediment Control Measure	X
Minor changes to schedule or phases	X
Changes in construction materials	X
(1) Any field changes not identified for field location or field determination by the QSP must be made as an amendment by the QSD.	

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1.5 RETENTION OF RECORDS

Paper or electronic records of documents required by this SWPPP will be retained for a minimum of three years from the date generated or date submitted, whichever is later, for the following items:

- SWPPP;
- Visual monitoring reports;
- Weather Forecasts, Rain Logs;
- Sampling equipment calibration records;
- pH and turbidity sampling field sheets;
- Analytical laboratory reports;
- Annual Reports

These records will be available at the Site until construction is complete. Records assisting in the determination of compliance with the 2022 CGP will be made available within a reasonable time to the

Regional Water Board, State Water Board, or U.S. Environmental Protection Agency (EPA) upon request. Requests by the Regional Water Board for retention of records for a period longer than three years will be adhered to.

1.6 REPORTING

Completed inspection checklists are not required to be submitted to the Regional Water Board. However, completed inspection checklists will be kept with the SWPPP on-site or electronically. The 2022 CGP requires that permittees prepare, certify, and electronically submit an Annual Report no later than September 1 of each year. Reporting requirements are identified in 2022 CGP Section VI.P. Annual reports will be filed in SMARTS and in accordance with information required by the online forms.

Planned changes in site construction activities that may result in non-compliance with the 2022 CGP are required to be provided in writing to the Regional Water Board and local stormwater agency in advance of the changes.

If a 2022 CGP discharge violation occurs, the QSP will immediately notify the LRP. The LRP will include information on the violation with the Annual Report. Corrective measures will be implemented immediately following identification of the discharge or written notice of non-compliance from the Regional Board. Discharges and corrective actions must be documented and include the following items:

- The date, time, location, nature of operation, and type of unauthorized discharge;
- The cause or nature of the notice or order;
- The BMPs deployed before the discharge event, or prior to receiving notice or order; and
- The date of deployment and type of BMPs deployed after the discharge event, or after receiving the notice or order, including additional measures installed or planned to reduce or prevent re-occurrence.

IF THE CONTRACTOR PLANS TO HAVE DEWATERING DISCHARGES:
The Regional Water Board will be notified via email 24 hours prior to the beginning of a planned dewatering discharge.

In the event of an emergency dewatering, the Regional Water Board and applicable MS4 are to be notified within 24 hours of a discharge occurring. An emergency is defined as the need to protect human life and health or prevent severe property damage.

Results of (pH and turbidity, etc.) monitoring will be electronically submitted through SMARTS for all field sampling results within 30 days of the completion of the precipitation event or within 10 days if the field sampling results demonstrate the exceedance of the pH and/or turbidity NALs.

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1.7 CHANGES TO PERMIT COVERAGE

The 2022 CGP allows for the reduction or increase of the total acreage covered under the 2022 CGP when: a portion of the project is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the project is purchased by a different entity; or when new acreage is added to the project.

Modified PRDs will be filed electronically through a Change of Information (COI) within 30 days of a reduction or increase in total disturbed area if a change in permit-covered acreage is to be sought. The SWPPP will be modified appropriately and will be logged at the front of the SWPPP. SWPPP Amendments QSD Certifications will be located in Appendix C. COIs submitted electronically via SMARTS can be found in Appendix D.

1.8 NOTICE OF TERMINATION

A Notice of Termination (NOT) must be submitted electronically by the LRP or DAR via SMARTS to terminate coverage under the 2022 CGP.

According to the requirements of 2022 CGP Section III.H.4., the following final stabilization method will be used to satisfy final stabilization condition requirements:

- Custom method for which Regional Water Board approval has been obtained, supported by documentation required by the Regional Water Board and pre- and post- project photographs demonstrating stabilization.

The Regional Water Board will consider a construction site complete when the conditions of the 2022 CGP Section III.H., have been met.

The discharger is required to submit the following in SMARTS:

- NOT SMARTS Form;
- QSP-prepared final NOT inspection which includes the QSP name and valid QSP certificate number;
- Final site map with photo orientation references;
- Photos demonstrating final stabilization and the applicable post-construction BMPs and/or low impact development; and
- A long-term maintenance plan for the post-construction stormwater runoff BMPs and/or low impact development features being implemented.

According to the 2022 CGP, the NOT will be automatically approved within 30 calendar days after the date the NOT was submitted, unless, within the 30 calendar days the Regional Water Board notifies the discharger through SMARTS that the Notice of Termination has been denied, returned, or accepted for review (2022 CGP Section III.H.7).

Note: If an Annual Report has not been filed in the current reporting year, an Annual Report will need to be submitted prior to the NOT.

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Section 2 Project Information

2.1 PROJECT AND SITE DESCRIPTION

2.1.1 Site Description

The Project site is Risk Level 1 that comprises approximately 180 acres and is located adjacent to the City of Los Banos Wastewater Treatment Plant (address 17963 Henry Miller Ave, Los Banos, CA) between the San Luis Canal and San Luis Drain. The project site is located approximately 1.5 miles north of Highway 152 and adjacent to the City of Los Banos. The project site is located adjacent to the San Luis Canal and San Luis Drain. The project is located at 37.085017, -120.819628 and is identified on the Site Map in Appendix A.

2.1.2 Existing Conditions

As of the initial date of this SWPPP, the project site is an existing agricultural. There are no known sources of historic contamination.

2.1.3 Existing Drainage

The project site is relatively level and slopes internally. The elevation of the project site ranges from 100-105 feet above mean sea level (msl). The site does not drain offsite. Existing site topography, drainage patterns, and stormwater conveyance systems are shown on Site Maps in Appendix A and on the construction plan set.

2.1.4 Geology and Groundwater

According to the Geotechnical Engineering Investigation Report for the Proposed New Recharge Basin and Sewer Improvements, dated January 15, 2024;

> The near surface soil consisted of sandy clay, clayey sand and sandy silt, underlain by sandy silt, silty sand and poorly graded sand to the maximum depth explored (51.5 feet bgs)… The soil types encountered in the upper 10 to 20 feet were predominantly sandy silts and clays.

Additionally in the report,

> Groundwater was encountered as shallow as 20 feet…The California Department of Water Resources indicates the depth to recent regional groundwater at the project site is greater than 25 feet bgs. However, fluctuations in the groundwater level or the presence of perched groundwater may occur due to variations in rainfall, irrigation, seasonal factors, pumping from wells and other factors that were not evident at the time of our investigation. Groundwater is not anticipated to affect construction of the proposed improvements above 20 feet bgs.

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2.1.5 Project Description

Project grading will occur on approximately 180 acres of the project. The limits of grading are shown on Site Maps in Appendix A. Grading will include both cut and fill activities, with the total graded material estimated to be 480,000 cubic yards. Graded materials are expected to be balanced onsite to develop the basin levees. Soil will be stockpiled on the project site as necessary to construction the project and are not specifically shown on Site Maps. Construction activities will be phased in as much as typical basin construction projects. The mass clearing and grubbing will occur first, perimeter BMPs will be deployed concurrently. Basin grading will take place to develop the basin levees as detailed on the construction plan set. Basin interties will be constructed after basin levees have been built. Once interties are completed, basin finish grading will take place.

2.1.6 Developed Condition

Post-construction surface drainage will be directed to the onsite basins and exterior levee swales. Post-construction drainage patterns are generally presented on Site Maps in Appendix A and on the construction plan set.

Table 2-2 Construction Site Estimates

Construction site area	180	acres
Total area of disturbance	180	acres
Percent impervious before construction	0	%
Runoff coefficient before construction	0.20	
Percent impervious after construction	0	%
Runoff coefficient after construction	0.20	

2.2 PERMITS AND GOVERNING DOCUMENTS

In addition to the 2022 CGP, the following documents have been taken into account while preparing this SWPPP:

- Regional Water Board Basin Plan requirements
- Contract Documents
- Air Quality regulations and permits
- Federal Endangered Species Act, State of California Endangered Species Act

2.3 STORMWATER RUN-ON FROM OFFSITE AREAS

There is no anticipated offsite run-on to this construction site due to site topography and being bounded by Canals on three sides (north, east, and west) and existing travel paths.

2.4 CONSTRUCTION SITE SEDIMENT AND RECEIVING WATER RISK DETERMINATION

A construction site risk assessment has been performed for the project and the resultant risk level is Risk Level 1. The risk level was determined through the use of the USEPA's Rainfall Erosivity Factor Calculator for Small Construction Sites (R-Value) and the SMARTS GIS Database (K, LS & Receiving Water). The risk level is based on project duration, location, proximity to impaired receiving waters, and soil conditions. A copy of the Risk Level determination submitted on SMARTS with the PRDs is included in Appendix B.

Table 2-3 and Table 2-4 summarize the sediment and receiving water risk factors and document the sources of information used to derive the factors.

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Table 2-3 Summary of Sediment Risk

RUSLE Factor	Value	Method for Establishing Value
R	22.38	USEPA's Rainfall Erosivity Factor Calculator
K	0.32	SMARTS/GIS Database
LS	0.29	SMARTS/GIS Database
Total Predicted Sediment Loss (tons/acre)		**2.08**
Overall Sediment Risk Low Sediment Risk < 15 tons/ acre Medium Sediment Risk >= 15 and < 75 tons/acre High Sediment Risk >= 75 tons/acre		☒ Low ☐ Medium ☐ High

The project site does not discharge.

Table 2-4 Summary of Receiving Water Risk

Overall Receiving Water Risk(1)	**☒ Low** **☐ High**
(1) SMARTS/GIS Database	

Risk Level 1 sites are subject to the narrative effluent limitations specified in the 2022 CGP, and may be subject to numeric effluent limits for applicable TMDLs, dewatering activities, active treatment systems and passive treatment systems used on site. The narrative effluent limitations require stormwater discharges associated with construction activity to minimize or prevent pollutants in stormwater and authorized non-stormwater through the use of controls, structures, and best management practices (BMPs). This SWPPP has been prepared to address Risk Level 1 requirements (2022 CGP Attachment D).

2.5 CONSTRUCTION SCHEDULE

For purposes of SWPPP development, the site sediment risk was determined based on construction taking place between October 1, 2025 and September 30, 2026. Actual construction timelines may vary, and final stabilization may take longer than the construction timeline. Modification or extension of the schedule (start and end dates) may affect risk determination and permit requirements. The LRP shall contact the QSD if the schedule changes during construction to address potential impact to the SWPPP. The estimated schedule for planned work can be found in Appendix E.

2.6 POTENTIAL CONSTRUCTION ACTIVITY AND POLLUTANT SOURCES

Appendix F includes a list of construction activities and associated materials that are anticipated to be used onsite as well as the pollutant source assessment form that was completed for the project. These activities and associated materials will or could potentially contribute pollutants, other than sediment, to stormwater runoff.

The anticipated activities and associated pollutants were used in Section 3 to select the BMPs for the project. Locations of anticipated pollutants and associated BMPs are shown on the Site Map in Appendix A.

Additionally, proper measures will be taken to ensure that trench spoils or any other soils disturbed during construction activities that are contaminated are not discharged with stormwater or non-stormwater discharges into storm drains or water bodies (except pursuant to a separate NPDES Permit). If contaminated soils are found on site, and the responsible party cannot be identified or fails to take action, soils will be sampled to determine proper handling and protect public safety. The appropriate local, State, and federal agencies along with the appropriate Regional Water Board will be notified when contaminated soils are observed.

For sampling requirements for non-visible pollutants associated with construction activity, please refer to Section 7.7.1. For a full and complete list of onsite pollutants, refer to the Safety Data Sheets (SDS), which are retained onsite at the construction trailer or are available electronically at the site.

2.7 TMDL REQUIREMENTS

There are no requirements for TMDL Monitoring for this project based on the 2022 CGP Attachment H.

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2.8 IDENTIFICATION OF NON-STORMWATER DISCHARGES

Non-stormwater discharges into storm drainage systems or waterways, which are not authorized under the 2022 CGP and listed in the SWPPP, or authorized under a separate NPDES permit, are prohibited. Non-stormwater discharges that are authorized from this project site include the following:

- Irrigation of Vegetative Erosion Control Measures
- Pipe Testing and Flushing
- Uncontaminated Groundwater Dewatering

These authorized non-stormwater discharges will be managed with the stormwater and non-stormwater BMPs described in Section 3 of this SWPPP and will be minimized under the direction of the QSP. Additionally, the non-stormwater discharges not applicable to this project are still allowable granted they do not contact potential pollutant sources. Activities at this site that may result in unauthorized non-stormwater discharges include:

- Vehicle/Equipment Cleaning, Fueling, and Maintenance Operations
- Vehicle/Equipment Wash water including Concrete Washout Water
- Wash water from Cleaning Painting Equipment
- Concrete cutting/coring operation slurries, PCC grinding or AC grinding operations
- Slurries from Concrete or Mortar Mixing operations
- Slurries from Drilling or Boring operations
- Blast residue from High-Pressure Washing
- Dust Control runoff or dust control palliatives
- Liquid waste, Sanitary/Septic wastes, etc.
- Chemical leaks and/or spills of any kind including but not limited to petroleum, paints, curing compounds, etc.

Steps will be taken, including the implementation of appropriate BMPs, to ensure that unauthorized discharges are eliminated, controlled, disposed, or treated on-site.
Discharges of construction materials and wastes, such as fuel or paint, resulting from dumping, spills, or direct contact with rainwater or stormwater runoff, are also prohibited.

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2.9 REQUIRED SITE MAP INFORMATION

The construction project's Site Map(s) showing the project location, surface water boundaries, geographic features, construction site perimeter and general topography, locations of storm drain inlets that receive runoff from the project, and other requirements identified in 2022 CGP Sections IV.O.2. k. and l are located in Appendix A. Table 2-9 identifies Maps or Sheet Nos. where required elements are illustrated.

Table 2-9 Required Map Information

Included on Map/Plan Sheet No. (1)	Required Element
Pre-Earthwork Drawings	
Site Maps	Site and project boundaries
Site Maps	Areas disturbed during geotechnical or other preconstruction investigation work
Site Maps	Existing roads and trails
n/a	Drainage areas
n/a	Discharge locations

Table 2-9 Required Map Information

Included on Map/Plan Sheet No. [1]	Required Element
n/a	Existing storm drain system if applicable
Staging Area	Proposed locations of storage areas for waste
n/a	Proposed locations of construction materials
TBD	Proposed locations of project staging areas
Site Maps	Proposed locations of stockpiles
Staging Area	Proposed locations of vehicles, equipment staging and vehicle maintenance
Staging Area	Proposed locations of loading/unloading materials
Staging Area Cover Page	Proposed locations of site access (entrance/exits)
Staging Area	Proposed locations of fueling, water storage, water transfer for dust control
Demo Plan	Proposed locations of demolition
n/a	Proposed locations of other construction support activities
Construction and Earthwork Drawing(s)	
Site Maps	Site layout (grading plans) including roads
Site Maps	Site and project boundaries
Drainage Area Map	Drainage areas
TBD	Discharge locations
TBD	Sampling locations
Site Maps	Areas of soil disturbance (temporary or permanent)
Site Maps	Proposed active areas of soil disturbance (cut or fill)
Site Maps	Proposed locations of erosion control BMPs
Site Maps	Proposed locations of sediment control BMPs
Site Maps	Proposed locations of run-off BMPs
n/a	Temporary and/or permanent run-on conveyance (if applicable)
n/a	Proposed locations of active treatment systems(s) (if applicable)
Staging Area	Proposed locations of storage areas for waste
Staging Area	Proposed locations of construction materials
TBD	Proposed locations of project staging areas
TBD	Proposed locations of stockpiles
Staging Area	Proposed locations of vehicles, equipment and vehicle maintenance
Staging Area	Proposed locations of loading/unloading materials
Staging Area	Proposed locations of site access (entrance/exits)

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Table 2-9 Required Map Information

Included on Map/Plan Sheet No. (1)	Required Element
Cover Sheet	
Staging Area	Proposed locations of fueling, water storage, water transfer for dust control
n/a	Proposed locations of demolition
n/a	Proposed locations of other construction support activities
Final Stalization	Site-specific procedures to implement final stabilization BMPs as soon as reasonably practicable

Notes:
(1) Indicate maps or drawings that information is included on (e.g., Vicinity Map, Site Map, Drainage Plans, Grading Plans, Progress Maps.)

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Section 3 Best Management Practices

3.1 SCHEDULE FOR BMP IMPLEMENTATION

BMPs will be implemented as per the schedules indicated in Tables 3-1 – 3-4. In accordance with the 2022 CGP Section IV.O.b-c, BMPs will be stockpiled onsite at all times to facilitate deployment.

3.2 EROSION AND SEDIMENT CONTROL

Erosion and sediment controls are required by the 2022 CGP to provide effective reduction or elimination of sediment related pollutants in stormwater discharges and authorized non-stormwater discharges from the Site. Applicable BMPs are identified in this section for erosion control, sediment control, tracking control, and wind erosion control.

3.2.1 Erosion Control

Erosion control, also referred to as soil stabilization, consists of source control measures that are designed to prevent soil particles from detaching and becoming transported in stormwater runoff. Erosion control BMPs protect the soil surface by covering and/or binding soil particles.
This construction project will implement the following practices to provide effective temporary and final erosion control during construction:

1. Preserve existing vegetation where required and when feasible.
2. The area of soil disturbing operations shall be controlled such that the Contractor is able to implement erosion control BMPs quickly and effectively.
3. Stabilize non-active areas within 14 days of cessation of construction activities or sooner if stipulated by local requirements.
4. Control erosion in concentrated flow paths by applying erosion control blankets, check dams, erosion control seeding, or alternate methods.
5. Prior to the completion of construction, apply permanent erosion control to remaining disturbed soil areas.

Sufficient erosion control materials shall be maintained onsite to allow implementation in conformance with this SWPPP.
The following erosion control BMP selection table, Table 3-2 indicates the BMPs that will be implemented to control erosion on the construction site. Fact Sheets for temporary erosion control BMPs are provided in Appendix G.

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These temporary erosion control BMPs shall be implemented in conformance with the following guidelines and as outlined in the BMP Factsheets provided in Appendix G. If there is a conflict between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.

Scheduling

The Contractor shall sequence construction activities with the installation of both soil stabilization and sediment control measure BMPs to reduce the discharge of sediment and pollutants to storm drain facilities or watercourses. The contractor shall create a schedule detailed enough to show major activities sequences with the implementation of construction site BMPs. Scheduling will be used as much as practicable to reduce areas of in-active soil disturbance per BMP detail EC-1.

Preservation of Existing Vegetation

The Contractor shall not disturb or destroy any vegetation or habitat unless absolutely necessary for the performance of the Work. The Contractor shall inform onsite personnel of the work limits

and not to disturb vegetation outside those limits, including travel to and from the project site. The protection and preservation of such vegetation shall serve to control erosion and filter out sediment.

Geotextiles and Mats

The Contractor will use plastic covers to cover exposed soil and stockpiled material areas. Covers will be placed over stockpiles prior to forecast storm events and anchored to prevent damage by wind. Plastic covers will be used in conjunction with sandbags or fiber rolls to cover all stockpiles within 48 hours of stockpiling material or before a forecasted storm event, whichever occurs first. Plastic sheeting will also be used under equipment to catch drips if the equipment is not in use.

Earth Dike and Drainage Swales

Dikes and swales may be implemented as part of the engineered project design. If the Contractor proposes the use of dikes or swales as a temporary measure, the dike and/or swale shall be designed and stamped by a licensed CA Civil Engineer.

Soil Preparation-Roughening

In areas of high traffic (travel banks, dirt roads) and bank slopes equipment will be utilized to compact and track walk surfaces that require stabilization but not a seed mixture or other impervious treatment. The slope compaction will aid in final stabilization and prevent sediment erosion runoff into surrounding agricultural fields. The roughing and compaction will also reduce the potential of over-seeding the slope, introducing seed product to the adjacent agricultural fields or require watering during drought conditions.

Non-Vegetated Stabilization

Non-Vegetative Stabilization is to be used in conjunction with Soil Preparation Roughening. In addition to Soil Preparation Roughening, the Contractor shall use impervious concrete surfaces and rock slope stabilization (rip rap per construction plans) to prevent sediment erosion and potential pollutant run-off after construction is complete. No non-native chemical binders will be used other than concrete without Owner approval.

Wind Erosion Control

The water will be applied using water trucks. Wind Erosion Control and Water Conservation Practices BMPs will be implemented to provide dust control and prevent discharges from dust control activities and water supply equipment. Water application rates will be minimized as necessary to prevent runoff and ponding and water equipment leaks will be repaired immediately.

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Table 3.1 Erosion Control BMPs

Fact Sheet[1]	BMP Name	Considered for the Project [2]	Construction Phase Used			
			Demo/ Pre-Construction	Grading	Concrete	Final Stabilization
EC-1	Scheduling	✓	✓	✓	✓	✓
EC-2	Preservation of Existing Vegetation	✓	✓	✓	✓	✓
EC-3	Hydraulic Mulch	✓[3]	n/a			
EC-4	Hydroseed	✓[3]				
EC-5	Soil Binders	✓[3]				
EC-6	Straw Mulch	✓[3]				
EC-7	Geotextiles and Mats	✓[3]	✓	✓	✓	✓
EC-8	Wood Mulching	✓[3]	n/a			
EC-9	Earth Dike and Drainage Swales	✓[4]	✓	✓		✓
EC-10	Velocity Dissipation Devices	✓[4]	n/a			
EC-11	Slope Drains	✓[4]				
EC-12	Stream Bank Stabilization					
EC-14	Compost Blankets	✓[3]				
EC-15	Soil Preparation-Roughening		✓	✓		✓
EC-16	Non-Vegetated Stabilization	✓[3]	✓	✓	✓	✓
WE-1	Wind Erosion Control	✓	✓	✓	✓	✓

Notes:
1. CASQA Fact Sheets, 2024 Edition or most current.
2. The General Permit's Fact Sheet Section II.J.1.c through II.J.1.g describes various BMPs that should be considered for use on the construction site.
3. The QSD shall ensure implementation of one of the minimum measures listed or a combination thereof to achieve and maintain the Risk Level requirements.
4. All run-on and runoff from the construction site shall be managed for LUP Types 2 and 3 and LUP Type 1 if the evaluation of quantity and quality of run-on and runoff deems them necessary or visual inspections show that the site requires these controls. Run-on from offsite shall be directed away from all disturbed areas, diversion of offsite flows may require design/analysis by a licensed civil engineer and/or additional environmental permitting.

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3.2.2 Sediment Controls

Sediment controls are temporary or permanent structural measures that are intended to complement the selected erosion control measures and reduce sediment discharges from active construction areas. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water.

The following sediment control BMP selection table indicates the BMPs that will be implemented to control sediment on the construction site. Fact Sheets for temporary sediment control BMPs are provided in Appendix G.

These temporary sediment control BMPs will be implemented in conformance with the following guidelines and in accordance with the BMP Fact Sheets provided in Appendix G. If there is a conflict

between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.

Silt Fence

The Contractor shall use silt fence as specified in the Site Maps and by the QSP. Silt fences shall be installed per the BMP guidance sheet and shall not contribute to erosion/pollutant discharges. Repair silt fences within 24 hours of discovering damage. Remove and properly disposed of accumulated sediment with 24 hrs.

Sediment Basin

The Contractor shall use basins as designed in the construction drawings. The basins will prevent the transportation of sediments and debris from the Project to the surrounding roadways and agricultural areas.

Check Dams

The Contractor shall use check dams in locations where fiber rolls are not proven effective to control run-off in concentrated drainage paths. The check dams shall be constructed of gravel or sandbag, packed to prevent leakage through the structure and shall be installed per the BMP guidance sheet and shall not contribute to erosion/pollutant discharges. Repair check dams and remove accumulated sediment within 24 hours of discovering damage/build-up.

Fiber Rolls

The Contractor shall install fiber rolls downstream of the drainage perimeter as needed where shown on the Site Maps. Obstruction including rocks, clods, and debris greater than one inch in diameter will be removed from the ground before placing fiber rolls. Repair fiber rolls within 24 hrs. of discovering damage.

Gravel Bag Berm, Sandbag Barrier

Bags will be used as a linear sediment barrier for stockpiled materials; bags must be placed in a single layer and placed end to end to eliminate gaps. Bags will be placed along the down gradient side of any parked vehicles and equipment thereby diverting and filtering the rain runoff water around the vehicle and equipment in the event of imminent rain. Temporary bags shall be maintained to provide for adequate sediment holding capacity. Sediment deposits shall be removed when the deposit reaches one third of the temporary bag barrier height. Removed sediment shall be deposited within the project in such a way that the sediment is not subject to erosion by wind or water, or as directed by the QSD/P, Owner and/or Engineer.

Street Sweeping

The Contractor shall use hand or mechanical methods such as vacuuming to perform street sweeping where noticeable tracking of material from the job site onto adjacent streets occurs. Street sweeping shall start at the beginning of construction activities and continue daily and on as needed basis until the completion of the project, or as directed by the Owner or QSD/P. Road sweeping and vacuuming will occur during soil hauling and as necessary to keep streets clear of tracked material and debris. Washing of sediment tracked onto streets into storm drains will not occur.

Stabilized Construction Entrance and Exit

A stabilized construction entrance/exit will be constructed and maintained at construction site entrances and exits. The site entrance/exit will be stabilized to reduce tracking of sediment as a result of construction traffic. The entrance shall be designated and graded to prevent runoff from

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leaving the site. Stabilization material will be 3-inch minus aggregate over filter fabric. The entrance shall be flared where meets the existing road to provide an adequate turning radius. A site entrance/exit shall only be installed to reduce tracking of sediment during dirt-hauling activities that extend over a one-week time period.

Table 3.2 Temporary Sediment Control BMPs

Fact Sheet[1]	BMP Name	Considered for the Project[2]	Construction Phase Used			
			Demo/ Pre-Construction	Grading	Concrete	Final Stabilization
SE-1	Silt Fence	✓[3,4]	✓	✓	✓	
SE-2	Sediment Basin		✓	✓	✓	✓
SE-3	Sediment Trap		✓	✓	✓	
SE-4	Check Dams		✓	✓	✓	
SE-5	Fiber Rolls	✓[3,4]	✓			✓
SE-6	Gravel Bag Berm	✓[4]	✓	✓	✓	✓
SE-7	Street Sweeping	✓	✓	✓	✓	✓
SE-8	Sandbag Barrier		✓	✓	✓	✓
SE-9	Straw Bale Barrier		n/a			
SE-10	Storm Drain Inlet Protection	✓ RL2&3				
SE-11	ATS					
SE-12	Manufactured Linear Sediment Controls					
SE-13	Compost Sock and Berm	✓[4]				
SE-14	Biofilter Bags	✓[4]				
TC-1	Stabilized Construction Entrance and Exit	✓	✓	✓	✓	✓
TC-2	Stabilized Construction Roadway		n/a			
TC-3	Entrance Outlet Tire Wash					

Notes:
1. CASQA Fact Sheets, 2024 Edition or most current.
2. The General Permit's Fact Sheet Section II.J.1.c through II.J.1.g describes various BMPs that should be considered for use on the construction site.
3. The QSD shall ensure implementation of one of the minimum measures listed or a combination thereof to achieve and maintain the Risk Level requirements.
4. All run-on and runoff from the construction site shall be managed. Risk Level 2 &3 shall provide linear sediment control along toe of slope, face of slope, and at the grade breaks of exposed slope.

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3.3 NON-STORMWATER CONTROLS AND WASTE AND MATERIALS MANAGEMENT

3.3.1 Non-Stormwater Controls

Non-stormwater discharges into storm drainage systems or waterways which are not authorized under the 2022 CGP are prohibited. Non-stormwater discharges for which a separate NPDES permit is required by the local Regional Water Board are prohibited unless coverage under the separate NPDES permit has been obtained for the discharge. The selection of non-stormwater BMPs is based on the list of

construction activities with a potential for non-stormwater discharges identified in Section 2.7 of this SWPPP.

The following non-stormwater control BMP selection table indicates the BMPs that will be implemented to control sediment on the construction site. Fact Sheets for temporary non-stormwater control BMPs are provided in Appendix G.

Non-stormwater BMPs will be implemented in conformance with the following guidelines and in accordance with the BMP Fact Sheets provided in Appendix G. If there is a conflict between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.

Water Conservation Practices

The Contractor shall implement water conservation practices when water is used on the project site. The Contractor shall make sure that any water leakage is repaired promptly, and all water equipment will be kept in good working condition. Vehicles and equipment will not be washed on site. Water will not be used to clean construction areas and authorization must be obtained before washing anything at the job site with water that could possibly discharge into a storm drain system or watercourse. Discharges must be reported immediately. Water should be directed from the job site to areas where it can infiltrate into the ground. Direct water from off-site sources around the job site if practicable.

Dewatering Operation

A Dewatering Plan will be developed by the Project QSP in accordance with 2022 CGP Attachment J and filed in SWPPP Appendix Q. The Plan will be approved by the QSD – SWPPP Developer and QSD – Field QSD and uploaded as an amendment to the Project SWPPP at least 14 days prior to dewatering activities. Dewatering activities require a 24-hour notice to the QSD – SWPPP Developer and QSD – Field QSD prior to commencing for notification to the RWQCB.

Paving and Grinding Operation

The Contractor shall perform some paving, grinding, sealing, and sawcutting operations throughout the project site. Do not allow water or slurry during sawcutting or grinding of existing PCC or AC to enter storm drains or water courses, cover drain inlets prior to these operations. Whenever precipitation is forecasted, limit paving, sawcutting, and grinding to places where runoff can be captured. Residue from sawcutting or grinding operations shall be picked up by means of a vacuum. Noticeable tracking and fines shall be removed to prevent sediment and grindings from entering drainage systems and watercourses. Drip protection will be placed under paving equipment when not in use. Paving equipment will be staged on level ground and drip protection will be free of rips and holes and will be bermed.

Illicit Connection/Discharge

The site will be inspected before the project commences and regularly during the project for illicit connections or illegal dumping or discharge. If any are found, they will be reported to the QSD/P and/or Owner at the time of discovery. Store chemicals in watertight containers (with appropriate secondary containment to prevent any spillage or leakage) or in a storage shed (completely enclosed).

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Potable Water/Irrigation (includes non-potable water)

Potable water will be used for dust control purposes. Irrigated areas within the construction limits will be inspected for excess watering. Watering times and schedules will be adjusted to ensure that the appropriate amount of water is being used and to minimize runoff.

Vehicle and Equipment Cleaning

Vehicle and equipment cleaning or washing at the job site will not be allowed except what is necessary to control vehicle tracking or hazardous waste using NS-8. Clean or wash vehicles and equipment in a structure equipped with disposal facilities. Vehicles may be washed in an outside area if the area is, paved with asphalt concrete, HMA, or PCC, surrounded by a containment berm, and equipped with a sump to collect and dispose of wash water.

Vehicle and Equipment Fueling

Construction vehicles will be fueled offsite when possible. When necessary, NS-9 will be used on all vehicles that cannot be fueled offsite. If fueling or maintenance must be done onsite, activities must be performed on level ground in areas protected from stormwater run-on and runoff.

Vehicle and Equipment Maintenance

Most construction vehicles will be stored offsite, but NS-10 will be utilized for all equipment that must be stored onsite. Plastic Sheeting will be placed under equipment that is not in use.

Concrete Curing

The Contractor shall not overspray chemical curing compound. Minimize the drift by spraying as close to the concrete as possible. Cover drainage inlets before applying the curing compound. Minimize the use and discharge of water by using wet blankets or similar methods to maintain moisture while curing concrete.

Concrete Finishing

Collect and dispose of water and solid waste from high-pressure water blasting. Cover drainage inlets within 50 feet before sandblasting. Minimize drift of dust and blast material by keeping the nozzle close to the surface of the concrete. The blast residue may contain hazardous material. Inspect concrete finishing containment structures for damage before each day of use and before predicted precipitation. Remove liquid and solid waste from containment structures after each work shift.

Demolition Removal Adjacent to Water

Demolition/Removal adjacent to water bodies (full, running, stagnant or empty) shall not enter the water body or cause a pollutant discharge into the water body. Utilize the BMP guidance sheet for specific installations.

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Table 3.3 Temporary Non-Stormwater BMPs

Fact Sheet[1]	BMP Name	Considered for the Project[2]	Construction Phase Used			
			Demo/ Pre-Construction	Grading	Concrete	Final Stabilization
NS-1	Water Conservation Practices	✓	✓	✓	✓	✓
NS-2	Dewatering Operation	✓	✓	✓	✓	✓
NS-3	Paving and Grinding Operation		✓	✓	✓	✓
NS-4	Temporary Stream Crossing		n/a			
NS-5	Clear Water Diversion					
NS-6	Illicit Connection/ Discharge	✓	✓	✓	✓	✓
NS-7	Potable Water/Irrigation	✓	✓	✓	✓	✓
NS-8	Vehicle and Equipment Cleaning	✓	✓	✓	✓	✓
NS-9	Vehicle and Equipment Fueling	✓	✓	✓	✓	✓
NS-10	Vehicle and Equipment Maintenance	✓	✓	✓	✓	✓
NS-11	Pile Driving Operation		n/a			
NS-12	Concrete Curing		✓	✓	✓	✓
NS-13	Concrete Finishing		✓	✓	✓	✓
NS-14	Material and Equipment Use Over Water		n/a			
NS-15	Demolition Removal Adjacent to Water		✓	✓	✓	✓
NS-16	Temporary Batch Plants		n/a			

Notes:
1. CASQA Fact Sheets, 2024 Edition or most current.
2. The General Permit's Fact Sheet Section II.J.1.c through II.J.1.g describes various BMPs that should be considered for use on the construction site.

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3.3.2 Materials Management and Waste Management

Materials management control practices consist of implementing procedural and structural BMPs for handling, storing, and using construction materials to prevent the release of those materials into stormwater discharges. The amount and type of construction materials to be utilized at the Site will depend upon the type of construction and the length of the construction period. The materials may be used continuously, such as fuel for vehicles and equipment, or the materials may be used for a discrete period, such as soil binders for temporary stabilization.

Waste management consist of implementing procedural and structural BMPs for handling, storing, and ensuring proper disposal of wastes to prevent the release of those wastes into stormwater discharges.

Materials and waste management pollution control BMPs will be implemented to minimize stormwater contact with construction materials, wastes, and service areas; and to prevent materials and wastes from

being discharged off-site. The primary mechanisms for stormwater contact that shall be addressed include:

- Direct contact with precipitation
- Contact with stormwater run-on and runoff
- Wind dispersion of loose materials
- Direct discharge to the storm drain system through spills or dumping
- Extended contact with some materials and wastes, such as asphalt cold mix and treated wood products, which can leach pollutants into stormwater.

A list of construction activities is provided in Section 2.6. The following Materials and Waste Management BMP selection table, Table 3-5, indicates the BMPs that shall be implemented to handle materials and control construction site wastes associated with these construction activities. Fact Sheets for Materials and Waste Management BMPs are provided in Appendix G.

Material management BMPs will be implemented in conformance with the following guidelines and in accordance with the BMP Fact Sheets provided in Appendix G. If there is a conflict between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.

Material Delivery and Storage

The Contractor shall establish an onsite construction yard for this project and shall utilize the yard for storage of materials. Secondary containment shall be provided for any hazardous chemicals as required by the General Permit and other Federal and State regulations. Construction materials shall be brought onsite when needed to complete construction operations. Employees and subcontractors shall be trained on proper material delivery and storage practices. The contractor shall implement material delivery and storage primarily during unloading and handling of materials onsite.

Material Use

The Contractor shall use materials in accordance with the Manufacturer's specifications to avoid misuse. The Contractor shall mix and prepare a proper amount of material to avoid excess at the end of each work shift. Drip pans, safety data sheets, a material inventory, emergency contact numbers, spill kits, and absorbent pads shall be kept onsite and employed for any spills that occur.

Stockpile Management

Implement water pollution control practices within 48 hours of stockpiling material or before a forecasted storm event, whichever occurs first. If stockpiles are being used, do not allow soil, sediment, or other debris to enter storm drains, open drainages, and watercourses. Active and inactive soil stockpiles and stockpiles must be, covered with plastic tarpaulins and surrounded with a linear sediment barrier, such as gravel bags.

Spill Prevention and Control

Throughout the project limits the contractor will implement spill and leak prevention procedures for chemicals and hazardous substances when encountered on the jobsite. The project foreman will keep a spill and clean up kit in his truck at all times while onsite to allow for quick clean-up of all spills or leaks. Material and waste storage areas clean will be kept clean, well-organized, and equipped with enough cleanup supplies for the material being stored. As soon as it is safe,

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contain and clean up spills of petroleum materials and sanitary and septic waste substances listed under 40 CFR, Parts 110, 117, and 302.

Solid Waste Management

Throughout project, the Contractor will load solid wastes directly into trucks and/or waste disposal containers for off-site disposal weekly. Waste disposal containers will be covered at the end of every business day and during rain events. There will be watertight, closed-lid dumpsters to contain the solid waste generated by work activities. Dumpsters and trash receptacles will be placed in locations where workers eat lunch. When refuse reaches the fill line, the dumpsters shall be emptied. Dumpster will not be allowed to be washed out at the job site.

Hazardous Waste Management

Throughout the project limits, should the Contractor encounter hazardous waste during the course of the project, WM-6 practices will be implemented.

Contaminated Soil Management

Throughout the project limits, should the contractor encounter contaminated soil(s) during the course of the project, WM-7 practices will be implemented.

Concrete Waste Management

The Contractor will implement concrete waste management in the construction project yard and multiple areas throughout the construction project area. The temporary concrete washout will be furnished, maintained, and removed as necessary. The contractor will use portable temporary concrete washouts as a water pollution control practice for any concrete waste that is produced. All concrete washouts will be properly marked, covered before any rain event, and will be maintained properly. Employees, subcontractors, and suppliers shall be fully educated on the concrete waste management techniques outlined in the following practices and procedures: PCC and AC wastes shall not be allowed to enter storm drains or watercourses. Concrete pours or operations that will generate concrete slurries will not be conducted during or immediately prior to rainfall events.

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Sanitary-Septic Waste Management

Contractor shall not bury or discharge wastewater from a sanitary or septic system within the highway. Place a portable sanitary facility at least 50 feet away from storm drains, receiving waters, and flow lines. Portable toilets shall be inspected daily and maintained weekly.

Liquid Waste Management

The Contractor shall implement the Liquid Waste Management BMP when liquid wastes are anticipated to prevent it from entering the storm drain and receiving waters. Hold liquid waste in structurally sound, leak-proof containers, such as roll-off bins or portable tanks. Liquid waste containers must be of sufficient quantity and volume to prevent overflow, spills, and leaks. Store containers at least 50 feet from moving vehicles and equipment. All liquid wastes shall be stored in covered storage areas and within leak proof containers. Liquid wastes shall be properly collected and disposed of offsite.

Table 3.4 Temporary Materials Management BMPs

Fact Sheet[1]	BMP Name	Considered for Project[2]	Construction Phase Used			
			Demo/ Pre-Construction	Grading	Concrete	Final Stabilization
WM-01	Material Delivery and Storage	✓	✓	✓	✓	✓
WM-02	Material Use	✓	✓	✓	✓	✓
WM-03	Stockpile Management	✓	✓	✓	✓	✓
WM-04	Spill Prevention and Control	✓	✓	✓	✓	✓
WM-05	Solid Waste Management	✓	✓	✓	✓	✓
WM-06	Hazardous Waste Management	✓	✓	✓	✓	✓
WM-07	Contaminated Soil Management		✓	✓	✓	✓
WM-08	Concrete Waste Management	✓	✓	✓	✓	✓
WM-09	Sanitary-Septic Waste Management	✓	✓	✓	✓	✓
WM-10	Liquid Waste Management		✓	✓	✓	✓

Notes:
1. CASQA Fact Sheets, 2024 Edition or most current.
2. The General Permit's Fact Sheet Section II.J.1.c through II.J.1.g describes various BMPs that should be considered for use on the construction site.

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3.4 TMDL-RELATED BMPS

Bacteria TMDL BMPs:

- The QSP shall conduct training for construction site staff on routine housekeeping and sanitary waste management of identified sources of bacteria.
- Structural BMPs designed for retention, infiltration, or diversion of stormwater shall be evaluated and implemented when the implemented minimum source control BMPs are inadequate to reduce bacteria loading to receiving waters.

Chloride and Salts TMDL BMPs:

- No additional BMPs are identified for this pollutant category in the 2022 CGP.

Diazinon TMDL BMPs:

- No additional BMPs are identified for this pollutant category in the 2022 CGP.

Nutrient TMDL BMPs:

- No additional BMPs are identified for this pollutant category in the 2022 CGP.

Sediment TMDL BMPs:

- No additional BMPs are identified for this pollutant category in the 2022 CGP.

Temperature BMPs:

- No additional BMPs are identified for this pollutant category in the 2022 CGP.

Metals and Toxics TMDL BMPs:

- No additional BMPs are identified for this pollutant category in the 2022 CGP.

3.5 POST CONSTRUCTION STORMWATER MANAGEMENT MEASURES

Post construction BMPs are permanent measures installed during construction, designed to reduce or eliminate pollutant discharges from the site after construction is completed. This site is not subject to the post-construction requirements of an existing NPDES Phase I or Phase II MS4.

The post construction runoff reduction requirements have been satisfied through compliance with 2022 CGP Provision IV.N.3 and use of the SMARTS water balance calculator. The post construction requirements were uploaded as part of the PRDs as required by 2022 CGP Provision IV.N.2.

The following source control, site design, and treatment control post-construction BMPs to comply with 2022 CGP Section IV.N.3 have been identified for the site:

- Reduction of potential runoff from the site (basin)
- Development of onsite graded swales to retain 24hr, 2 day 85th percentile rain event

A plan for the post construction funding and maintenance of these BMPs has been developed to address at minimum five years following construction. The post construction BMPs that are described above will be funded and maintained as described in the Operations and Maintenance Plan that will be uploaded with the NOT.

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Section 4 BMP Inspection and Maintenance

4.1 BMP INSPECTION AND MAINTENANCE

The 2022 CGP requires routine weekly inspections of BMPs, along with inspections before, during, and after qualifying precipitation events. A BMP inspection checklist must be filled out for inspections and maintained on-site with the SWPPP. The inspection checklist must include the necessary information covered in Section 7.6. A blank BMP Inspection Form can be found in Appendix H. Completed forms will be kept in Appendix N.

Maintenance, repair, or design and implementation of new BMPs alternatives will begin withing 72 hours of the identification of failures or other shortcomings. Corrections will be completed as soon as possible, prior to the next forecasted precipitation event (2022 CGP Appendix D Section II.J).
The QSP will verify that all BMP maintenance and repairs were appropriately implemented during the next visual inspection following completion.

The QSP may delegate BMP maintenance and repair verification to an appropriately trained QSP Delegate.

Specific details for maintenance, inspection, and repair of Construction Site BMPs can be found in the BMP Factsheets in Appendix G.

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Section 5 Training

Appendix J identifies the QSPs and QSP Delegates for the project. To promote stormwater management awareness specific for this project, periodic training of job-site personnel will be included as part of routine project meetings (e.g., daily/weekly tailgate safety meetings), or task specific training as needed. Refresher training will be provided as necessary.

The QSP will be responsible for providing this information at the meetings, and subsequently completing the Training Reporting Form shown in Appendix I, which identify the site-specific stormwater topics covered as well as the names of site personnel who attended the meeting.

The QSP may delegate specific tasks to trained QSP Delegates who have received the following training based on the guidelines developed by the Construction General Permit Training Team.

1. **Foundational training** for all QSP Delegate(s) regarding stormwater compliance roles and responsibilities, forecast information, and documentation and reporting procedures; and
2. **Site-specific training** regarding visual inspections, sampling procedures, and/or SWPPP and BMP implementation activities relevant to the responsibilities assigned to the QSP Delegate(s).

The delegate cannot perform the QSD and QSP inspections required in Section V.C.4 or Section V.D.2, respectively.

Documentation of training activities will be retained in Appendix I.

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Section 6 Responsible Parties and Operators

6.1 RESPONSIBLE PARTIES

The DAR responsible for SWPPP implementation and have authority to sign permit-related documents is listed below. The DAR assigned to this project is:

Name	Title	Phone Number
Jelene de Melo	Administrative Coordinator	(209) 827-7056

QSDs identified for the project are identified in Appendix J. The QSD will have primary responsibility for assessing how construction activities will affect sediment transport, erosion, and other discharges of pollutants in stormwater runoff throughout the project. The QSD is required to revise the SWPPP to address potential problems identified by visual inspections, sampling data, comments from a QSP, or their own site observations. The QSD is required to perform the following on-site visual inspections:

- Within 30 days of construction activities commencing on site;
- Within 30 days when a new QSD is assigned to the project;
- Twice annually, once August through October and once January through March;
- Within 14 calendar days after a numeric action level exceedance; and
- Within the time period requested in writing from Regional Water Board staff.

QSPs and QSP Delegates identified for the project are identified in Appendix J. The QSP will have primary responsibility and significant authority for the implementation, maintenance, and inspection/monitoring of SWPPP requirements. The QSP will be available at all times throughout the duration of the project.

Duties of the QSP include but are not limited to:

- Implementing all elements of the 2022 CGP and SWPPP, including, but not limited to:
    - Performing the following on-site visual inspections:
        - One inspection per calendar month; other weekly inspections in the month can be delegated to a trained QSP Delegate under the specific direction of the QSP.
        - Within 72 hours prior to a forecasted qualifying precipitation event, to inspect any areas of concern and to verify the status of any deficient BMPs, or other identified issues at the site. If extended forecast precipitation data (greater than 72 hours) is available from the National Weather Service, then the Pre-Precipitation Event inspection may be done up to 120 hours in advance.
        - Within 14 days after a NAL exceedance, the QSP shall visually inspect the drainage area for exceedance and document any areas of concern.
        - Prior to the submittal for the NOT or COI (for acreage changes) for all or part of the site.
    - Ensuring that all BMPs are implemented, inspected, and properly maintained;
    - Ensure that the SMARTS generated WDID Number Notification form is posted on-site, in a location viewable by the public or readily available upon request, and the dates are correct and match the dates listed in SMARTS.
- Implementing non-stormwater management, and materials and waste management activities such as: monitoring discharges; general Site clean-up; vehicle and equipment cleaning, fueling and maintenance; spill control; ensuring that no materials other than stormwater are discharged in quantities which will have an adverse effect on receiving waters or storm drain systems, etc.;
- Ensuring elimination of unauthorized discharges.

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- The QSPs shall be assigned authority by the LRP to mobilize crews in order to make immediate repairs to the control measures.
- Coordinate with the Contractor(s) to assure the necessary corrections/repairs are made immediately and that the project complies with the SWPPP, the 2022 CGP, and approved plans at all times.
- Notifying the LRP or Duly Authorized Representative immediately of off-site discharges or other non-compliance events.
- Providing foundation and site-specific training to QSP Delegates and overseeing QSP Delegate work. Tasks that may be delegated to appropriately trained QSP-delegates include:
    - Performing non-stormwater and stormwater visual observations and inspections;
    - Performing stormwater sampling and analysis, as required; and
    - Performing routine inspections and observations.

Table 6-1. QSP and QSP Delegate Authorized Inspections

	Weekly BMP and NSW	Pre-QPE	Daily-QPE Visual Inspections	Post-QPE Visual Inspections	Post NAL Exceedances	Monthly BMP and NSW	NOT
QSP	X	X	X	X	X	X	X
QSP Delegate	X		X	X			

6.2 CONTRACTOR LIST

The list of contractors with potential for ground disturbance or pollutant discharges are located in Appendix K.

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Section 7 Construction Site Monitoring Program

7.1 Purpose

This Construction Site Monitoring Program was developed to address the following objectives:

1. To demonstrate that the site is in compliance with the Discharge Prohibitions;
2. To determine whether non-visible pollutants discharged from the construction site and are causing or contributing to exceedances of water quality objectives;
3. To determine whether immediate corrective actions, additional BMP implementation, or SWPPP revisions are necessary to reduce pollutants in stormwater discharges and authorized non-stormwater discharges;
4. To determine whether BMPs included in the SWPPP are effective in preventing or reducing pollutants in stormwater discharges and authorized non-stormwater discharges.

7.2 Applicability of Permit Requirements

This project has been determined to be a Risk Level 1 project. The 2022 CGP identifies the following types of monitoring as being applicable for a Risk Level 1 project.

- Visual inspections of BMPs;
- Visual monitoring of the site related to qualifying precipitation events;
- Visual monitoring of the site for non-stormwater discharges;
- Sampling and analysis of construction site runoff for non-visible pollutants [including TMDL pollutants] identified during the pollutant source assessments when applicable; and
- Sampling and analysis of construction site runoff as required by the Regional Water Board when applicable.

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7.3. Weather and Precipitation Event Tracking

Visual monitoring and inspections requirements of the 2022 CGP are triggered by a Qualifying Precipitation Event. The 2022 CGP defines a Qualifying Precipitation Event as any weather pattern that is forecast to have a 50 percent or greater Probability of Precipitation (PoP) and a Quantitative Precipitation Forecast (QPF) of 0.5 inches or more within a 24-hour period. The event begins with the 24-hour period when 0.5 inches has been forecast and continues on subsequent 24-hour periods when 0.25 inches of precipitation or more is forecast.

7.3.1 Weather Tracking

The QSP should daily consult the National Oceanographic and Atmospheric Administration (NOAA) for the Forecast Weather Table Interface. These forecasts can be obtained at http://forecast.weather.gov. Weather reports should be printed and maintained with the SWPPP in Appendix M. Record the date and time the forecast was printed.

7.3.2 Rain Gauges

The Contractor shall install one (1) rain gauge on the project site. Locate the gauge in an open area away from obstructions such as trees or overhangs. Mount the gauge on a post at a height of 3 to 5 feet with the gauge extending several inches beyond the post. Make sure that the top of the gauge is level. Make sure the post is not in an area where rainwater can indirectly splash from sheds, equipment, trailers, etc.

The rain gauge shall be read daily during normal site scheduled hours. The rain gauge should be read at approximately the same time every day and the date and time of each reading recorded. An example rain gauge log sheet is provided in Appendix O. Retain rain gauge readings in Appendix N. Follow the rain gauge instructions to obtain accurate measurements.

Once the rain gauge reading has been recorded, accumulated rain shall be emptied, and the gauge reset. For comparison with the site rain gauge, the nearest appropriate NOAA governmental rain gauge is located at the San Luis National Wildlife Refuge, 7 miles north of the project site.

7.4 Monitoring Locations

Monitoring locations are shown on the Site Maps in Appendix A. Monitoring locations are described in Sections 7.6 and 7.7. Whenever changes in the construction site might affect the appropriateness of sampling locations, the sampling locations shall be revised accordingly. All such revisions shall be implemented as soon as feasible and the SWPPP amended. Temporary changes that result in a one-time additional sampling location do not require a SWPPP amendment.

7.5 Safety and Monitoring Exemptions

Safety practices for sample collection will be in accordance with the State of California, Department of Transportation "Construction Site Monitoring Program Guidance Manual" (Aug 2013). A summary of the safety requirements that apply to sampling personnel is provided below.

- Appropriate Construction Site Clothing – Pants, Boots
- PPE – Hard Hat, High Visibility Reflective Vest, Safety Glasses

This project is not required to collect samples or conduct visual observations (inspections) under the following conditions (see Section III.B of the 2022 CGP):

- During dangerous weather conditions such as electrical storms, flooding, and high winds above 40 miles per hour;
- Outside of scheduled site operating hours; or
- When the site is not accessible to personnel.

Scheduled site business hours are Monday – Friday, 7:00 am – 5:00 pm excluding standard holidays and scheduled non-operational times. If monitoring (visual monitoring or sample collection) of the site is unsafe because of the dangerous conditions noted above, then the QSP shall document the conditions for why an exception to performing the monitoring was necessary. The exemption documentation will be filed in Appendix N and must be included in the Annual Report.

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7.6 Visual Monitoring

Per Section III.B.2. of Attachment D in the 2022 CGP, "For inactive projects, dischargers may reduce the visual inspection frequency and suspend sampling per Section III.G of the 2022 CGP. Dischargers shall provide an explanation with supporting information for all missed visual inspections or sampling required by this Attachment, to be included in the Annual Report."

Visual monitoring includes observations and inspections. Inspections of BMPs are required to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. Visual observations of the site are required to observe storm water drainage areas to identify any spills, leaks, or uncontrolled pollutant sources.

Table 7-1 identifies the required frequency of visual observations and inspections. Inspections and observations will be conducted at the locations identified in Section 7.6.3.

Table 7-1 Summary of Visual Monitoring and Inspections

Type of Inspection	Frequency
Routine Inspections[1]	
BMP Inspections	Weekly[2]
BMP Inspections – Track-out Control	Daily[4]
BMP Inspections – Spill Prevention Staging Area, Work Area, Material Storage Area(s)	Daily[4]
Qualifying Precipitation Event Triggered Inspections	
Site Inspections Prior to a Qualifying Precipitation Event	Within 72 hours of a qualifying precipitation event or up to 120 hours prior if supported with forecast 2
BMP Inspections During an Extended Qualifying Precipitation Event	Once every 24-hour period of a qualifying precipitation event3
Site Inspections Following a Qualifying Precipitation Event	Within 96 hours of a qualifying precipitation event2
Note: 1. Inspections are required during scheduled site operating hours. 2. Most BMPs must be inspected weekly; those identified below must be inspected more frequently. 3. Inspections are required during scheduled site operating hours on days that the forecast predicts at least 0.25 inches of precipitation once the qualifying precipitation event commences.	

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7.6.1 Routine Observations and Inspections

Routine site inspections and visual monitoring are necessary to confirm that the project is in compliance with the requirements of the 2022 CGP.

7.6.1.1 Routine BMP Inspections

Inspections of BMPs are conducted to identify and record:

- BMPs that are properly installed;
- BMPs that need maintenance to operate effectively;
- BMPs that have failed; or
- BMPs that could fail to operate as intended.

7.6.1.2 Non-Stormwater Discharge Observations

Each drainage area will be inspected for the presence of or indications of prior unauthorized and authorized non-stormwater discharges. Inspections will record:

- Presence or evidence of any non-stormwater discharge (authorized or unauthorized);
- Identification and elimination of unauthorized non-stormwater discharges
- Pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.); and
- Source of discharge.

7.6.2 Qualifying Precipitation Event Triggered Observations and Inspections

Visual observations of the site and inspections of BMPs are required prior to a qualifying precipitation event; following a qualifying precipitation event, and every 24-hour period during a qualifying precipitation event. Pre-Qualifying Precipitation Event inspections will be conducted after consulting NOAA and determining that a precipitation event with a 50 percent or greater PoP and a QPF of 0.5 inches or more precipitation within a 24-hour period has been predicted by the National Weather Service Forecast Office.

7.6.2.1 Visual Observations Prior to a Forecasted Qualifying Precipitation Event

Within 72 hours prior to a qualifying precipitation event or up to 120 hours prior if extended forecast precipitation data is available, a stormwater visual monitoring site inspection will include observations of the following locations:

- All stormwater drainage areas to identify leaks, spills, or uncontrolled pollutant sources and when necessary, implement appropriate corrective actions.
- All BMPs to identify whether they have been properly implemented per the SWPPP and implement appropriate corrective actions, as necessary.
- All stormwater storage and containment areas to detect leaks and check for available capacity to prevent overflow.

The QSP must conduct the inspection prior to the qualifying precipitation event. Consistent with the requirements for a qualifying precipitation event, pre-rain BMP inspections and visual monitoring will be triggered by a NOAA forecast that indicates a 50 percent or greater probability of 0.5 inches of precipitation or more in a 24-hour period in the project area.

7.6.2.2 BMP Inspections During a Qualifying Precipitation Event

During an extended qualifying precipitation event BMP inspections will be conducted at least once every 24 hours. Qualifying precipitation events are extended for each subsequent 24-hour period forecast to have at least 0.25 inches of precipitation. The BMP inspections are to identify and record:

- If BMPs were adequately designed, implemented and effective.
- BMPs that require repair or replacement due to damage.
- Additional BMPs that need to be implemented and revise the SWPPP accordingly.

If the construction site is not accessible during the rain event, the visual inspections shall be performed at all relevant outfalls, discharge points, downstream locations. The inspections should record any projected maintenance activities.

7.6.2.3 Visual Observations Following a Qualifying Precipitation Event

Within 96 hours following the end of a qualifying precipitation event a stormwater visual monitoring site inspection is required to observe:

- If BMPs were adequately designed, implemented and effective.
- BMPs that require repair or replacement due to damage.
- Additional BMPs that need to be implemented and revise the SWPPP accordingly.

7.6.3 Visual Monitoring Procedures

Visual monitoring shall be conducted by the QSP or QSP Delegates. The name(s) and contact number(s) of the QSPs or QSP Delegates assigned to conduct visual observations are listed below and their training qualifications are provided in Appendix J.

Assigned QSP: Greg Feaver	Contact phone: 559-449-2700
Assigned QSP: Gretchen Heisdorf	Contact phone: 559-449-2700
Assigned QSP: Yvan Mendoza	Contact phone: 559-449-2700

Stormwater observations shall be documented on the *Visual Inspection Field Log Sheet* (see Appendix O). BMP inspections shall be documented on the site-specific BMP inspection checklist and include photographs of areas of concern along with the QSP's description of the problem.

The QSP shall, within 2 business days of the inspection submit copies of the completed inspection report to the QSD, LRP, Contractor, and Construction Manager (if applicable).

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The completed reports will be kept in Appendix N or electronically. Results of visual monitoring must be summarized and reported in the Annual Report.

7.6.4 Visual Monitoring Follow-Up and Reporting

Maintenance, repairs, and correction of deficiencies, including design changes to BMPs, identified by the observations or inspections, including required repairs or maintenance of BMPs, shall be initiated within 72 hours of identification and completed as soon as possible, prior to the next forecasted precipitation event.

When design changes to BMPs are required, the SWPPP shall be amended to reflect the changes.

Deficiencies identified in site inspection reports and correction of deficiencies will be tracked on the *Inspection Field Log Sheet* or *BMP Inspection Report* shall be kept in Appendix N. QSP Delegates shall report issues identified during inspections that require corrective action to the QSP within 24 hours of the observation.
The QSP shall, within 2 business days of the inspection submit copies of the completed *Inspection Field Log Sheet* or *BMP Inspection Report* with the corrective actions to the QSD, LRP, Contractor, and Construction Manager (if applicable). Results of visual monitoring must be summarized and reported in the Annual Report.

7.6.5 Visual Monitoring Locations

The inspections and observations identified in Sections 7.6.1 and 7.6.2 will be conducted at the locations identified in this section.

BMP locations are shown on the Site Maps in Appendix A.

There are 11 drainage areas on the project site and the contractor's yard, staging areas, and storage areas. Drainage areas are shown on the Site Maps in Appendix A and Table 7-2 identifies each drainage area by location.

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Table 7-2 Site Drainage Areas

Location No.	Location
DA1	East exterior levee swale, north cell
DA2	East exterior levee swale, south cell
DA3	South exterior levee swale, south cell
DA4	West exterior levee swale, south cell
DA5	West exterior levee swale, central cell
DA6	West exterior levee swale, north cell
DA7	Interior, north cell
DA8	Cell travel path, north-central cells
DA9	Interior, central cell
DA10	Cell travel path, south-central cells
DA11	Interior, south cell

There are no stormwater storage or containment areas on the project site from which stormwater will be dewatered. There are no proposed or known discharge locations on the project site. If there are site discharges, the discharge locations will be shown on the Site Maps in Appendix A and Table 7-4 will identify each stormwater discharge location.

Table 7-4 Site Stormwater Discharge Locations

Location No.	Location

7.7 Water Quality Sampling and Analysis

7.7.1 Sampling and Analysis Plan for Non-Visible Pollutants in Stormwater Runoff Discharges

This Sampling and Analysis Plan for Non-Visible Pollutants describes the sampling and analysis strategy and schedule for monitoring non-visible pollutants in stormwater runoff discharges from the project site.

Sampling for non-visible pollutants, including those associated with TMDLs will be conducted when (1) a breach, leakage, malfunction, or spill is observed; and (2) the leak or spill has not been cleaned up prior to the rain event; and (3) there is the potential for discharge of non-visible pollutants to surface waters or drainage system.

Table 7-5 summarizes the potential non-visible pollutants identified in the pollutant source assessment in Section 2, and the water quality constituent or indicator for that pollutant. Drainage areas where the source is present are shown on the Site Maps in Appendix A. For other pollutants or activities that may be onsite, refer to the 2013 Caltrans Construction Site Monitoring Program Guidance Manual Table 5-1. Pollutant Testing Guidance Table included with Table 7.7.

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Table 7.5 Potential Non-Visible Pollutants and Water Quality Indicator Constituents

Pollutant Source	Pollutant	Water Quality Indicator Constituent
Adhesives		COD, Phenols, SVOCs
Cleaning	Acids	pH
	Bleaches	Residual Chlorine
	Solvents	VOCs, SVOCs
	Detergents	MBAS
	TSP	Phosphate
Concrete	Sealants	SVOC, VOCs, pH, Al, Ca, Va, Zn
	Curing Compounds	VOCs, SVOCs, pH
	Ash, Sand, Slag	pH, Al, Ca, Va, Zn
Framing/Carpentry	Treated Wood	Cu, Cr, As, Zn
	Untreated Wood	BOD
	Particle Board	Formaldehyde
Grading/Earthwork	Soils	Turbidity
Liquid Waste		Constituents specific to materials onsite
Painting	Resins	COD, SVOC
	Thinner	COD, VOCs

Table 7.5 Potential Non-Visible Pollutants and Water Quality Indicator Constituents

Pollutant Source	Pollutant	Water Quality Indicator Constituent
	Paint Strippers	VOCs, SVOCs, metals
	Lacquers, varnishes, enamels	COD, VOCs, SVOCs,
	Sealants	COD
	Adhesives	Phenols, SVOCs
Plumbing	Solder, Flux, Pipe fittings	Cu, Pb, Sn, Zn
Sanitary Waste	Portable Toilets, Sewer Line Breaks	BOD, Total/Fecal Coliform
Utility Line Testing		Residual chlorine, Chloramines
Vehicle/Equipment Use	Fuels, Oils, Greases	PCBs, Fuel
	Batteries	Sulfuric Acid, Pb, pH
Note: Adapted from Attachment S, Caltrans SWPPP/WPCP Preparation Manual vs. 2003 and CASQA Construction BMP Handbook		

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7.7.1.1 Sampling Schedule

Samples for the potential non-visible pollutant(s) and a sufficiently large unaffected background sample shall be collected during the first eight hours of discharge from rain events that result in a sufficient discharge for sample collection. Samples shall be collected during the site's scheduled hours and shall be collected regardless of the time of year and phase of the construction.

Collection of discharge samples for non-visible pollutant monitoring will be triggered only when any of the following conditions are observed during site inspections conducted prior to or during a rain event.

- Materials or wastes containing potential non-visible pollutants are not stored under watertight conditions. Watertight conditions are defined as (1) storage in a watertight container, (2) storage under a watertight roof or within a building, or (3) protected by temporary cover and containment that prevents stormwater contact and runoff from the storage area.
- Materials or wastes containing potential non-visible pollutants are stored under watertight conditions, but (1) a breach, malfunction, leakage, or spill is observed, (2) the leak or spill is not cleaned up prior to the rain event, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- A construction activity, including but not limited to those in Section 2.6, with the potential to contribute non-visible pollutants (1) was occurring during or within 24 hours prior to the rain event, (2) BMPs were observed to be breached, malfunctioning, or improperly implemented, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- Soil amendments that have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil have been applied, and there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- Stormwater runoff from an area contaminated by historical usage of the site has been observed to combine with stormwater runoff from the site, and there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.

7.7.1.2 Sampling Locations

Sampling locations are based on proximity to planned non-visible pollutant storage, occurrence or use, accessibility for sampling, and personnel safety. There are no planned non-visible pollutant sampling locations. If sampling is required, they will be added to Site Maps in Appendix A and included the locations identified in Table 7-6.

Table 7-6 Non-Visible Pollutant Sample Locations

Sample Location Identifier	Sample Location Description	Sample Location Latitude and Longitude (Decimal Degrees)	Runoff or Run-on

If a stormwater visual monitoring site inspection conducted prior to or during a storm event identifies the presence of a material storage, waste storage, operations area with spills, or the potential for the discharge of non-visible pollutants to surface waters or a storm drain system that is at a location not listed above and has not been identified on the Site Maps, sampling locations will be selected by the QSP using the same rationale as that used to identify planned locations. Non-visible pollutant sampling locations shall be documented by the QSP on the pre-rain event inspection form prior to a forecasted qualifying precipitation event and the *Effluent Sampling Field Log Sheet*, which are provided in Appendix O.

7.7.1.3 Monitoring Preparation

Non-visible pollutant samples will be collected by:

QSP ☒ Yes ☐ No

QSP Delegate ☐ Yes ☒ No

An adequate stock of monitoring supplies and equipment for monitoring non-visible pollutants will be available on the project site prior to a sampling event. Monitoring supplies and equipment will be stored in a cool temperature environment that will not come into contact with rain or direct sunlight. The QSP or QSP Delegates responsible for sampling will be available to collect samples in accordance with the sampling schedule. Supplies maintained at the project site will include, but are not limited to, clean powder-free nitrile gloves, sample collection equipment, coolers, appropriate number and volume of sample bottles, identification labels, re-sealable storage bags, paper towels, personal rain gear, ice, and *Effluent Sampling Field Log Sheets* and Chain of Custody (CoC) forms, which are provided in Appendix O.

7.7.1.4 Analytical Constituents

Table 7-5 lists the specific sources and types of potential non-visible pollutants based on the project pollutant source assessment and the water quality indicator constituent(s) for that pollutant. Table 7-7 provides the specific analytical methods and reporting limits for the potential non-visible pollutants. Analytical methods were selected in compliance with U.S. EPA sufficiently sensitive method requirements in 40 Code of Federal Regulations Part 136, as evidenced by the method detection limit and minimum level.

7.7.1.5 Sample Collection

Samples of discharge shall be collected at the designated non-visible pollutant sampling locations identified in Table 7-6 and shown on the Site Maps in Appendix A or in the locations determined by

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observed breaches, malfunctions, leakages, spills, operational areas, soil amendment application areas, and historical site usage areas that triggered the sampling event.

Grab samples shall be collected and preserved in accordance with the methods identified in Table 7-7, "Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants" provided in Section 7.7.1.6. Only the QSP, or QSP Delegates trained on sample collection identified in Section 7.7.1.3 shall collect samples.

Sample collection and handling requirements are described in Section 7.7.7.

7.7.1.6 Sample Analysis

Samples shall be analyzed using the analytical methods identified in Table 7-7 or in the 2013 Caltrans Construction Site Monitoring Program Guidance Manual Table 5-1. Pollutant Testing Guidance Table. Samples will be analyzed by:

Laboratory Name:	BSK Associates
Street Address:	687 N Laverne
City, State Zip:	Fresno, CA 93727
Telephone Number:	800-877-8310
ELAP Certification Number:	1108

Samples will be delivered to the laboratory by:

Driven by QSP/QSP Delegate/Contractor	☒	Yes	☐	No
Picked up by Laboratory Courier	☐	Yes	☒	No
Shipped	☐	Yes	☒	No

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Table 7.7 Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants

Constituent	Analytical Method	Minimum Sample Volume	Sample Containers	Sample Preservation	Reporting Limit	Maximum Holding Time
pH	Litmus paper or test kits	40 ml	PTFE, plastic, glass	None	9>x>6	15 min
Oil & Grease	EPA 1664A	1 L	Glass amber	HCl	5 mg/L	28 d
Total Suspended Solids	SM 2540-D	500 ml	1 L Poly	None	1 mg/L	7 d
Total Cyanide	SM 4500-CN C, D, or E	250 ml	PTFE, plastic,	NaOH*	0.005 mg/L	14 d
Ammonia (as N)	SM 4500-NH3 B+ C or E	50 ml	125 ml Poly	H2SO4	0.02 mg/L	28 d
Dissolved Ag, Al, As, Cu, Hg, Pb, Se	EPA 200.8	500 ml	PTFE, plastic, glass	HNO3	0.005 mg/L	180 d
Dissolved Fe, Mg, Zn	EPA 200.7	500 ml	PTFE, plastic, glass	HNO3	0.005 mg/L	180 d
Dissolved Hg	EPA 245.1	500 ml	PTFE, plastic, glass	HNO3	0.005 mg/L	180 d
Chemical Oxygen Demand	SM 5220C	10 ml	125 Poly	H2SO4	50 mg/L	28 d
Chlorpyrifos & Diazinon	EPA 8141B	1 L	Glass amber	None	0.7; 2.0 µg/L	7 d
Organochlorine Pesticides	EPA 8081	1 L	Glass amber	None	0.05 – 5 µg/L	7 d
Total Organic Carbon	EPA 9060A	1 L	Glass amber	H_2SO_4	0.05 mg/L	14 d
Notes:						
*Cyanide add NaOH to pH>12; metals add HNO3 if pH<2; reporting limit can vary with the laboratory within range limits						

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Table 5-1. Pollutant Testing Guidance Table[1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators[2]	Suggested Analyses Field[3]	Laboratory
Asphalt Products	Hot Asphalt	Yes – Rainbow Surface or Brown Suspension	Visually Observable – No Testing Required		
	Asphalt Emulsion				
	Liquid Asphalt (tack coat)				
	Cold Mix				
	Crumb Rubber	Yes – Black, solid material	Visually Observable – No Testing Required		
	Asphalt Concrete (Any Type)	Yes – Rainbow Surface or Brown Suspension	Visually Observable – No Testing Required		
Cleaning Products	Acids	No	**pH** Acidity Anions (acetic acid, phosphoric acid, sulfuric acid, nitric acid, hydrogen chloride)	pH Meter	EPA 150.2 (pH)
					SM 2310B (Acidity)
					EPA 300.0 (Anion)
	Bleaches	No	**Residual Chlorine**	Chlorine test kit	SM 4500-CL G (Res. Chlorine)
	Detergents	Yes – Foam	Visually Observable - No Testing Required		
	TSP	No	**Phosphate**	None	EPA 365.3 (Phosphate)
	Solvents	No	**VOC**	None	EPA 601/602 or EPA 624 (VOC)
			SVOC	None	EPA 625 (SVOC)

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Table 5-1. Continued

Category	Construction Site Material	Visually Observable?	Pollutant Indicators[2]	Suggested Analyses Field[3]	Laboratory
Portland Concrete Cement & Masonry Products	Portland Cement (PCC)	Yes – Milky Liquid	Visually Observable – No Testing Required		
	Masonry products	No	**pH**	pH Meter	EPA 150.2 (pH)
			Alkalinity		SM 2320 (Alkalinity)
	Sealant (Methyl Methacrylate)	No	**Methyl Methacrylate**	None	EPA 625 (SVOC)
			Cobalt		EPA 200.8 (Metal)
			Zinc		
	Incinerator Bottom Ash Bottom Ash Steel Slag Foundry Sand Fly Ash Municipal Solid Waste	No	**Aluminum** **Calcium** **Vanadium** **Zinc**	None	EPA 200.8 (Metal) EPA 200.7 (Calcium)
	Mortar	Yes – Milky Liquid	Visually Observable – No Testing Required		
	Concrete Rinse Water	Yes – Milky Liquid	Visually Observable – No Testing Required		
	Non-Pigmented Curing Compounds	No	Acidity	pH Meter	SM 2310B (Acidity)
			Alkalinity		SM 2320 (Alkalinity)
			pH		EPA 150.2 (pH)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)

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Table 5-1. Continued

Category	Construction Site Material	Visually Observable?	Pollutant Indicators[2]	Suggested Analyses Field[3]	Laboratory
Landscaping and Other Products	Aluminum Sulfate	No	Aluminum	TDS Meter	EPA 200.8 (Metal)
			TDS		SM2540 C (TDS)
			Sulfate		EPA 300.0 (Sulfate)
	Sulfur-Elemental	No	**Sulfate**	None	EPA 300.0 (Sulfate)
	Fertilizers-Inorganic[4]	No	**Nitrate**	None	EPA 300.0 (Nitrate)
			Phosphate	None	EPA 365.3 (Phosphate)
			Organic Nitrogen	None	SM4500-NH3 C (TKN)
			Potassium	None	EPA 200.8 (Metal)
	Fertilizers – Organic	No	TOC	None	SM 5310 C (TOC)
			Nitrate		EPA 300.0 (Nitrate)
			Organic Nitrogen		SM4500-NH3 C (TKN)
			COD		EPA 410.4 (COD)
	Natural Earth (Sand, Gravel, and Topsoil)	Yes – Cloudiness and turbidity	Visually Observable – No Testing Required		
	Herbicide	No	**Herbicide**	None	Check lab for specific herbicide or pesticide
	Pesticide		**Pesticide**		
	Lime		Alkalinity	pH Meter	SM 2320 (Alkalinity)
			pH		EPA 150.2 (pH)

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Table 5-1. Continued

Category	Construction Site Material	Visually Observable?	Pollutant Indicators[2]	Suggested Analyses Field[3]	Laboratory
Painting Products	Paint	Yes	Visually Observable - No Testing Required		
	Paint Strippers	No	**VOC**	None	EPA 601/602 or EPA 624 (VOC)
			SVOC	None	EPA 625 (SVOC)
	Resins	No	**COD**	None	EPA 410.4 (COD)
			SVOC		EPA 625 (SVOC)
	Sealants	No	**COD**	None	EPA 410.4 (COD)
	Solvents	No	**COD**	None	EPA 410.4 (COD)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)
	Lacquers, Varnish, Enamels, and Turpentine	No	**COD**	None	EPA 410.4 (COD)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)
	Thinners	No	VOC	None	EPA 601/602 or EPA 624 (VOC)
			COD		EPA 410.4 (COD)
Portable Toilet Waste Products	Portable Toilet Waste	Yes	Visually Observable – No Testing Required		

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Table 5-1. Continued

Category	Construction Site Material	Visually Observable?	Pollutant Indicators[2]	Suggested Analyses Field[3]	Laboratory
Contaminated Soil [5]	Aerially Deposited Lead[3]	No	**Lead**	None	EPA 200.8 (Metal)
	Petroleum	Yes – Rainbow Surface Sheen and Odor	Visually Observable – No Testing Required		
	Mining or Industrial Waste, etc.	No	**Contaminant Specific**	Contaminant Specific– Check with laboratory	Contaminant Specific – Check with laboratory
Line Flushing Products	Chlorinated Water	No	**Total chlorine**	Chlorine test kit	SM 4500-CL G (Res. Chlorine)
Adhesives	Adhesives	No	COD	None	EPA 410.4 (COD)
			Phenols	None	EPA 420.1 (Phenol)
			SVOC	None	EPA 625 (SVOC)
Dust Palliative Products	Salts (Magnesium Chloride, Calcium Chloride, and Natural Brines)	No	Chloride	None	EPA 300.0 (Chloride)
			TDS	TDS Meter	SM 2540 C (TDS)
			Cations (Sodium, Magnesium, Calcium)	None	EPA 200.7 (Cations)
Vehicle	Antifreeze and Other Vehicle Fluids	Yes – Colored Liquid	Visually Observable – No Testing Required		
	Batteries	No	Sulfuric Acid	None	EPA 300.0 (Sulfate)
			Lead	None	EPA 200.8 (Metal)
			pH	pH Meter	EPA 150.2 (pH)
	Fuels, Oils, Lubricants	Yes – Rainbow Surface Sheen and Odor	Visually Observable – No Testing Required		

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Table 5-1. Continued

Category	Construction Site Material	Visually Observable?	Pollutant Indicators[2]	Suggested Analyses Field[3]	Laboratory
Soil Amendment/ Stabilization Products	Polymer/Copolymer[6, 7]	No	**Organic Nitrogen**	None	EPA 351.3 (TKN)
			BOD	None	SM 5210 B (BOD)
			COD	None	EPA 410.4 (COD)
			DOC	None	SM 5310 C (DOC)
			Nitrate	None	EPA 300.0 (Nitrate)
			Sulfate	None	EPA 300.0 (Sulfate)
			Nickel	None	EPA 200.8 (Metal)
	Straw/Mulch	Yes – Solids	Visually Observable – No Testing Required		
	Lignin Sulfonate	No	Alkalinity	None	SM 2320 (Alkalinity)
			TDS	TDS Meter	SM 2540 C(TDS)
	Psyllium	No	COD	None	EPA 410.4 (COD)
			TOC		SM 5310 C (TOC)
	Guar/Plant Gums	No	COD	None	EPA 410.4 (COD)
			TOC		SM 5310 C (TOC)
			Nickel		EPA 200.8 (Metal)
	Gypsum	No	pH	pH Meter	EPA 150.2 (pH)
			Calcium	None	EPA 200.7 (Calcium)
			Sulfate	None	EPA 300.0 (Sulfate)
			Aluminum	None	EPA 200.8 (Metal)
			Barium		
			Manganese		
			Vanadium		

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Table 5-1. Continued

Category	Construction Site Material	Visually Observable?	Pollutant Indicators[2]	Suggested Analyses Field[3]	Laboratory
Treated Wood Products	Ammoniacal-Copper-Zinc-Arsenate Copper-Chromium-Arsenic Ammoniacal-Copper-Arsenate Copper Naphthenate	No	Arsenic Total Chromium **Copper** Zinc	None	EPA 200.8 (Metal)
	Creosote	Yes – Rainbow Surface or Brown Suspension	Visually Observable – No Testing Required		

Adapted from Attachment S of the *Storm Water Pollution Prevention Plan/Water Pollution Control Program Preparation Manual* (Caltrans, 2007)

Notes:
1. If specific pollutant is known, analyze only for that specific pollutant. See Material Data Safety Sheet to verify.
2. For each construction material, test for one of the pollutant indicators. **Bolded** pollutant indicates lowest analysis cost or best indicator. However, the composition of the specific construction material, if known, is the first criterion for selecting which analysis to use.
3. See www.hach.com, www.lamotte.com, www.ysi.com and www.chemetrics.com for some of the test kits.
4. If the type of inorganic fertilizer is unknown, analyze for all pollutant indicators listed.
5. Only if special handling requirements are required in the Standard Special Provisions for aerially deposited lead
6. If used with a dye or fiber matrix, it is considered visually observable and no testing is required.
7. Based upon research conducted by Caltrans, the following copolymers/polymers do not discharge pollutants and water quality sampling and analysis is not required: Super Tak, M-Binder, Fish Stik, Pro40dc, Fisch-Bond, Soil Master WR, and EarthGuard.

Acronyms:
BOD = biochemical oxygen demand
COD = chemical oxygen demand
DOC = dissolved organic carbon
EPA = United States Environmental Protection Agency
HACH = Global company that provides advanced analytical systems and technical support for water quality testing.
SM = Standard Method
SVOC = semi-volatile organic compounds
TDS = total dissolved solids
TKN = total kjeldahl nitrogen
TOC = total organic carbon
TSP = tri-sodium phosphate
VOC = volatile organic compounds

References:
California Storm Water Quality Task Force, 2001 (now known as the California Stormwater Quality Association). *Construction Storm Water Sampling and Analysis Guidance Document*. October.
National Cooperative Highway Research Program, 2001. *Environmental Impact of Construction and Repair Materials on Surface and Ground Waters, Report 448*.
California Department of Transportation (Caltrans), Environmental Program, 1999. *Soil Stabilization for Temporary Slopes*. October 1.
Caltrans, Division of Environmental Analysis, 2002. *Statewide Storm Water Management Plan*. April.
Caltrans, Environmental Program, 2000. *Statewide Storm Water Quality Practice Guidelines*. August.
Caltrans, 2000a. *Soil Stabilization for Temporary Slopes and District 7 Erosion Control Pilot Study*. June.
Caltrans, 2000b. *Stormwater Monitoring Protocols, Guidance Manual*. May.

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7.7.1.7 Data Evaluation and Reporting

The QSP shall complete an evaluation of the water quality sample analytical results based on a comparison of the results to the unaffected sample.

Runoff/downgradient results shall be compared with the associated upgradient/unaffected results and any associated run-on results. Should the runoff/downgradient sample show an increased level of the tested analyte relative to the unaffected background sample, which cannot be explained by run-on results, the BMPs, site conditions, and surrounding influences shall be assessed to determine the probable cause for the increase.

As determined by the site and data evaluation, appropriate BMPs shall be repaired or modified to mitigate discharges of non-visible pollutant concentrations. Any revisions to the BMPs shall be recorded as an amendment to the SWPPP.

Analytical results of non-visible pollutant monitoring shall be submitted to SMARTS within 30 days of obtaining the analytical results.

The 2022 CGP prohibits storm water discharges that contain hazardous substances equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4. The results of any non-stormwater discharge results that indicate the presence of a hazardous substance in excess of established reportable quantities shall be immediately reported to the Regional Water Board and other agencies as required by 40 C.F.R. §§ 117.3 and 302.4.

7.7.2 Sampling and Analysis Plan for pH and Turbidity in Stormwater Runoff Discharges

Sampling and analysis of runoff for pH and turbidity is not required for Risk Level 1 projects.

7.7.3 Sampling and Analysis Plan for pH and Turbidity in Receiving Water

This project is not subject to Receiving Water Monitoring.

7.7.4 Sampling and Analysis Plan for Dewatering Discharges

☒ No dewatering activities are planned for this project.
☐ Dewatering activities planned for this project will be conducted and monitored according to the requirements of the following NPDES Permit: _____
☐ Dewatering activities planned for this project will be conducted and monitored according to the requirements of the 2022 CGP Attachment J.

A Sampling and Analysis Plan for dewatering discharges that describes the sampling and analysis strategy and schedule for monitoring dewatering discharges in accordance with the requirements of the 2022 CGP.

IF the contractor anticipates dewatering discharges, the contractor shall develop a Dewatering plan compliant with the requirement of the CGP.

7.7.5 Sampling and Analysis Plan for Other Pollutants Required by the Regional Water Board

The Regional Water Board has not specified monitoring for additional pollutants.

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7.7.6 Training of Sampling Personnel

QSP Delegates assigned to conduct sampling shall be trained by the QSP to collect, maintain, and ship samples in accordance with the 2022 CGP Sample Collection and Handling Instructions and supplemental information as needed. Training records of QSP Delegates assigned to sample are provided in Appendix I.

The QSP and QSP Delegates have received the following stormwater sampling training and experience:

Name	Training
Greg Feaver	Construction Inspection, SWPPP Field Training, 5+ years field experience, HAZWOPPER, CISEC training, CASQA Training, & Caltrans SWPPP and Sampling Training courses/seminars
Yvan Mendoza	PG 10352, Caltrans SWPPP and Sampling Training courses/seminars, field sampling and monitoring, 10+ years field experience
Gretchen Heisdorf	RCE 77241, CASQA Training, Caltrans SWPPP and Sampling Training courses/seminars, WDR training and continuing education seminars, 20+ years field experience

7.7.7 Sample Collection and Handling

7.7.7.1 Sample Collection

Samples shall be collected at the designated sampling locations shown on the Site Maps and listed in the preceding sections. Samples shall be collected, maintained and shipped in accordance with the 2022 CGP Sample Collection and Handling Instructions.

Grab samples shall be collected and preserved in accordance with the methods identified in preceding sections.

To maintain sample integrity and prevent cross-contamination, sample collection personnel shall follow the protocols below.

- Collect samples (for laboratory analysis) in analytical laboratory-provided or specified sample containers;
- Use of any other type of containers could cause sample contamination and may result in NAL or NEL exceedances.
- Wear clean, powder-free nitrile gloves when collecting samples;
- Change gloves whenever something not known to be clean has been touched;
- Change gloves between sampling locations;
- Decontaminate all equipment (e.g., bucket, tubing) prior to sample collection;
- using a trisodium phosphate water wash, distilled water rinse, and final rinse with distilled water..
- Dispose of wash and rinse water appropriately (i.e., do not discharge to storm drain or receiving water).
- Do not decontaminate laboratory provided sample containers;
- Do not smoke during sampling events;
- Never sample near a running vehicle;
- Do not park vehicles in the immediate sample collection area (even non-running vehicles);
- Do not eat or drink during sample collection; and
- Do not breathe, sneeze, or cough in the direction of an open sample container.

The most important aspect of grab sampling is to collect a sample that represents the entire runoff stream. Typically, samples are collected by dipping the collection container in the runoff flow paths and streams as noted below.

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1. For small streams and flow paths, simply dip the bottle facing upstream until full.
2. For larger stream that can be safely accessed, collect a sample in the middle of the flow stream by directly dipping the mouth of the bottle. Once again making sure that the opening of the bottle is facing upstream as to avoid any contamination by the sampler.
3. For larger streams that cannot be safely waded, pole-samplers may be needed to safely access the representative flow.
4. Avoid collecting samples from ponded, sluggish or stagnant water.
5. Avoid collecting samples directly downstream from a bridge as the samples can be affected by the bridge structure or runoff from the road surface.

Note, that depending upon the specific analytical test, some containers may contain preservatives. These containers should **never** be dipped into the stream but filled indirectly from the collection container.

7.7.7.2 Sample Handling

Turbidity and pH measurements must be conducted immediately. Do not store turbidity or pH samples for later measurement.

Samples for laboratory analysis must be handled as follows. Immediately following sample collection:

- Cap sample containers;
- Complete sample container labels;
- Place sealed containers in a re-sealable storage bag;
- Place sample containers into an ice-chilled cooler;
- Document sample information on the *Effluent Sampling Field Log Sheet* (Appendix O); and
- Complete the CoC.

All samples for laboratory analysis must be maintained between 0-6 degrees Celsius during delivery to the laboratory. Samples must be kept on ice, or refrigerated, from sample collection through delivery to the laboratory. Place samples to be shipped inside coolers with ice. Make sure the sample bottles are well packaged to prevent breakage and secure cooler lids with packaging tape.

7.7.7.3 Sample Documentation Procedures

All original data documented on sample container identification labels, *Effluent Sampling Field Log Sheet* (Appendix O), and CoCs shall be recorded using waterproof ink. These shall be considered accountable documents. If an error is made on an accountable document, the individual shall make corrections by lining through the error and entering the correct information. The erroneous information shall not be obliterated. All corrections shall be initialed and dated.

Duplicate samples shall be identified consistent with the numbering system for other samples to prevent the laboratory from identifying duplicate samples. Duplicate samples shall be identified in the Effluent Sampling Field Log Sheet.

Sample documentation procedures include the following:
Sample Bottle Identification Labels: Sampling personnel shall attach an identification label to each sample bottle. Sample identification shall uniquely identify each sample location. (These location identifiers should be listed in the tables in the SWPPP.)

Field Log Sheets: Sampling personnel shall complete the *Effluent Sampling Field Log Sheet* and *Receiving Water Sampling Field Log Sheet* (Appendix O) for each sampling event, as appropriate.

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Chain of Custody: Sampling personnel shall complete the CoC for each sampling event for which samples are collected for laboratory analysis. The sampler will sign the CoC (Appendix O) when the sample(s) is turned over to the testing laboratory or courier.

7.8 Active Treatment System Monitoring

Will an Active Treatment System (ATS) be deployed on the site?

☐ Yes ☒ No

This project does not require a project specific Sampling and Analysis Plan for an ATS because deployment of an ATS is not planned.

7.9 Passive Treatment Monitoring

Will passive treatment technologies be deployed on the site?

☐ Yes ☒ No

This project does not require a project specific Sampling and Analysis Plan for passive treatment because deployment of passive treatment is not planned.

7.10 Watershed Monitoring Option

This project is not participating in a watershed monitoring option.

7.11 Quality Assurance and Quality Control

An effective Quality Assurance and Quality Control (QA/QC) plan shall be implemented as part of the CSMP to ensure that analytical data can be used with confidence. QA/QC procedures to be initiated include the following:

- Field logs;
- Clean sampling techniques;
- CoCs;
- QA/QC Samples; and
- Data verification.

Each of these procedures is discussed in more detail in the following sections.

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7.11.1 Field Logs

The purpose of field logs is to record sampling information and field observations during monitoring that may explain any uncharacteristic analytical results. Sampling information to be included in the field log include the date and time of water quality sample collection, sampling personnel, sample container identification numbers, and types of samples that were collected. Field observations should be noted in the field log for any abnormalities at the sampling location (color, odor, BMPs, etc.). Field measurements for pH and turbidity should also be recorded in the field log. A Visual Inspection Field Log, and an Effluent Sampling Field Log Sheet are included in Appendix O.

7.11.2 Clean Sampling Techniques

Clean sampling techniques involve the use of certified clean containers for sample collection and clean powder-free nitrile gloves during sample collection and handling. As discussed in Section 7.7.7, adoption of a clean sampling approach will minimize the chance of field contamination and questionable data results.

7.11.3 Chain of Custody

The sample CoC is an important documentation step that tracks samples from collection through analysis to ensure the validity of the sample. Sample CoC procedures include the following:

- Proper labeling of samples;

- Use of CoC forms for all samples; and
- Prompt sample delivery to the analytical laboratory.

Analytical laboratories usually provide CoC forms to be filled out for sample containers. An example CoC is included in Appendix O.

7.11.4 QA/QC Samples

QA/QC samples provide an indication of the accuracy and precision of the sample collection; sample handling; field measurements; and analytical laboratory methods. The following types of QA/QC will be conducted for this project:

- ☒ Field Duplicates at a frequency of [10% per sampling event]
  (Required for all sampling plans with field measurements or laboratory analysis)
- ☒ Equipment Blanks at a frequency of [1 per trip]
  (Only needed if the equipment used to collect samples could add the pollutants to sample)
- ☒ Field Blanks at a frequency of [10% per sampling event]
  (Only required if sampling method calls for field blanks)
- ☒ Travel Blanks at a frequency of [1 per trip]
  (Required for sampling plans that include VOC laboratory analysis)

7.11.4.1 Field Duplicates

Field duplicates provide verification of laboratory or field analysis and sample collection. Duplicate samples shall be collected, handled, and analyzed using the same protocols as primary samples. The sample location where field duplicates are collected shall be randomly selected from the discharge locations. Duplicate samples shall be collected immediately after the primary sample has been collected. Duplicate samples must be collected in the same manner and as close in time as possible to the original sample. Duplicate samples shall not influence any evaluations or conclusion.

7.11.4.2 Equipment Blanks

Equipment blanks provide verification that equipment has not introduced a pollutant into the sample. Equipment blanks are typically collected when:

- New equipment is used;
- Equipment that has been cleaned after use at a contaminated site;
- Equipment that is not dedicated for surface water sampling is used; or
- Whenever a new lot of filters is used when sampling metals.

7.11.4.3 Field Blanks

Field blanks assess potential sample contamination levels that occur during field sampling activities. De-ionized water field blanks are taken to the field, transferred to the appropriate container, and treated the same as the corresponding sample type during the course of a sampling event.

7.11.4.4 Travel Blanks

Travel blanks assess the potential for cross-contamination of volatile constituents between sample containers during shipment from the field to the laboratory. De-ionized water blanks are taken along for the trip and held unopened in the same cooler with the VOC samples.

7.11.5 Data Verification

After results are received from the analytical laboratory, the QSP or QSP Delegates shall verify the data to ensure that it is complete, accurate, and the appropriate QA/QC requirements were met. Data must be verified as soon as the data reports are received. Data verification shall include:

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- Check the CoC and laboratory reports.
  Make sure all requested analyses were performed and all samples are accounted for in the reports.
- Check laboratory reports to make sure hold times were met and that the reporting levels meet or are lower than the reporting levels agreed to in the contract.
- Check data for outlier values and follow up with the laboratory.
  Occasionally typographical errors, unit reporting errors, or incomplete results are reported and should be easily detected. These errors need to be identified, clarified, and corrected quickly by the laboratory. The QSP or QSP Delegates should especially note data that is an order of magnitude or more different than similar locations or is inconsistent with previous data from the same location.
- Check laboratory QA/QC results.
  EPA establishes QA/QC checks and acceptable criteria for laboratory analyses. These data are typically reported along with the sample results. The QSP or QSP Delegates shall evaluate the reported QA/QC data to check for contamination (method, field, and equipment blanks), precision (laboratory matrix spike duplicates), and accuracy (matrix spikes and laboratory control samples). When QA/QC checks are outside acceptable ranges, the laboratory must flag the data, and usually provides an explanation of the potential impact to the sample results.
- Check the data set for outlier values and, accordingly, confirm results and re-analyze samples where appropriate.
  Sample re-analysis should only be undertaken when it appears that some part of the QA/QC resulted in a value out of the accepted range. Sample results may not be discounted unless the analytical laboratory identifies the required QA/QC criteria were not met and confirms this in writing.

Field data including inspections and observations must be verified as soon as the field logs are received, typically at the end of the sampling event. Field data verification shall include:

- Check field logs to make sure all required measurements were completed and appropriately documented;
- Check reported values that appear out of the typical range or inconsistent;
  Follow-up immediately to identify potential reporting or equipment problems, if appropriate, recalibrate equipment after sampling;
- Verify equipment calibrations;
- Review observations noted on the field logs; and
- Review notations of any errors and actions taken to correct the equipment or recording errors.

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7.12 Records Retention

All records of stormwater monitoring information and copies of reports (including Annual Reports) must be retained for a period of at least three years from date of submittal or longer if required by the Regional Water Board.

Results of visual monitoring, field measurements, and laboratory analyses must be kept in the SWPPP along with CoCs, and other documentation related to the monitoring.

Records are to be kept onsite while construction is ongoing. Records to be retained include:

- The date, place, and time of inspections, sampling, visual observations, and/or measurements, including precipitation;
- The individual(s) who performed the inspections, sampling, visual observation, and/or field measurements;
- The date and approximate time of field measurements and laboratory analyses;

- The individual(s) who performed the laboratory analyses;
- A summary of all analytical results, the method detection limits and reporting limits, and the analytical techniques or methods used;
- Rain gauge readings from site inspections;
- QA/QC records and results;
- Calibration records;
- Visual observation and sample collection exception records;
- The records of any corrective actions and follow-up activities that resulted from analytical results, visual observations, or inspections;
- Dewatering notifications to the Regional Water Board (as necessary);
- Dewatering exception notifications to the Regional Water Board and local stormwater agency (as necessary);

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Section 8 References

Project Plans and Specifications dated August 2025, prepared by Provost & Pritchard Consulting Group.

SWRCB (State Water Resources Control Board). (2022). Order 2022-0057-DWQ, NPDES General Permit No. CAS000002: Stormwater Discharges Associated with Construction and Land Disturbing Activities. Available online at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction/general_permit_reissuance.html.

CASQA 2024. *Stormwater BMP Handbook: Construction.* Available online at: www.casqa.org

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Appendix A: Site Maps and Drawings

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811 Know what's below. Call before you dig.

WARNING
POWER LINES OVERHEAD

STORMWATER POLLUTION PREVENTION PLANS
BMP SITE MAPS

BASINS AND STORMWATER CAPTURE PROJECT

CITY OF LOS BANOS

LOS BANOS, MERCED, CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD
WDID NO._____

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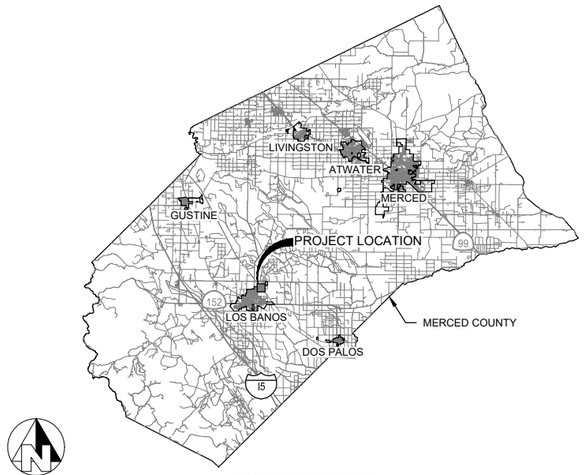

VICINITY MAP
NOT TO SCALE

PROJECT CONTACTS

1. OWNER
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411 MADISON AVE
LOS BANOS, CA 93635

2. PROJECT ENGINEER
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3. QSD SWPPP PREPARER
GRETCHEN HEISDORF
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4. QSP INSPECTOR
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GREG FEAVER
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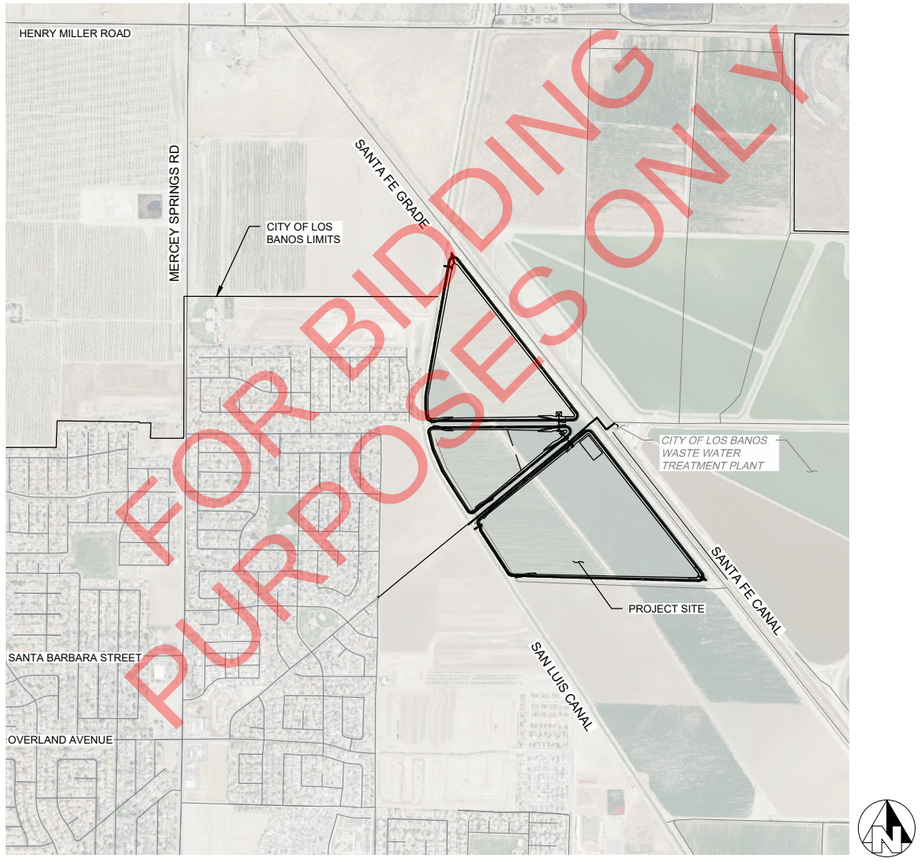

SITE MAP
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GENERAL WATER POLLUTION CONTROL NOTES

1. THE INFORMATION ON THESE DRAWINGS ARE INTENDED TO BE USED AS A GUIDELINE FOR CONTRACTORS AND SUBCONTRACTORS TO INSTALL STORM WATER POLLUTION CONTROL DEVICES AT THE LOCATIONS SHOWN. THESE DRAWINGS ARE TO SHOW THE LOCATIONS FOR EROSION, SEDIMENT, NON-STORM WATER MANAGEMENT AND WASTE MANAGEMENT CONTROL BEST MANAGEMENT PRACTICES (BMPS). THESE DRAWINGS ARE TO BE USED IN CONJUNCTION WITH THE NARRATIVE SECTIONS OF THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP).
2. FIELD CONDITIONS MAY NECESSITATE MODIFICATIONS TO THESE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE OWNER, QUALIFIED SWPPP DEVELOPER (QSD) AND THE QUALIFIED SWPPP PRACTIONER (QSP) ON ANY UPDATE TO THESE DRAWINGS BASED ON THE CONDITIONS THAT DIFFER FROM THIS DRAWING SET.
3. THE CONTRACTOR SHALL REFER TO THE CALIFORNIA STORM WATER QUALITY ASSOCIATION STORM WATER QUALITY CONSTRUCTION HANDBOOK, AUGUST 2023 EDITION (OR MOST CURRENT VERSION) FOR SITE BEST MANAGEMENT PRACTICES (BMPs). COPIES OF THE BMPs ARE PROVIDED IN THE SWPPP APPENDIX. ALL BEST MANAGEMENT PRACTICES (BMPS) SHALL BE IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS.
4. THE CONTRACTOR SHALL SELECT ADDITIONAL ON-SITE SAMPLING LOCATIONS FOR NON-VISIBLE POLLUTANTS AT LOCATIONS NEAR VEHICLE AND EQUIPMENT MAINTENANCE AREAS AND MATERIAL STORAGE AREAS. SAMPLING WILL BE REQUIRED AS SPECIFIED IN THE SECTION 7 OF THE SWPPP. SEE SECTION 7 FOR ADDITIONAL REQUIREMENTS.
5. THE CONTRACTOR SHALL PROVIDE A SECONDARY CONTAINMENT PERIMETER AROUND WASTE CONTAINMENT, MATERIAL STORAGE, AND VEHICLE AND EQUIPMENT (FUELING, MAINTENANCE AND STORAGE) AREAS TO CONTAIN LEAKS AND SPILLS AND PREVENT CONTAMINANTS FROM CONTACTING STORM FLOWS.
6. TRACKING CONTROL SHALL BE PROVIDED AT ALL CONSTRUCTION SITE ENTRANCES AND EXITS. THE CONTRACTOR SHALL COORDINATE THE MODIFICATION OF THESE DRAWINGS TO SHOW ACTUAL ENTRANCE/ EXITS USED.
7. THE CONTRACTOR SHALL IMPLEMENT ADEQUATE EROSION AND SEDIMENT CONTROL MEASURES FOR ALL TRENCHING AND STOCKPILING ACTIVITIES. SPOIL PILES SHALL BE PROTECTED WITH EROSION & SEDIMENT CONTROL BMPS. THE CONTRACTOR SHALL IMPLEMENT DEWATERING OPERATIONS PER NS-2 AS NECESSARY.
8. TEMPORARY SOIL STABILIZATION MEASURES WILL BE IMPLEMENTED FOR ALL DISTURBED SOIL AREAS (DSA) WITHIN 14 DAYS OF INACTIVITY.
9. PERMANENT EROSION CONTROL SHALL BE INSTALLED IN AREAS THAT ARE SUBSTANTIALLY COMPLETE. SEDIMENT CONTROL BMPS SHALL BE REMOVED AFTER SOIL IS STABILIZED AND WHEN PERMANENT EROSION CONTROL IS COMPLETE, AS APPROVED BY THE INSPECTOR.
10. THE STORM WATER POLLUTION PREVENTION CONTROL MEASURES SHOWN IN THESE DRAWINGS ARE SUGGESTED BEST MANAGEMENT PRACTICES (BMPs). DIFFERENT CONTROL MEASURES MAY BE NECESSARY TO SATISFY THE REQUIREMENTS OF THE GENERAL PERMIT, BASED ON ACTUAL CONSTRUCTION ACTIVITIES AND FIELD CONDITIONS.
11. THE CONTRACTOR IS RESPONSIBLE FOR MAKING ANY NECESSARY CHANGES DURING CONSTRUCTION TO MAINTAIN COMPLIANCE WITH THE GENERAL PERMIT. THE REVISED DRAWINGS NEED TO REVIEWED AND AMENDED BY THE PROJECT'S QUALIFIED SWPPP DEVELOPER (QSD). THE QSD SHALL RECORD ALL BMP SM DRAWING AMENDMENTS IN THE APPENDICES SECTION OF THE SWPPP.
12. THESE BMP SM DRAWINGS HAVE BEEN COMPLETED BY THE OWNER'S QSD.
13. BMPS SHOULD BE USED TO SHORTEN SLOPE DISTANCES ON STEEP SLOPES, EXAMPLE AS INDICATED IN TABLE 1.

TABLE 1 - MAXIMUM SLOPE DISTANCE

SLOPE (V:H)	MAXIMUM SLOPE DISTANCE
≤ 1:20	PER QSD'S SPECIFICATION
> 1:20 TO ≤ 1:4	35 FT
> 1:4 TO ≤ 1:3	20 FT
> 1:3 TO ≤ 1:2	15 FT
> 1:2	10 FT

SHEET INDEX

SHEET NO.	DESCRIPTION
STORMWATER POLLUTION PREVENTION PLAN	
1	COVER
2	LEGEND & ABBREVIATIONS
3	NOTES & STAGING AREA
4	EXISTING CONDITIONS AND DEMOLITION
5	SOUTH CELL BMP SITE MAP
6	CENTER CELL BMP SITE MAP
7	NORTH CELL BMP SITE MAP
8	FINAL STABILIZATION SOUTH CELL
9	FINAL STABILIZATION CENTER CELL
10	FINAL STABILIZATION NORTH CELL
11	DRAINAGE AREA MAP
12	DETAILS

THIS PLAN ACCURATE FOR STORM WATER POLLUTION CONTROL WORK ONLY

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No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER ★ VIRGINIA ★ FOR REVIEW ONLY ★ STATE OF CALIFORNIA

DATE SIGNED: _____

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY

COVER
STORMWATER POLLUTION PREVENTION PLAN

PROVOST & PRITCHARD
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DATE: 08/07/2025
JOB NO: 350123007
PROJECT NO:
PHASE:
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ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 1
1 OF 12

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ABBREVIATIONS

AB	AGGREGATE BASE
AC	ASPHALT CONCRETE
ACP	ASBESTOS-CEMENT PIPE
AGG	AGGREGATE
APN	ASSESSOR'S PARCEL NUMBER
AVE	AVENUE
BTM	BOTTOM
BWR	BARB WIRE
C, CONC	CONCRETE
CA	CALIFORNIA
CLVT	CULVERT
CL	CENTERLINE
CLF	CHAIN LINK FENCE
CNS	COMPACTED NATIVE SOIL
CONT	CONTINUOUS
CONST	CONSTRUCT/CONSTRUCTION
CP	CULVERT PROTECTION
CR	CROWN
D/S	DOWNSTREAM
(E)	EXISTING
EG	EXISTING GRADE
EL, ELEV	ELEVATION
ELEC	ELECTRIC
EP	EDGE OF PAVEMENT
ESMT	EASEMENT
ES	EROSION/SEDIMENT CONTROL
FF	FINISHED FLOOR
FG	FINISHED GRADE
FL	FLOW LINE
FNC	FENCE
FR	FIBER ROLL
GB	GRADE BREAK
GM	GAS METER
GRVL	GRAVEL
GUY	GUY WIRE
GV	GATE VALVE
HGL	HYDRAULIC GRADE LINE
HP	HINGE POINT, HIGH POINT
HP GAS	HIGH PRESSURE GAS
HWL	HIGH WATER LEVEL
IRR	IRRIGATION
IP	INLET PROTECTION
MAX	MAXIMUM
MIN	MINIMUM
MISC	MISCELLANEOUS
NTS	NOT TO SCALE
OC	ON CENTER
OH	OVERHEAD
(P)	PROPOSED
PL	PROPERTY LINE
PP	POWER POLE
PVMT	PAVEMENT
R/W	RIGHT OF WAY
S=	SLOPE
SF	SILT FENCE
STRC	STRUCTURE
SWL	SWALE
STWL	STILLING WELL
TB	TOP OF BANK
TOE	TOE OF SLOPE
TOP	TOP OF SLOPE
TP	TELEPHONE POLE
TS	TOP OF STRUCTURE
TYP	TYPICAL
U/S	UPSTREAM
VERT	VERTICAL
W	WATER
WV	WATER VALVE

LINETYPES

LINETYPE EXISTING	LINETYPE NEW	DESCRIPTION
		WATER LEVEL
		BARRICADE
		CONTOUR (DEPRESSION)
123	123	CONTOUR (MAJOR)
		CONTOUR (MINOR)
		EMBANKMENT TOE
		EMBANKMENT TOP
		FENCE (BLOCK WALL)
		FENCE (CHAIN LINK)
		FENCE (WOOD)
		FENCE (WIRE)
		GATE SWING
		GRADE BREAK
FL	FL	SWALE CENTERLINE
		SWALE W/FLOW ARROWS
OE OE	OE	ELECTRIC (AERIAL)
UE	UE	ELECTRIC (BURIED)
G G	G	GAS
		CENTERLINE
		EASEMENT
		PROPERTY LINE
		RIGHT-OF-WAY
		SECTION LINE
		STATE/COUNTY/CORPORATE LIMIT
		ROLLING DIP PER USFS SPECIFICATION (SPACING PER USFS)
		SWPPP PIPELINE AND/OR SLOPE DRAIN
		BERM WITH DRAIN SYSTEM
	FR	FIBER ROLL
SF	SF	FENCE (SILT)
EC	EC	LINEAR EROSION CONTROL

HATCHES

EXISTING	NEW	DESCRIPTION	NEW	DESCRIPTION
		AGGREGATE		TRAVEL PATH
		AC PAVEMENT		DEMOLITION
		CONCRETE		EQUIPMENT/MAINTENANCE AREAS (CONTRACTOR TO VERIFY LOCATION)
		CONCRETE LINING (PLAN VIEW)		BMP: TRACKOUT DEVICE (CONTRACTOR TO VERIFY LOCATION)
		EARTH		BMP: MATERIAL STORAGE (CONTRACTOR TO VERIFY LOCATION)
		RIP RAP		BMP: CONCRETE WASTE MANAGEMENT (CONTRACTOR TO VERIFY LOCATION)
		SAND		BMP: ASPHALT CONCRETE STOCKPILE MANAGEMENT (CONTRACTOR TO VERIFY LOCATION)
		GRATING		BMP: SOIL STOCKPILE MANAGEMENT (CONTRACTOR TO VERIFY LOCATION)

SYMBOLS

SYMBOL EXISTING	SYMBOL NEW	DESCRIPTION
		UTILITY POLE
		UTILITY POLE ANCHOR
		2-NOZZLE HYDRANT
		3-NOZZLE HYDRANT
FD	FD	FIRE DEPT. CONNECTION
F	F	FIRE VAULT
		WATER METER
W	W	WELL
		WATER VALVE
		BLOW-OFF
		AIR RELIEF VALVE
BFP	BFP	BACK FLOW PREVENTOR
		GATE VALVE HANDLE
		STILLING WELL
		FENCE POST
		FENCE GATE
	XX	REVISION
	X	CONSTRUCTION CALLOUT
XX / XXXX		DETAIL NUMBER / SHEET NUMBER — DETAIL CALLOUT
		LINE BREAK
		SPILL KIT
		DRAINAGE DIRECTION
E		CONSTRUCTION SITE ENTRANCE/EXIT, TRACKOUT LOCATION
		EMBANKMENT ARROW
HWL= XXX.XX		HIGH WATER LINE
XXX.X± FG MATCH (E)	SPOT ELEVATION DESCRIPTION	SPOT ELEVATION
		SECTION VIEW
SF ES FR		BMP: EROSION & SEDIMENT CONTROL BARRIER AND WIND EROSION CONTROL MEASURES PER BMP HANDBOOK (CONTRACTOR TO VERIFY LOCATION)
		SEDIMENT BASIN; LOCATION & DESIGN PER CONSTRUCTION PLAN SET
CP IP		BMP: STORM DRAIN INLET/CULVERT PROTECTION PER BMP HANDBOOK
S#		TENTATIVE SAMPLING LOCATION (TO BE FIELD DETERMINED)
D#		POTENTIAL DISCHARGE LOCATION (TO BE FIELD DETERMINED)

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REGISTERED PROFESSIONAL ENGINEER — GRETCHEN HEISDORF — No. RCE 77241 — STATE OF CALIFORNIA — REVIEW ONLY

DATE SIGNED:

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY

STORMWATER POLLUTION PREVENTION PLAN

LEGEND & ABBREVIATIONS

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PHASE:
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ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 2
2 OF 12

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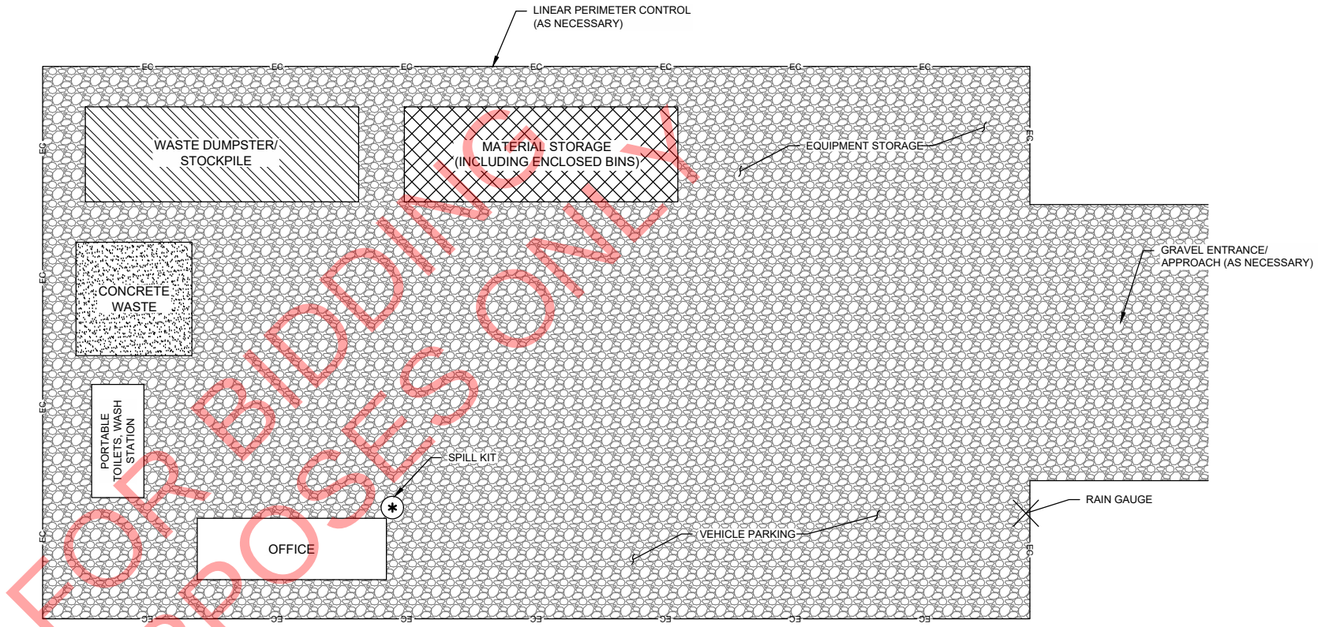
NOTES

1. QSD SHALL BE NOTIFIED AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CONSTRUCTION CONTRACT DOCUMENTS.
3. SWPPP BMP IMPLEMENTATION SHALL MEET THE MINIMUMS REQUIRED BY THE CONSTRUCTION GENERAL PERMIT GENERAL ORDER AND APPLICABLE ATTACHMENTS.
4. CONTRACTOR IS RESPONSIBLE FOR THE IMPLEMENTATION OF ALL STORMWATER AND NON-STORMWATER POLLUTION PREVENTION PRACTICES REGARDLESS OF INCLUSION IN THESE SITE MAPS OR IN THE PROJECT SWPPP.
5. CONTRACTOR AND QSP SHALL USE THESE DRAWINGS FOR ANY CHANGES TO THE SWPPP. BMPS MAY BE ALTERED BY QSP AS SITE CONDITIONS DICTATE BUT SHALL NOT BECOME LESS STRINGENT. QSP TO FORWARD REVISIONS/NEW BMP LOCATIONS FOR DEMOLITION TO QSD FOR APPROVAL.
6. CONTRACTOR SHALL LIMIT GROUND DISTURBANCES AT ALL TIMES TO THE MAXIMUM EXTENT FEASIBLE TO ACCOMPLISH WORK. ALL GROUND DISTURBANCES REQUIRE EROSION AND SEDIMENT CONTROL MITIGATIONS.
7. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ADEQUATE DUST CONTROL AT ALL TIMES.
8. THE CONTRACTOR SHALL HAVE A SECURE ONSITE LOCATION FOR SWPPP AND ENVIRONMENTAL DOCUMENT STORAGE.
9. DO NOT BLOCK DRIVEWAYS OR ENTRANCE LOCATIONS WITH ANY BMP ITEMS.
10. CONTRACTOR IS RESPONSIBLE FOR ALL STORMWATER AND NON-STORMWATER, VISIBLE AND NON-VISIBLE SAMPLING.
11. ALL DEMOLITION SHALL BE IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.
12. CONTRACTOR SHALL PROVIDE INLET AND/OR CULVERT PROTECTION AT INLETS/CULVERTS WITHIN AND IMMEDIATELY DOWNSTREAM OF PROJECT SITE(S), REGARDLESS OF SPECIFIC INCLUSION ON THESE DRAWINGS.
13. PERIMETER LINEAR CONTROLS ARE LIMITED TO 36"-HIGH EXPOSED WIRE-BACKED SILT FENCING WITH METAL T-POSTS, UNLESS OTHERWISE SHOWN OR APPROVED BY THE QSD.
14. HEMP, STERILE FIBER ROLLS, GRAVEL OR SANDBAGS MAY BE UTILIZED AS INTERNAL PROJECT LINEAR GRADE CONTROLS UNLESS OTHERWISE SPECIFIED. DEPICTION SHOWN ON MAP IS GENERALIZED AND MAY NOT BE ACCURATE TO ACTUAL FIELD CONDITIONS.
15. TRACKOUT ONTO PUBLIC ROADS IS PROHIBITED AND MUST BE CLEANED IMMEDIATELY VIA HAND OR MECHANICAL MEANS. GRAVEL TRACKOUT IN ACCORDANCE WITH CASQA BMP TC-1 IS REQUIRED AT ALL EXIT LOCATIONS TO THE PROJECT AREA(S) TO PUBLIC ROADS PER THE SWPPP REGARDLESS OF SPECIFIC INCLUSION IN THESE DRAWINGS.
16. BULK MATERIAL STORAGE WILL BE IN THE STAGING AREA(S) OR IN OTHER OWNER APPROVED LOCATIONS. ALL MATERIAL STORAGE WILL BE IN ACCORDANCE WITH CASQA BMPS WM-1 AND WM-3.
17. SOIL/MATERIAL STOCKPILES WILL BE COVERED WITH VISQUEEN AND LINEAR CONTROLS INSTALLED PER CASQA BMP WM-3.
18. ALL EXCESS ERODIBLE OR NON-FINAL STATE CONSTRUCTION MATERIALS SHALL BE REMOVED FROM THE SITE OR HOUSED IN WATERTIGHT ENCLOSURES, INCLUDING SOIL/OVERBURDEN AND DEBRIS.
19. CONCRETE DEMOLITION, INSTALLATION, AND/OR WASTES REQUIRE CASQA BMPS WM-8, WM-3, NS-12, AND NS-13 REGARDLESS OF SPECIFIC INCLUSIONS ON THESE DRAWINGS. MOBILE CONCRETE WASHOUTS ARE ACCEPTABLE & TO BE LOCATED BY THE CONTRACTOR. WASHOUTS WILL BE CLEANED/CLEARED OF WASTE CONCRETE PRIOR TO OVERTOPPING. LIQUID DECANT IS CONSIDERED A WASTE PRODUCT AND MUST BE DISPOSED OF PROPERLY IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REQUIREMENTS. IT CAN NOT BE USED FOR DUST CONTROL.
20. ALL CHEMICAL ADDITIVES (CURING COMPOUNDS) WILL NOT BE APPLIED WITHIN 48 HOURS OF A PREDICTED RAIN EVENT UNLESS THE AFFECTED AREA IS FULLY COVERED AND SEALED FROM EXPOSURE TO PRECIPITATION. EPOXY USE WILL NOT OCCUR WITHIN 48 HOURS OF A PREDICTED RAIN EVENT UNLESS THE AFFECTED AREA IS FULLY COVERED AND SEALED FROM EXPOSURE TO PRECIPITATION.
21. TREATED LUMBER PRODUCTS, METAL PRODUCTS, PLASTICS, PAINT, EPOXY, AND OTHER MATERIALS SHALL BE USED IN SUCH A MANNER AS TO NOT INTRODUCE POLLUTANTS TO ANY DISCHARGE. ANY WASTES OR SPILLS SHALL BE CLEANED IMMEDIATELY.
22. VEHICLES & EQUIPMENT SHALL BE STORED IN THE STAGING AREA WHEN NOT IN USE & OVERNIGHT. WHILE IN USE, VEHICLES & EQUIPMENT SHALL BE MONITORED TO PREVENT SPILLS OR LEAKS. VEHICLES & EQUIPMENT, WHILE STORED, SHALL BE STORED ON AN IMPERVIOUS BERMED AREA OR WITH ADEQUATELY SIZED IMPERVIOUS SECONDARY CONTAINMENT TO PREVENT LEAKS OR SPILL TO BARE GROUND.
23. PORTABLE TOILETS/SANITARY STATIONS AND WASH STATIONS SHALL BE LOCATED ON A FLAT SURFACE WITHIN SECONDARY CONTAINMENT AND STAKED DOWN TO PREVENT TIPPING.
24. FUELING SPILL KITS WILL BE MAINTAINED ON THE FUELING TRUCK AND A SPILL KIT WILL BE KEPT ONSITE AT THE ACTIVE CONSTRUCTION AREA(S) DURING WORK HOURS.
25. SAMPLING AND MONITORING MAY TAKE PLACE IN VARIOUS LOCATIONS TO BE DETERMINED BY THE QSP WITHIN THE PROJECT AREA(S) TO ENSURE CONSTRUCTION ACTIVITIES ARE NOT CAUSING PROJECT SITE DISCHARGES. SAMPLING SHALL BE IN ACCORDANCE WITH SECTION 7 OF THE SWPPP AND SAMPLING SHALL INCLUDE ALL APPLICABLE CONSTITUENTS BASED ON CONSTRUCTION ACTIVITIES. THE QSP WILL PROVIDE A MAP TO THE QSD OF ALL PROPOSED SAMPLING LOCATIONS.
26. FINAL STABILIZATION IS REQUIRED PRIOR TO A NOTICE OF TERMINATION BEING APPLIED FOR. FINAL STABILIZATION IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL. STABALIZATION WILL BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
27. BMP GUIDANCE SHEETS ARE AVAILABLE FROM WWW.CASQA.COM.



GENERIC STAGING AREA
NTS

NOTES

1. ALL EQUIPMENT SHALL BE STORED ON AN IMPERVIOUS SURFACE WITH ADEQUATE SECONDARY CONTAINMENT.
2. ALL FUELING SHALL INCLUDE THE USE OF DRIP PANS AND RAGS REGARDLESS OF LOCATION. A SPILL KIT SHALL BE IN THE IMMEDIATE VICINITY DURING FUELING.
3. STAGING AREA(S) WILL INCLUDE, BUT WILL NOT BE LIMITED TO, PERVIOUS CONSTRUCTED SURFACES (GRAVEL OR HARD PACKED EARTH), LINEAR PERIMETER CONTROLS, VEHICLE AND EQUIPMENT CLEANING, FUELING, AND MAINTENANCE CONTROLS (INCLUDING IMPERVIOUS SURFACING), WASTE MANAGEMENT CONTROLS, CONCRETE WASTE MANAGEMENT CONTROLS, HAZARDOUS/NON-HAZARDOUS CHEMICAL/MATERIAL CONTAINMENT CONTROLS, SEDIMENT AND EROSION CONTROLS, AND SANITARY, WASH WATER, AND LIQUID WASTE CONTROLS.
4. LOCATE RAIN GAUGE IN AN OPEN AREA WITH EASY ACCESS FOR MEASUREMENT READING AND GAUGE MAINTENANCE.
5. IF PROJECT OFFICE IS LOCATED IN THE STAGING AREA, MAINTAIN APPROPRIATE SWPPP AND ENVIRONMENTAL DOCUMENTATION INSIDE.

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DATE SIGNED: _____

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY
STORMWATER POLLUTION PREVENTION PLAN

NOTES & STAGING AREA

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SHEET 3
3 OF 12

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811
Know what's below. Call before you dig.

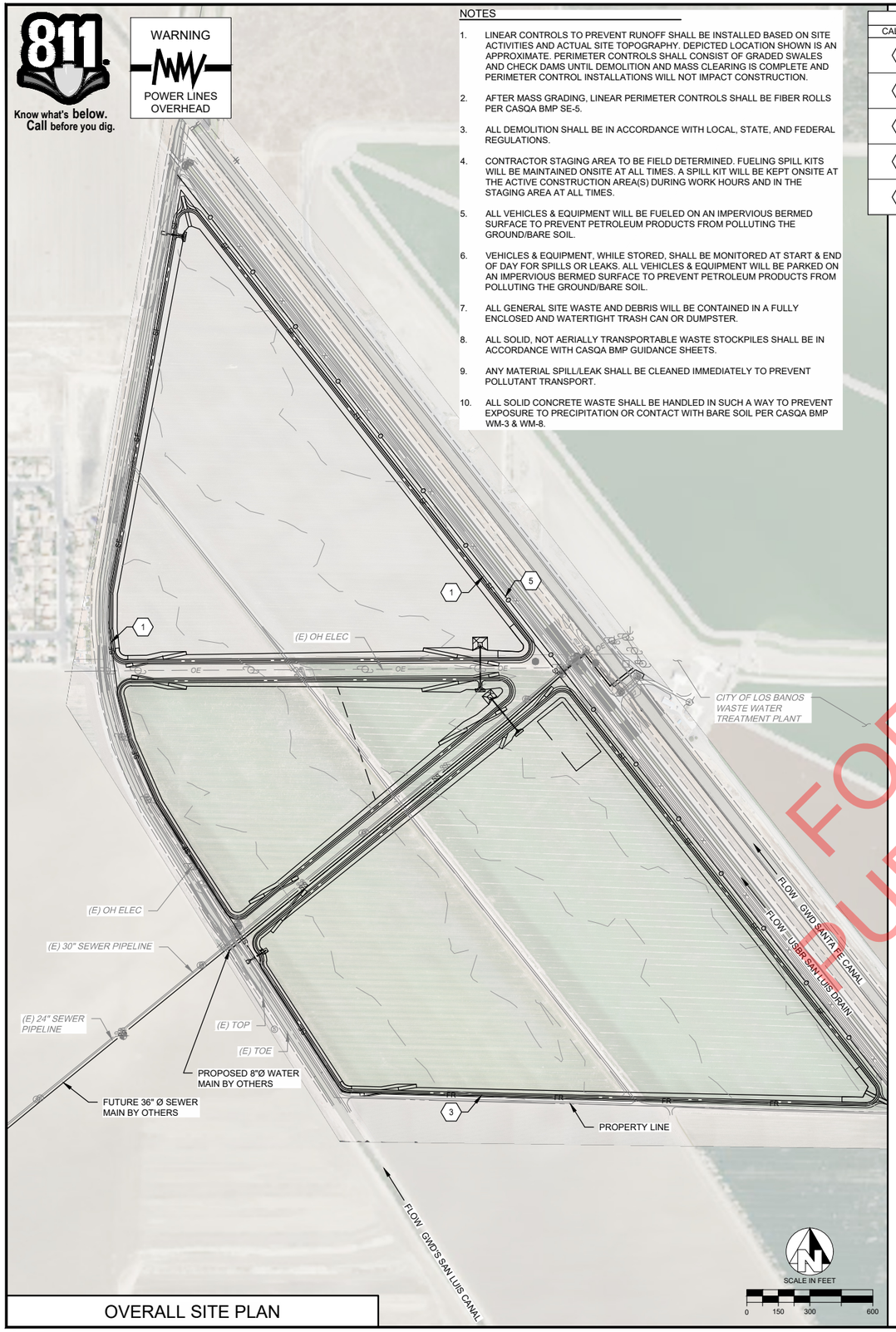
WARNING
POWER LINES OVERHEAD

NOTES

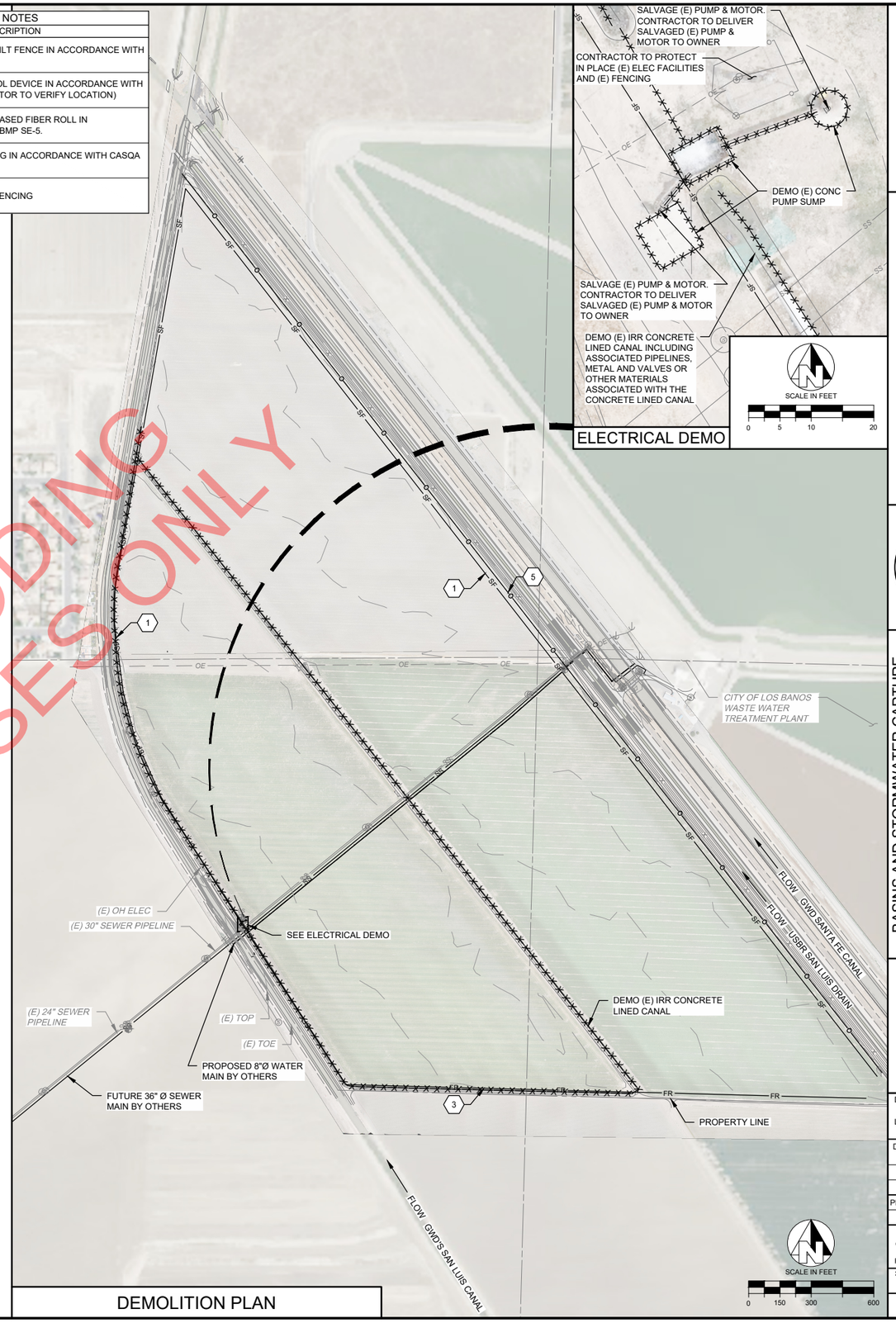
1. LINEAR CONTROLS TO PREVENT RUNOFF SHALL BE INSTALLED BASED ON SITE ACTIVITIES AND ACTUAL SITE TOPOGRAPHY. DEPICTED LOCATION SHOWN IS AN APPROXIMATE. PERIMETER CONTROLS SHALL CONSIST OF GRADED SWALES AND CHECK DAMS UNTIL DEMOLITION AND MASS CLEARING IS COMPLETE AND PERIMETER CONTROL INSTALLATIONS WILL NOT IMPACT CONSTRUCTION.
2. AFTER MASS GRADING, LINEAR PERIMETER CONTROLS SHALL BE FIBER ROLLS PER CASQA BMP SE-5.
3. ALL DEMOLITION SHALL BE IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.
4. CONTRACTOR STAGING AREA TO BE FIELD DETERMINED. FUELING SPILL KITS WILL BE MAINTAINED ONSITE AT ALL TIMES. A SPILL KIT WILL BE KEPT ONSITE AT THE ACTIVE CONSTRUCTION AREA(S) DURING WORK HOURS AND IN THE STAGING AREA AT ALL TIMES.
5. ALL VEHICLES & EQUIPMENT WILL BE FUELED ON AN IMPERVIOUS BERMED SURFACE TO PREVENT PETROLEUM PRODUCTS FROM POLLUTING THE GROUND/BARE SOIL.
6. VEHICLES & EQUIPMENT, WHILE STORED, SHALL BE MONITORED AT START & END OF DAY FOR SPILLS OR LEAKS. ALL VEHICLES & EQUIPMENT WILL BE PARKED ON AN IMPERVIOUS BERMED SURFACE TO PREVENT PETROLEUM PRODUCTS FROM POLLUTING THE GROUND/BARE SOIL.
7. ALL GENERAL SITE WASTE AND DEBRIS WILL BE CONTAINED IN A FULLY ENCLOSED AND WATERTIGHT TRASH CAN OR DUMPSTER.
8. ALL SOLID, NOT AERIALLY TRANSPORTABLE WASTE STOCKPILES SHALL BE IN ACCORDANCE WITH CASQA BMP GUIDANCE SHEETS.
9. ANY MATERIAL SPILL/LEAK SHALL BE CLEANED IMMEDIATELY TO PREVENT POLLUTANT TRANSPORT.
10. ALL SOLID CONCRETE WASTE SHALL BE HANDLED IN SUCH A WAY TO PREVENT EXPOSURE TO PRECIPITATION OR CONTACT WITH BARE SOIL PER CASQA BMP WM-3 & WM-8.

CONSTRUCTION NOTES

CALLOUT	DESCRIPTION
1	INSTALL 36" WIRE BACKED SILT FENCE IN ACCORDANCE WITH CASQA BMP SE-1.
2	INSTALL TRACKOUT CONTROL DEVICE IN ACCORDANCE WITH CASQA BMP TC-1 (CONTRACTOR TO VERIFY LOCATION)
3	INSTALL STERILE HEMP ENCASED FIBER ROLL IN ACCORDANCE WITH CASQA BMP SE-5.
4	PERFORM STREET SWEEPING IN ACCORDANCE WITH CASQA BMP SE-7.
5	CONTRACTOR EXCLUSION FENCING



OVERALL SITE PLAN



ELECTRICAL DEMO

DEMOLITION PLAN

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FOR SWPPP PURPOSES ONLY
08/07/2025

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER ★ CALIFORNIA ★ STATE OF CALIFORNIA
FOR REVIEW ONLY
DATE SIGNED: _____

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY

STORMWATER POLLUTION PREVENTION PLAN
EXISTING CONDITIONS AND DEMOLITION

PROVOST& PRITCHARD
455 W FIR AVENUE
CLOVIS, CA 93611-9166
PHONE (559) 449-2700
FAX (559) 449-2715
www.provostandpritchard.com

DESIGN ENGINEER: GRETCHEN HEISDORF
LICENSE NO: RCE 77241, CASQA 00485
DRAFTED BY: GJF | CHECKED BY: GMH
DATE: 08/07/2025
JOB NO: 350123007
PROJECT NO:
PHASE:
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 4
4 OF 12

8/7/2025 8:19 AM g:\los banos_city of-350\350123007-recharge basin and stormwater capture\300 CAD\340 sheet sets\SWPPP\4 EXISTING CONDITIONS AND DEMOLITION.dwg -Ivan Reyes-Chapa

811 Know what's below. Call before you dig.

WARNING
POWER LINES OVERHEAD

CONSTRUCTION NOTES	
CALLOUT	DESCRIPTION
1	INSTALL 36" WIRE BACKED SILT FENCE IN ACCORDANCE WITH CASQA BMP SE-1.
2	INSTALL TRACKOUT CONTROL DEVICE IN ACCORDANCE WITH CASQA BMP TC-1 (CONTRACTOR TO VERIFY LOCATION)
3	INSTALL STERILE HEMP ENCASED FIBER ROLL IN ACCORDANCE WITH CASQA BMP SE-5.
4	PERFORM STREET SWEEPING IN ACCORDANCE WITH CASQA BMP SE-7.
5	CONTRACTOR EXCLUSION FENCING

NOTES

1. LINEAR CONTROLS TO PREVENT RUNOFF SHALL BE INSTALLED BASED ON SITE ACTIVITIES AND ACTUAL SITE TOPOGRAPHY. DEPICTED LOCATION SHOWN IS AN APPROXIMATE. PERIMETER CONTROLS SHALL CONSIST OF GRADED SWALES AND CHECK DAMS UNTIL DEMOLITION AND MASS CLEARING IS COMPLETE AND PERIMETER CONTROL INSTALLATIONS WILL NOT IMPACT CONSTRUCTION.
2. AFTER MASS GRADING, LINEAR PERIMETER CONTROLS SHALL BE FIBER ROLL PER CASQA BMP SE-5.
3. LINEAR CONTROLS ARE NOT SHOWN ALONG NORTH PROJECT BORDER ADJACENT TO EXISTING DEID TURNIPSEED BASIN PHASE 2.
4. ALL DEMOLITION SHALL BE IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.
5. CONTRACTOR STAGING AREA TO BE FIELD DETERMINED. FUELING SPILL KITS WILL BE MAINTAINED ONSITE AT ALL TIMES. A SPILL KIT WILL BE KEPT ONSITE AT THE ACTIVE CONSTRUCTION AREA(S) DURING WORK HOURS AND IN THE STAGING AREA AT ALL TIMES.
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12. ALL LIQUID AND SOLID CONCRETE WASTE SHALL BE HANDLED IN SUCH A WAY TO PREVENT EXPOSURE TO PRECIPITATION OR CONTACT WITH BARE SOIL PER CASQA BMP WM-3 & WM-8.
13. EXCAVATED/REMOVED MATERIAL FROM TRENCHED ROAD AREAS SHALL BE DISPOSED OF PER LOCAL, STATE, AND FEDERAL REGULATIONS. TRENCH SPOIL STOCKPILES SHALL BE PER CASQA BMP WM-3.

LEGEND

- PROPOSED TOP OF BANK
- PROPOSED SIDE SLOPES; 5H:1V INTERIOR, 2H:1V EXTERIOR. UNLESS OTHERWISE NOTED

SCALE IN FEET
0 50 100 200

SEE NOTE 3
(E) 30" SEWER PIPELINE
(E) SSMH, TYP
(E) 24" SEWER PIPELINE
FUTURE 36" Ø SS HDPE SDR 21 (100 PSI) PIPE
100'
R50', TYP
(E) DIRT ROAD
FLOW GWD SAN LUIS CANAL
40'
(E) CITY OF LOS BANOS WASTE WATER TREATMENT PLANT
(E) WIRE FENCE
(E) DIRT ROAD
FLOW GWD SANTA FE CANAL
FLOW USBR SAN LUIS DRAIN
20'
(E) DIRT ROAD
SOUTH CELL
72.7± AC FLOOR AREA
262.5± AF STORAGE AT
HWL 102.0±
20'
PROPERTY LINE

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08/07/2025

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER — GRETCHEN M. HEISDORF — No. RCE 77241 — STATE OF CALIFORNIA — REVIEW
DATE SIGNED:

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY

STORMWATER POLLUTION PREVENTION PLAN

SOUTH CELL BMP SITE MAP

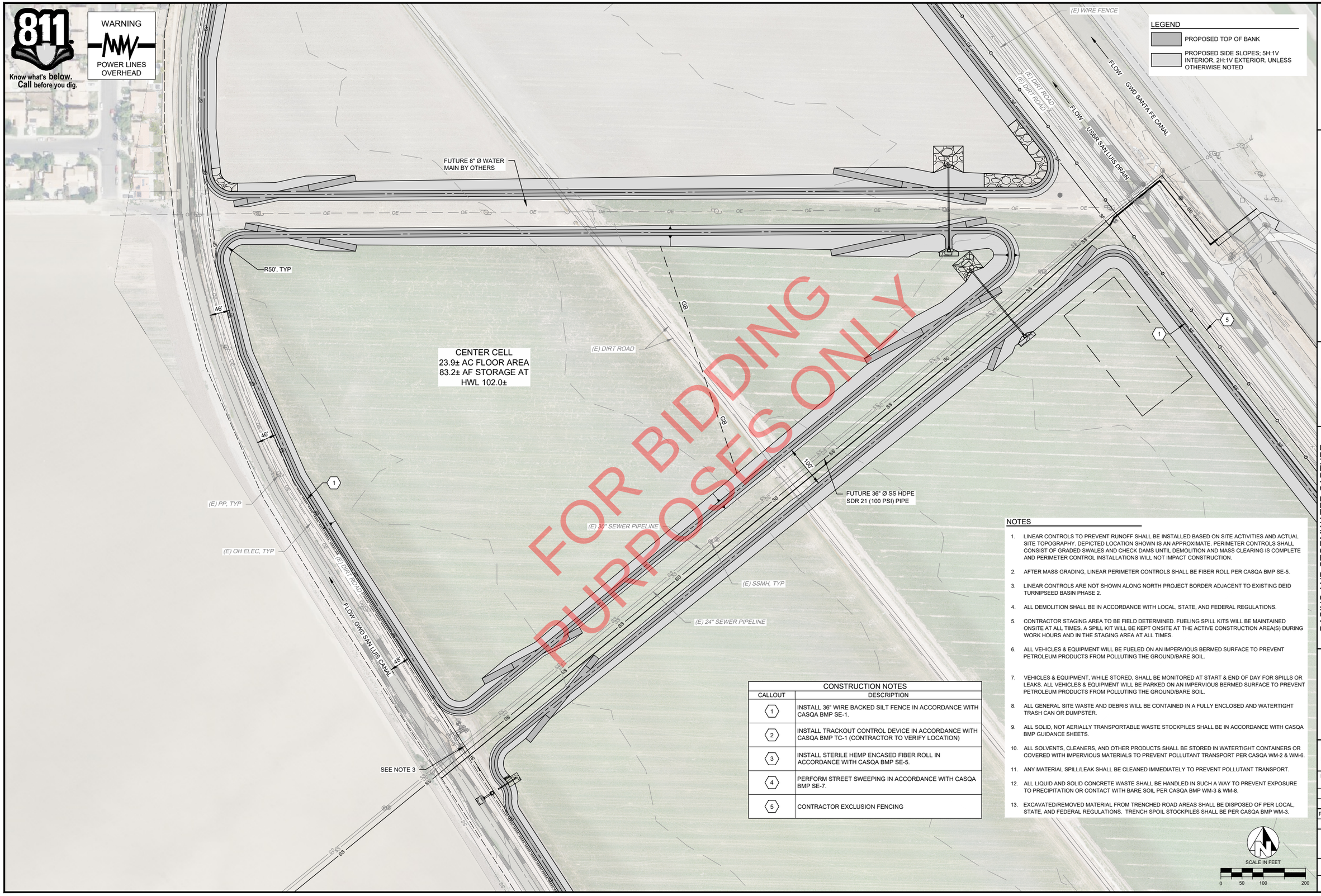
PROVOST& PRITCHARD
455 W FIR AVENUE
CLOVIS, CA 93611-9166
PHONE (559) 449-2700
FAX (559) 449-2715
www.provostandpritchard.com

DESIGN ENGINEER: GRETCHEN HEISDORF
LICENSE NO: RCE 77241, CASQA 00485
DRAFTED BY: GJF | CHECKED BY: GMH
DATE: 08/07/2025
JOB NO: 350123007
PROJECT NO:
PHASE:
0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 5
5 OF 12

8/7/2025 8:39 AM g:\los banos_city of-350135012\3007-recharge basin and stormwater capture\300 CAD\340 sheet sets\SWPPP\5 SOUTH CELL BMP SITE MAP.dwg Ivan Reyes-Chapa

811
Know what's **below.**
Call before you dig.

WARNING
POWER LINES OVERHEAD



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4	PERFORM STREET SWEEPING IN ACCORDANCE WITH CASQA BMP SE-7.
5	CONTRACTOR EXCLUSION FENCING

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FOR SWPPP PURPOSES ONLY
08/07/2025

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER ★ VIRGINIA ★ STATE OF CALIFORNIA
PREVIEW ONLY
DATE SIGNED:

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY

STORMWATER POLLUTION PREVENTION PLAN

CENTER CELL BMP SITE MAP

PROVOST & PRITCHARD
455 W FIR AVENUE
CLOVIS, CA 93611-0615
PH (559) 449-2700
FAX (559) 449-2715
www.provostandpritchard.com

DESIGN ENGINEER: GRETCHEN HEISDORF
LICENSE NO: RCE 77241, CASQA 00485
DRAFTED BY: GJF | CHECKED BY: GMH
DATE: 08/07/2025
JOB NO: 350123007
PROJECT NO:
PHASE:

0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET 6
6 OF 12

8/7/2025 8:21 AM g:\los banos_city of\350\13501230\07-recharge basin and stormwater capture\300 CAD\340 sheet sets\SWPPP\6 CENTER CELL BMP SITE MAP.dwg Ivan Reyes-Chapa

811
Know what's below. Call before you dig.

WARNING
POWER LINES OVERHEAD

LEGEND
- PROPOSED TOP OF BANK
- PROPOSED SIDE SLOPES; 5H:1V INTERIOR, 2H:1V EXTERIOR. UNLESS OTHERWISE NOTED

(E) DIRT ROAD
(E) DIRT ROAD
55'
GWD SAN LUIS CANAL FLOW
(E) PP, TYP
(E) OH ELEC, TYP
NORTH CELL
48.9± AC FLOOR AREA
259.1± AF STORAGE AT
HWL 102.0±
80'
FUTURE 8" Ø WATER MAIN BY OTHERS
FUTURE 36" Ø SS HDPE SDR 21 (100 PSI) PIPE
(E) SSMH, TYP
(E) 30" SEWER PIPELINE
(E) 24" SEWER PIPELINE
SEE NOTE 3
(E) WIRE FENCE
USBR SAN LUIS DRAIN FLOW
(E) DIRT ROAD
(E) DIRT ROAD
GWD SANTA FE CANAL FLOW

FOR BIDDING PURPOSES ONLY

CONSTRUCTION NOTES	
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SCALE IN FEET
0 50 100 200

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08/07/2025

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER — GRETCHEN M. HEISDORF — STATE OF CALIFORNIA — REVIEW ONLY
DATE SIGNED:

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY

STORMWATER POLLUTION PREVENTION PLAN

NORTH CELL BMP SITE MAP

PROVOST& PRITCHARD
455 W FIR AVENUE
CLOVIS, CA 93611-9166
PHONE (559) 449-2700
FAX (559) 449-2715
www.provostandpritchard.com

DESIGN ENGINEER: GRETCHEN HEISDORF
LICENSE NO: RCE 77241, CASQA 00485
DRAFTED BY: GJF | CHECKED BY: GMH
DATE: 08/07/2025
JOB NO: 350123007
PROJECT NO:
PHASE:
0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 7
7 OF 12

8/7/2025 8:39 AM g:\los banos_city of-350135\0123007-recharge basin and stormwater capture\300 CAD\340 sheet sets\SWPPP\7 NORTH CELL BMP SITE MAP.dwg Ivan Reyes-Chapa

811 Know what's below. Call before you dig.

WARNING
POWER LINES OVERHEAD

SEE NOTE 3

(E) 30" SEWER PIPELINE

(E) SSMH, TYP

(E) 24" SEWER PIPELINE

FUTURE 36" Ø SS HDPE
SDR 21 (100 PSI) PIPE

100'

R50', TYP

(E) DIRT ROAD

FLOW GWD SAN LUIS CANAL

46'

20'

PROPERTY LINE

(E) DIRT ROAD

SOUTH CELL
72.7± AC FLOOR AREA
262.5± AF STORAGE AT
HWL 102.0±

(E) CITY OF LOS BANOS
WASTE WATER
TREATMENT PLANT

(E) WIRE FENCE

(E) DIRT ROAD
(E) DIRT ROAD

FLOW GWD SANTA FE CANAL

FLOW USBR SAN LUIS DRAIN

20'

FOR BIDDING PURPOSES ONLY

LEGEND

- PROPOSED TOP OF BANK
- PROPOSED SIDE SLOPES; 5H:1V INTERIOR, 2H:1V EXTERIOR. UNLESS OTHERWISE NOTED

NOTES

1. THE CANAL PRISM, INTERNAL BASIN SLOPES AND BASIN FLOOR SHALL BE NATURAL EARTH.
2. CANAL DRIVE AND BASIN TRAVEL PATHS SHALL BE COMPACTED NATURAL EARTH.
3. EXTERIOR SLOPES WILL BE KEPT AS NATURAL OR SCALPED SLOPES FOR FUELS MANAGEMENT.
4. FINAL STORAGE SWALES ARE PER THE CONSTRUCTION PLAN SET.

SCALE IN FEET
0 50 100 200

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GRETCHEN M. HEISDORF
No. RCE 77241
STATE OF CALIFORNIA
REVIEW ONLY

DATE SIGNED:

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY

STORMWATER POLLUTION PREVENTION PLAN

FINAL STABILIZATION SOUTH CELL

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PHASE:

0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET 8
8 OF 12

8/7/2025 8:40 AM g:\los banos_city of-350135012\3007-recharge basin and stormwater capture\300 CAD\340 sheet sets\SWPPP\8 FINAL STABILIZATION SOUTH CELL.dwg Ivan Reyes-Chapa



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BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY

STORMWATER POLLUTION PREVENTION PLAN

FINAL STABILIZATION CENTER CELL

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ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET 9

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811
Know what's **below.**
Call before you dig.

WARNING
POWER LINES OVERHEAD

LEGEND
- PROPOSED TOP OF BANK
- PROPOSED SIDE SLOPES; 5H:1V INTERIOR, 2H:1V EXTERIOR. UNLESS OTHERWISE NOTED

(E) DIRT ROAD
55'
GWD SAN LUIS CANAL FLOW
(E) DIRT ROAD
(E) PP, TYP
(E) OH ELEC, TYP
80'
NORTH CELL
48.9± AC FLOOR AREA
259.1± AF STORAGE AT
HWL 102.0±
(E) WIRE FENCE
(E) DIRT ROAD
(E) DIRT ROAD
USBR SAN LUIS DRAIN FLOW
GWD SANTA FE CANAL FLOW
FUTURE 36" Ø SS HDPE
SDR 21 (100 PSI) PIPE
(E) SSMH, TYP
(E) 30" SEWER PIPELINE
(E) 24" SEWER PIPELINE

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NOTES
1. THE CANAL PRISM, INTERNAL BASIN SLOPES AND BASIN FLOOR SHALL BE NATURAL EARTH.
2. CANAL DRIVE AND BASIN TRAVEL PATHS SHALL BE COMPACTED NATURAL EARTH.
3. EXTERIOR SLOPES WILL BE KEPT AS NATURAL OR SCALPED SLOPES FOR FUELS MANAGEMENT.
4. FINAL STORAGE SWALES ARE PER THE CONSTRUCTION PLAN SET.

SCALE IN FEET
0 50 100 200

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BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY

STORMWATER POLLUTION PREVENTION PLAN

FINAL STABILIZATION NORTH CELL

PROVOST& PRITCHARD
455 W FIR AVENUE
CLOVIS, CA 93611-9166
PHONE (559) 449-2700
FAX (559) 449-2715
www.provostandpritchard.com

DESIGN ENGINEER: GRETCHEN HEISDORF
LICENSE NO: RCE 77241, CASQA 00485
DRAFTED BY: GJF | CHECKED BY: GMH
DATE: 08/07/2025
JOB NO: 350123007
PROJECT NO:
PHASE:
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ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 10
10 OF 12

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DRAINAGE AREA MAP

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DATE: 08/07/2025
JOB NO: 350123007
PROJECT NO:
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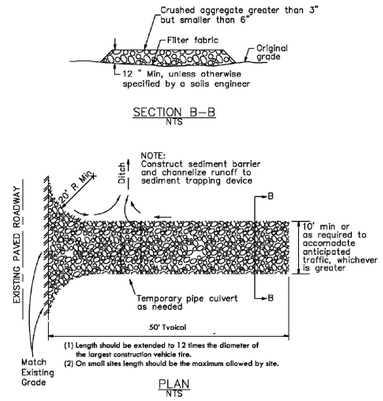
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET 11

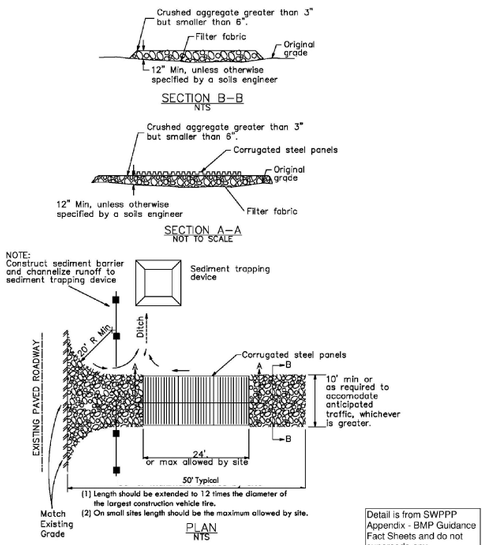
8/7/2025 8:28 AM g:\los banos_city of-3501\350123007-recharge basin and stormwater capture\300 CAD\340 sheet sets\SWPPP\11 DRAINAGE AREA MAP.dwg -Ivan Reyes-Chapa

Stabilized Construction Entrance/Exit TC-1



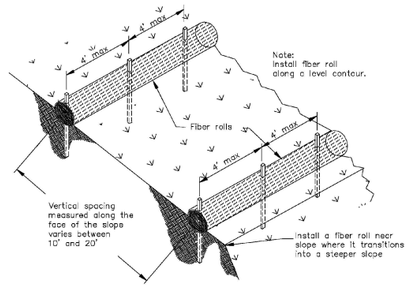
Detail is from SWPPP Appendix - BMP Guidance Fact Sheets and do not supersede any specifications elsewhere in the SWPPP or CGP

Stabilized Construction Entrance/Exit TC-1

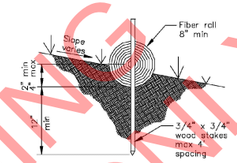


Detail is from SWPPP Appendix - BMP Guidance Fact Sheets and do not supersede any specifications elsewhere in the SWPPP or CGP

Fiber Rolls SE-5



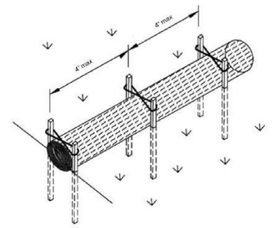
TYPICAL FIBER ROLL INSTALLATION
N.T.S.

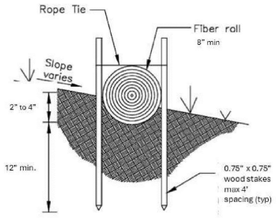


ENTRENCHMENT DETAIL
N.T.S.

Detail is from SWPPP Appendix - BMP Guidance Fact Sheets and do not supersede any specifications elsewhere in the SWPPP or CGP

Fiber Rolls SE-5



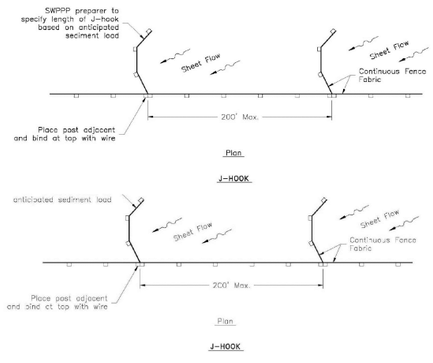


OPTIONAL ENTRENCHMENT DETAIL
N.T.S.

Detail is from SWPPP Appendix - BMP Guidance Fact Sheets and do not supersede any specifications elsewhere in the SWPPP or CGP

Reference: Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425-11.1, Section 4, Fiber Rolls SC-5, California Department of Transportation (Caltrans), March 2024.

Silt Fence SE-1



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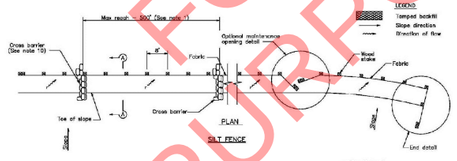
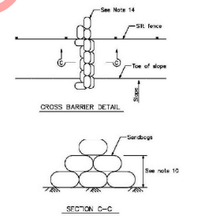
Silt Fence SE-1



NOTES

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the linear barrier, in no case shall the reach length exceed 500'.
2. The last 8'-0" of fence shall be turned up slope.
3. Stake dimensions are nominal.
4. Dimension may vary to fit field condition.
5. Stakes shall be spaced at 8'-0" maximum and shall be positioned on downstream side of fence.
6. Stakes to overlap and fence fabric to fold around each stake one full turn. Secure fabric to stake with 4 staples.
7. Stakes shall be driven tightly together to prevent potential flow-through of sediment at joint. The tops of the stakes shall be secured with wire.
8. For end stake, fence fabric shall be folded around two stakes one full turn and secured with 4 staples.
9. Minimum 4 staples per stake. Orientation shown are typical.
10. Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
11. Maintenance openings shall be constructed in a manner to ensure sediment remains behind silt fence.
12. Joining sections shall not be placed at sump locations.
13. Sandbag rows and layers shall be offset to eliminate gaps.
14. Add 3-4 bags to cross barrier on downgradient side of silt fence as needed to prevent bypass or undermining and as directed based on site limits of disturbance.



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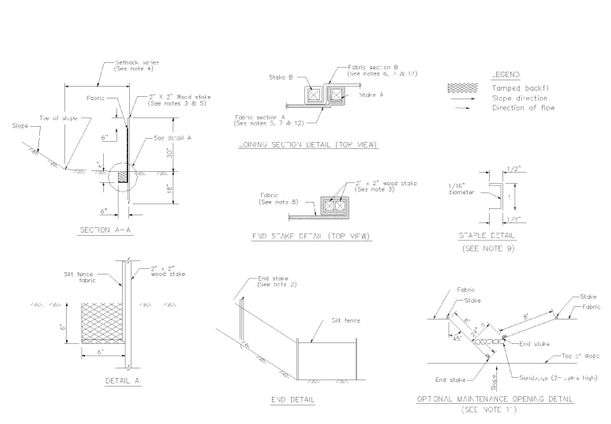
Silt Fence SE-1



Detail is from SWPPP Appendix - BMP Guidance Fact Sheets and do not supersede any specifications elsewhere in the SWPPP or GCP

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08/07/2025

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER — GRETCHEN HEISDORF — No. RCE 77241 — STATE OF CALIFORNIA — REVIEW ONLY

DATE SIGNED:

BASINS AND STORMWATER CAPTURE PROJECT
CITY OF LOS BANOS
IN MERCED COUNTY

STORMWATER POLLUTION PREVENTION PLAN

DETAILS

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DESIGN ENGINEER: GRETCHEN HEISDORF
LICENSE NO: RCE 77241, CASQA 00485
DRAFTED BY: GJF | CHECKED BY: GMH
DATE: 08/07/2025
JOB NO: 350123007
PROJECT NO:
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ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 12
12 OF 12

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Appendix B: Permit Registration Documents

Permit Registration Documents included in this Appendix:

Included in SWPPP	Permit Registration Document (in addition to a copy of the SWPPP)
TBI	Notice of Intent
Y	Risk Level Determination
N	Certification, completed electronically in SMARTS
n/a	Post-Construction Requirements, if applicable
N	Post-Construction Water Balance Calculator, if applicable
N	Copy of Annual Fee Receipt
n/a	ATS Design Documents, if applicable
n/a	Passive Treatment Design Documents, if applicable
Y	Site Maps and Drawings, see Appendix A

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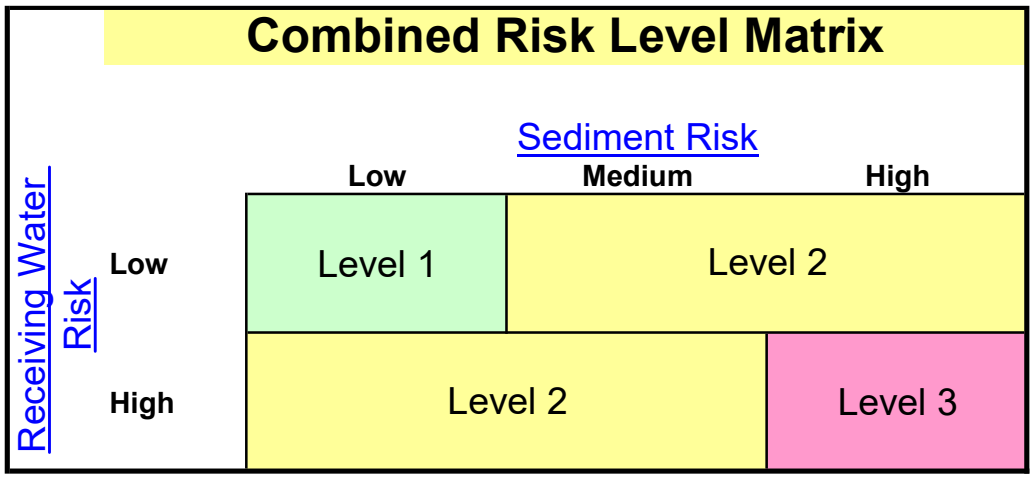
Combined Risk Level Matrix



Project Sediment Risk:	**Low**
Project RW Risk:	**Low**
Project Combined Risk:	**Level 1**

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	A	B	C
1	**Sediment Risk Factor Worksheet**		**Entry**
2	**A) R Factor**		
3	Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.		
4	http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm		
5	**R Factor Value**		22.38
6	**B) K Factor (weighted average, by area, for all site soils)**		
7	The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.		
8	Site-specific K factor guidance		
9	**K Factor Value**		0.32
10	**C) LS Factor (weighted average, by area, for all slopes)**		
11	The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.		
12	LS Table		
13	**LS Factor Value**		0.29
14			
15	**Watershed Erosion Estimate (=RxKxLS) in tons/acre**		2.076864
16	**Site Sediment Risk Factor**		**Low**
17	Low Sediment Risk: < 15 tons/acre		
18	Medium Sediment Risk: >=15 and <75 tons/acre		
19	High Sediment Risk: >= 75 tons/acre		
20			

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Steps to Calculate an R Factor for your Small Construction Project

1 Select the estimated start and end dates of construction by clicking the calendar icons below and using the dropdown calendar. The period of construction activity begins at initial earth disturbance and ends with final stabilization.

Start Date:

10/01/2025

End Date:

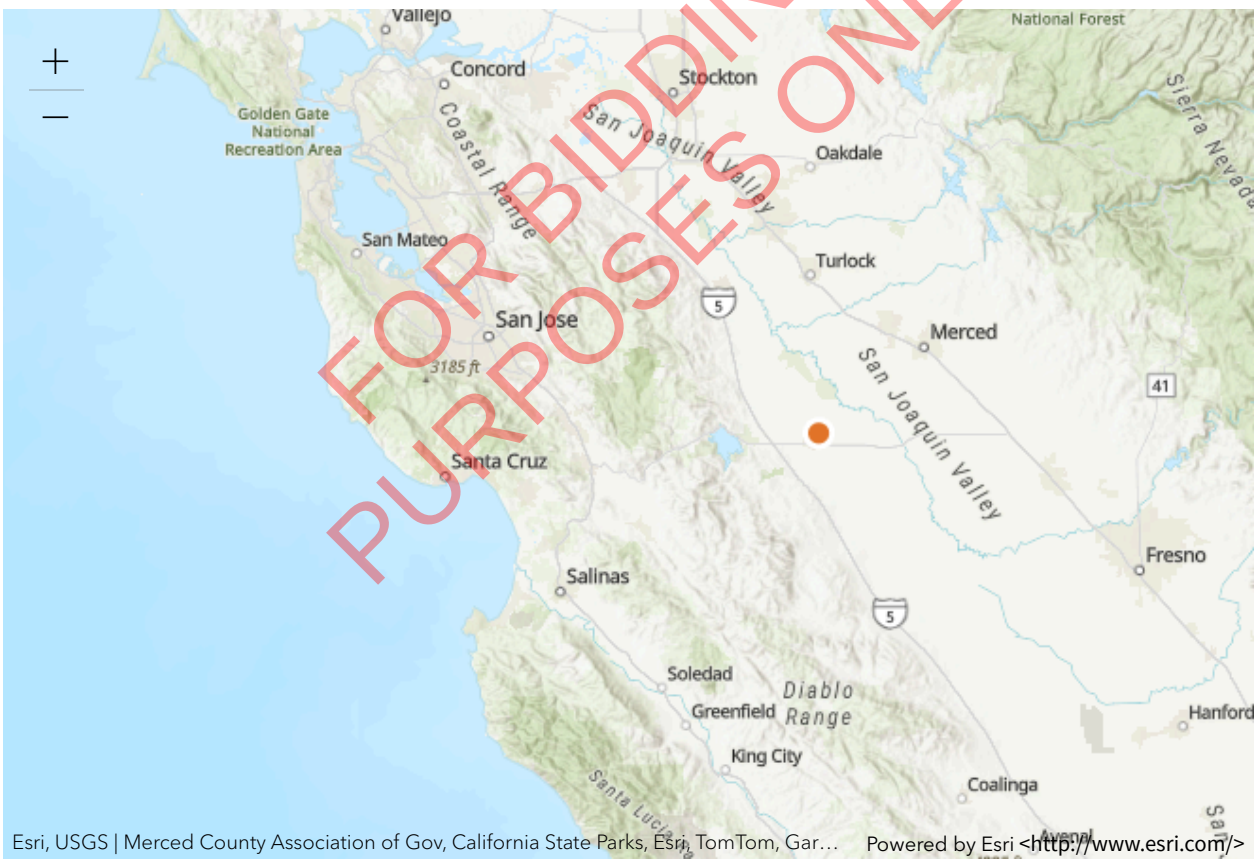
09/30/2026

2 Locate your small construction project by entering the address in the search box or by clicking on the map.

Location:

37.085017, -120.819628

Search



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3 Click the "Calculate R Factor" button below.

Calculate R Factor

Facility Information

Start Date: 10/01/2025	**Latitude:** 37.0850
End Date: 09/30/2026	**Longitude:** -120.8196

Calculation Results

Rainfall erosivity factor (R Factor) = 22.38

A rainfall erosivity factor of 5.0 or greater has been calculated for your site's period of construction.

You do NOT qualify for a waiver from NPDES permitting requirements and must seek Construction General Permit (CGP) coverage. If you are located in an area where EPA is the permitting authority (pdf) <https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-b-areas-of-permit-cover.pdf>, you must submit a Notice of Intent (NOI) through the NPDES eReporting Tool (NeT) <https://www.epa.gov/npdes/submitting-notice-intent-noi-notice-termination-not-or-low-erosivity-waiver-lew-under>.Otherwise, you must seek coverage under your state's CGP.

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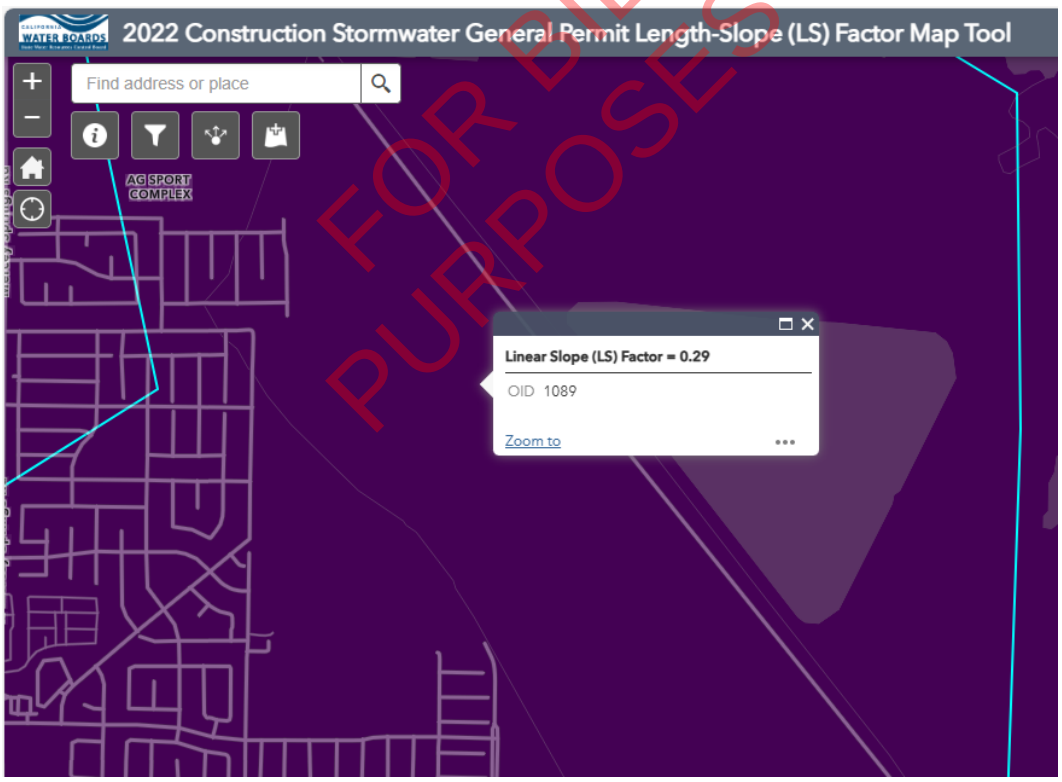
For questions or comments, email EPA's CGP staff at cgp@epa.gov.

K: 0.32



LS: 0.29



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Receiving Water (RW) Risk Factor Worksheet	Entry	Score
A. Watershed Characteristics	**yes/no**	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment** (For help with impaired waterbodies please visit the link below) or has a **USEPA approved TMDL implementation plan for sediment**?: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml	**No**	**Low**
OR		
A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY? (For help please review the appropriate Regional Board Basin Plan) http://www.waterboards.ca.gov/waterboards_map.shtml		
Region 1 Basin Plan Region 2 Basin Plan Region 3 Basin Plan Region 4 Basin Plan Region 5 Basin Plan Region 6 Basin Plan Region 7 Basin Plan Region 8 Basin Plan Region 9 Basin Plan		

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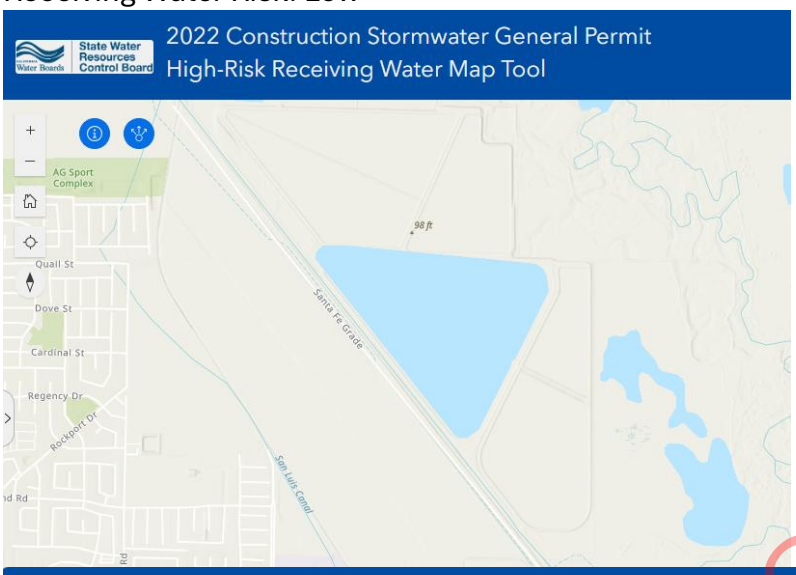
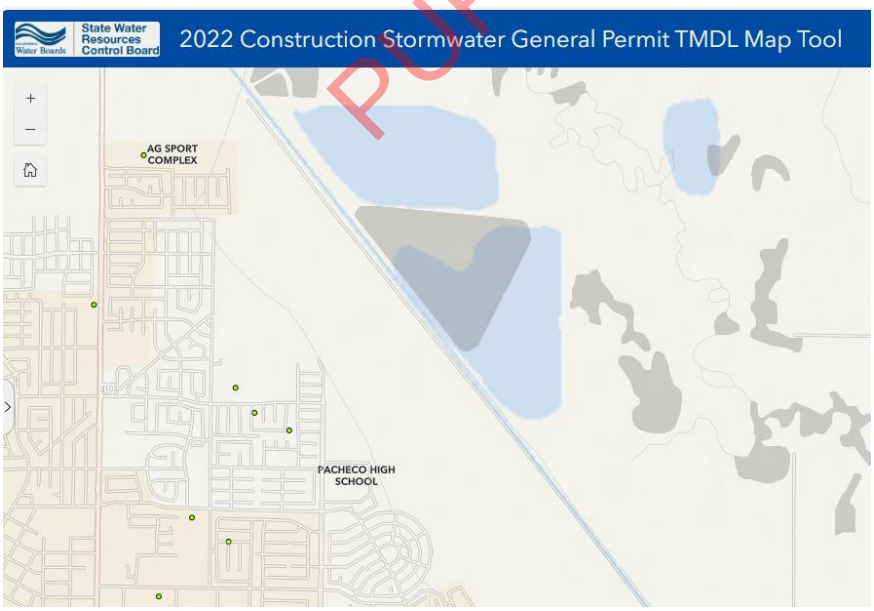
Receiving Water Risk: Low





TMDL: No



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Appendix C: SWPPP Amendment QSD Certifications

FOR BIDDING PURPOSES ONLY

SWPPP Amendment No. _____

Project Name: _____

WDID No. _____

Qualified SWPPP Developer's Certification of the Stormwater Pollution Prevention Plan Amendment

"This Stormwater Pollution Prevention Plan and its appendices were prepared under my direction to meet the requirements of the 2022 CGP (SWRCB Order No. 2022-0057-DWQ). I certify that I am a Qualified SWPPP Developer in good standing as of the date signed below."

QSD Signature	Date
QSD Name	QSD Certificate Number
Title and Affiliation	Telephone Number
Email	

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Appendix D: Submitted Changes of Information

FOR BIDDING PURPOSES ONLY

Log of Updated PRDs

The 2022 CGP allows for the reduction or increase of the total acreage when a portion of the project is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the project is purchased by a different entity; or when new acreage is added to the project.
A Change of Information (COI) shall be filed electronically within the timeframe shown in the table below. The SWPPP shall be modified appropriately, with revisions and amendments recorded in the SWPPP Amendment Log at the front of the SWPPP. COIs submitted electronically via SMARTS can be found in this Appendix.

Reason for Filing COI	**Timeline for Filing COI**
Reduction or increase in total disturbed area	Within 30 days of the reduction or increase
Updating site specific BMPs	Within 14 days of design change
Change construction start or end date	At least 14 days prior to the date to be changed
Post-construction plans updated or approved by the municipal stormwater permittee	Within 14 days of approval

This appendix includes all of the following updated PRDs (check all that apply):

☐ Change of Information;

☐ Revised Site Map;

☐ Revised Risk Assessment;

☐ New landowner's information (name, address, phone number, email address); and

☐ New signed certification statement.

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Signature of Authorized Representative of Legally Responsible Person or Duly Authorized Representative	Date
Name of Authorized Representative of Legally Responsible Person or Duly Authorized Representative	Telephone Number

Appendix E: Construction Schedule

FOR BIDDING PURPOSES ONLY

Appendix F: Construction Activities, Materials Used, and Associated Pollutants

Table F POLLUTANTS ASSOCIATED WITH CONSTRUCTION ACTIVITIES

General Work Activity/ Products with Potential Stormwater Pollutants	Specific Work Activity/Products with Potential Stormwater Pollutants	Pollutant Categories
Adhesives	• Adhesives, glues, resins, epoxy synthetics, PVC cement • Caulks, sealers, putty, sealing agents and • Coal tars (naphtha, pitch)	Oil and Grease, Synthetic Organics[1]
Asphalt paving/curbs	• Hot and cold mix asphalt	Oil and Grease
Cleaners	• Polishes (metal, ceramic, tile) • Etching agents • Cleaners, ammonia, lye, caustic sodas, bleaching agents and chromate salts	Metals, Synthetic Organics
Concrete / Masonry	• Cement and brick dust • Colored chalks • Concrete curing compounds • Glazing compounds • Surfaces cleaners • Saw cut slurries • Tile cutting	Metals, Synthetic Organics
Drywall	• Saw-cutting drywall	Metals
Framing/Carpentry	• Sawdust, particle board dust, and treated woods • Saw cut slurries	Metals, Synthetic Organics
Heating, Ventilation, Air Conditioning	• Demolition or construction of air condition and heating systems	Metals, Synthetic Organics
Insulation	• Demolition or construction involving insulation, venting systems	Metals, Synthetic Organics
Liquid waste	• Wash waters • Irrigation line testing/flushing	Metals, Synthetic Organics
Painting	• Paint thinners, acetone, methyl ethyl ketone, stripper paints, lacquers, varnish, enamels, turpentine, gum spirit, solvents, dyes, stripping pigments and sanding	Metals, Synthetic Organics
Planting / Vegetation Management	• Vegetation control (pesticides/herbicides) • Planting • Plant maintenance • Vegetation removal	Nutrients, Metals, Synthetic Organics
Plumbing	• Solder (lead, tin), flux (zinc chloride), pipe fitting • Galvanized metal in nails, fences, and electric wiring	Metals, Synthetic Organics
Pools/fountains	• Chlorinated water	Synthetic Organics
Removal of existing structures	• Demolition of asphalt, concrete, masonry, framing, roofing, metal structures.	Metals, Oil and Grease, Synthetic Organics

FOR BIDDING PURPOSES ONLY

Table F POLLUTANTS ASSOCIATED WITH CONSTRUCTION ACTIVITIES

General Work Activity/ Products with Potential Stormwater Pollutants	Specific Work Activity/Products with Potential Stormwater Pollutants	Pollutant Categories
Roofing	• Flashing • Saw cut slurries (tile cutting) • Shingle scrap and debris	Metals, Oil and Grease, Synthetic Organics
Sanitary waste	• Portable toilets • Disturbance of existing sewer lines.	Nutrients
Soil preparation/amendments	• Use of soil additives/amendments	Nutrients
Solid waste	• Litter, trash and debris • Vegetation	Gross Pollutants
Utility line testing and flushing	• Hydrostatic test water • Pipe flushing	Synthetic Organics
Vehicle and equipment use	• Equipment operation • Equipment maintenance • Equipment washing • Equipment fueling	Oil and Grease
Notes: 1. *Synthetic Organics are defined in Table 1.2 of the CASQA Stormwater BMP Handbook Portal: Construction as adhesives, cleaners, sealants, solvents, etc. These are generally categorized as VOCs or SVOCs.*		

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Appendix G: CASQA Stormwater BMP Handbook: Construction Fact Sheets

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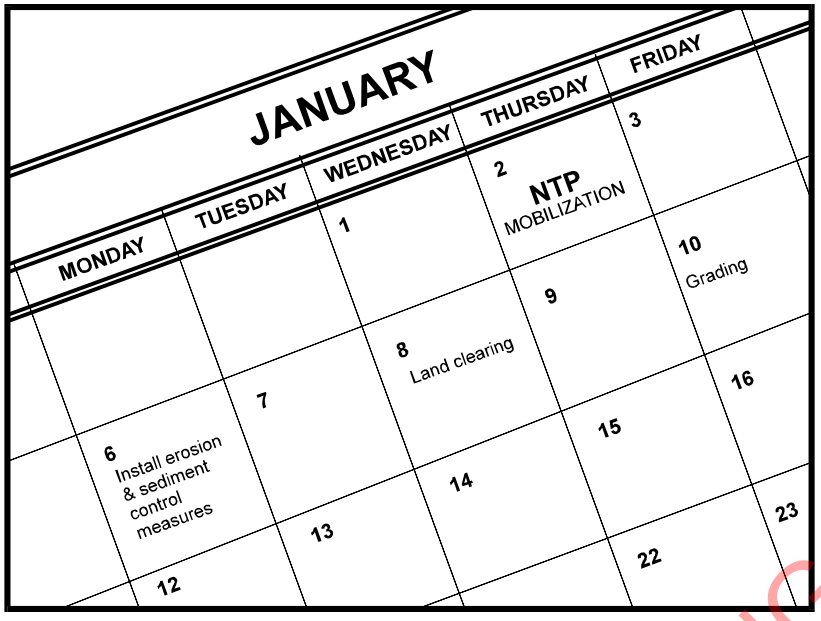
Scheduling EC-1



Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TC	Tracking Control	☒
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

Scheduling is the development of a written plan that includes sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

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Suitable Applications

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season. Use of other, more costly yet less effective, erosion and sediment control BMPs may often be reduced through proper construction sequencing.

Limitations

- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

Implementation

- Avoid rainy periods. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.

- Plan the project and develop a schedule showing each phase of construction. Clearly show how the rainy season relates to soil disturbing and re-stabilization activities. Incorporate the construction schedule into the SWPPP.
- Include on the schedule, details on the rainy season implementation and deployment of:
  - Erosion control BMPs
  - Sediment control BMPs
  - Tracking control BMPs
  - Wind erosion control BMPs
  - Non-stormwater BMPs
  - Waste management and materials pollution control BMPs
- Include dates for activities that may require non-stormwater discharges such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, pavement cleaning, etc.
- Work out the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, foundation pouring utilities installation, etc., to minimize the active construction area during the rainy season.
  - Sequence trenching activities so that most open portions are closed before new trenching begins.
  - Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
  - Schedule establishment of permanent vegetation during appropriate planting time for specified vegetation.
- Non-active areas should be stabilized as soon as practical after the cessation of soil disturbing activities or one day prior to the onset of precipitation.
- Monitor the weather forecast for rainfall.
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment treatment controls on all disturbed areas prior to the onset of rain.
- Be prepared year-round to deploy erosion control and sediment control BMPs. Erosion may be caused during dry seasons by un-seasonal rainfall, wind, and vehicle tracking. Keep the site stabilized year-round and retain and maintain rainy season sediment trapping devices in operational condition.

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- Apply permanent erosion control to areas deemed substantially complete during the project's defined seeding window.
- Avoid soil disturbance during periods with high wind velocities.

Inspection and Maintenance

- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Storm Water Management for Construction Activities Developing Pollution Prevention Plans and Best Management Practices (EPA 832-R-92-005), U.S. Environmental Protection Agency, Office of Water, September 1992.

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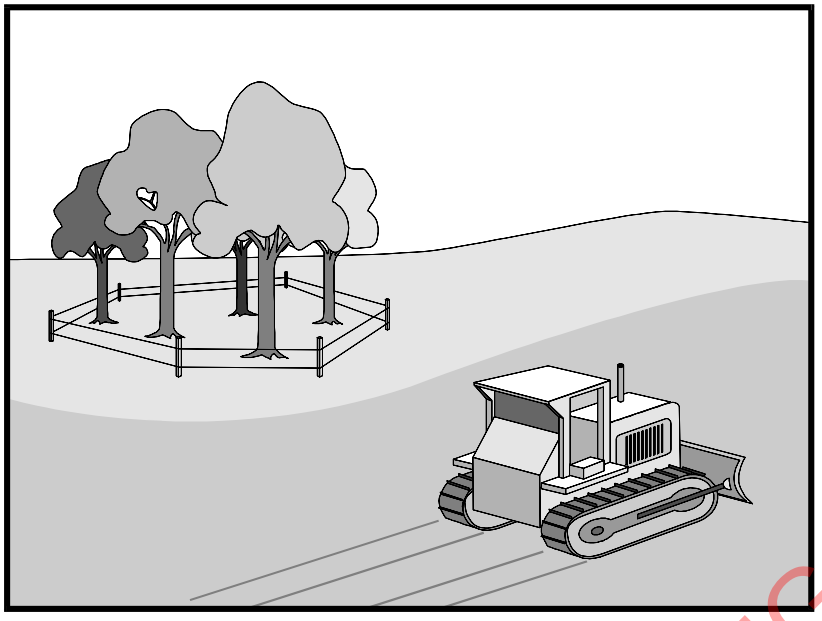
Preservation of Existing Vegetation EC-2



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☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
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Organics	

Potential Alternatives

None

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Description and Purpose

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs, and grasses that protect soil from erosion.

Suitable Applications

Preservation of existing vegetation is suitable for use on most projects. Large project sites often provide the greatest opportunity for use of this BMP. Suitable applications include the following:

- Areas within the site where no construction activity occurs or occurs at a later date. This BMP is especially suitable to multi year projects where grading can be phased.
- Areas where natural vegetation exists and is designated for preservation. Such areas often include steep slopes, watercourse, and building sites in wooded areas.
- Areas where local, state, and federal government require preservation, such as vernal pools, wetlands, marshes, certain oak trees, etc. These areas are usually designated on the plans, or in the specifications, permits, or environmental documents.
- Where vegetation designated for ultimate removal can be temporarily preserved and be utilized for erosion control and sediment control.
- Protecting existing vegetation buffers and swales.

Preservation of Existing Vegetation EC-2

Limitations

- Requires forward planning by the owner/developer, contractor, and design staff.
- Limited opportunities for use when project plans do not incorporate existing vegetation into the site design.
- For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactory for the planned development.

Implementation

The best way to prevent erosion is to not disturb the land. In order to reduce the impacts of new development and redevelopment, projects may be designed to avoid disturbing land in sensitive areas of the site (e.g., natural watercourses, steep slopes), and to incorporate unique or desirable existing vegetation into the site's landscaping plan. Clearly marking and leaving a buffer area around these unique areas during construction will help to preserve these areas as well as take advantage of natural erosion prevention and sediment trapping.

Existing vegetation to be preserved on the site must be protected from mechanical and other injury while the land is being developed. The purpose of protecting existing vegetation is to ensure the survival of desirable vegetation for shade, beautification, and erosion control. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. In addition, vegetation helps keep soil from drying rapidly and becoming susceptible to erosion. To effectively save existing vegetation, no disturbances of any kind should be allowed within a defined area around the vegetation. For trees, no construction activity should occur within the drip line of the tree.

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Timing

- Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other soil disturbing activities in areas where no construction activity is planned or will occur at a later date.

Design and Layout

- Mark areas to be preserved with temporary fencing. Include sufficient setback to protect roots.
  - Orange colored plastic mesh fencing works well.
  - Use appropriate fence posts and adequate post spacing and depth to completely support the fence in an upright position.
- Locate temporary roadways, stockpiles, and layout areas to avoid stands of trees, shrubs, and grass.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Maintain existing irrigation systems where feasible. Temporary irrigation may be required.
- Instruct employees and subcontractors to honor protective devices. Prohibit heavy equipment, vehicular traffic, or storage of construction materials within the protected area.

- Consider pruning or mowing vegetation instead of removing it to allow for regrowth.
- If possible, retain vegetation buffer around the site and adjacent waterways.

Inspection and Maintenance

During construction, the limits of disturbance should remain clearly marked at all times. Irrigation or maintenance of existing vegetation should be described in the landscaping plan. If damage to protected trees still occurs, maintenance guidelines described below should be followed:

- Verify that protective measures remain in place. Restore damaged protection measures immediately.
- Serious tree injuries shall be attended to by an arborist.
- Damage to the crown, trunk, or root system of a retained tree shall be repaired immediately.
- Trench as far from tree trunks as possible, usually outside of the tree drip line or canopy. Curve trenches around trees to avoid large roots or root concentrations. If roots are encountered, consider tunneling under them. When trenching or tunneling near or under trees to be retained, place tunnels at least 18 in. below the ground surface, and not below the tree center to minimize impact on the roots.
- Do not leave tree roots exposed to air. Cover exposed roots with soil as soon as possible. If soil covering is not practical, protect exposed roots with wet burlap or peat moss until the tunnel or trench is ready for backfill.
- Cleanly remove the ends of damaged roots with a smooth cut.
- Fill trenches and tunnels as soon as possible. Careful filling and tamping will eliminate air spaces in the soil, which can damage roots.
- If bark damage occurs, cut back all loosened bark into the undamaged area, with the cut tapered at the top and bottom and drainage provided at the base of the wood. Limit cutting the undamaged area as much as possible.
- Aerate soil that has been compacted over a trees root zone by punching holes 12 in. deep with an iron bar and moving the bar back and forth until the soil is loosened. Place holes 18 in. apart throughout the area of compacted soil under the tree crown.
- Fertilization:
  - Fertilize trees in the late fall or early spring. Although to note, many native species do not require fertilization.
  - Apply fertilizer to the soil over the feeder roots and in accordance with label instructions, but never closer than 3 ft to the trunk. Increase the fertilized area by one-fourth of the crown area for conifers that have extended root systems.
- Retain protective measures until all other construction activity is complete to avoid damage during site cleanup and stabilization.

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References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

County of Sacramento Tree Preservation Ordinance, September 1981.

Storm Water Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for The Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

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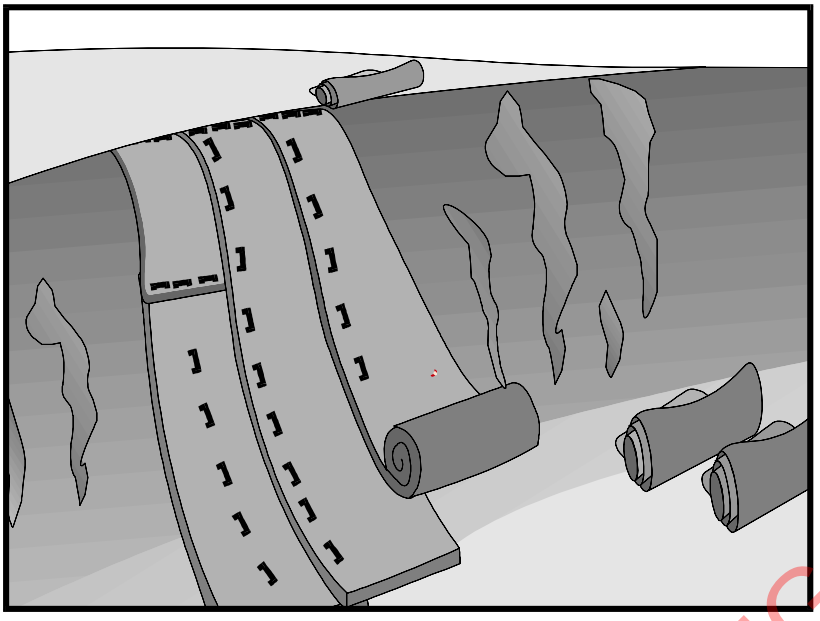
Geotextiles and Mats EC-7



Categories

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WE	Wind Erosion Control	☒
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Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-4 Hydroseeding

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Description and Purpose

Rolled Erosion Control Products (RECPs), also known as erosion control matting or blankets, can be made of natural or synthetic materials or a combination of the two. RECPs are used to cover the soil surface to reduce erosion from rainfall impact, hold soil in place, and absorb and hold moisture near the soil surface. Additionally, RECPs may be used to stabilize soils until vegetation is established or to reinforce non-woody surface vegetation.

Suitable Applications

RECPs are typically applied on slopes where erosion hazard is high, and vegetation will be slow to establish. Mattings are also used on stream banks, swales and other drainage channels where moving water at velocities between 3 ft/s and 6 ft/s are likely to cause scour and wash out new vegetation and in areas where the soil surface is disturbed and where existing vegetation has been removed. RECPs may also be used when seeding cannot occur (e.g., late season construction and/or the arrival of an early rain season). RECPs should be considered when the soils are fine grained and potentially erosive. RECPs should be considered in the following situations:

- Steep slopes, generally steeper than 3:1 (H:V).
- Long slopes.
- Slopes where the erosion potential is high.
- Slopes and disturbed soils where mulch must be anchored.

- Disturbed areas where temporary cover is needed, or plants are slow to establish or will not establish.
- Channels with flows exceeding 3.3 ft/s.
- Channels to be vegetated.
- Stockpiles.
- Slopes adjacent to water bodies.

Limitations

- RECP installed costs are generally higher than other erosion control BMPs, limiting their use to areas where other BMPs are ineffective (e.g., channels, steep slopes).
- RECPs may delay seed germination, due to reduction in soil temperature and/or sunlight.
- RECPs are generally not suitable for excessively rocky sites or areas where the final vegetation will be mowed (since staples and netting can catch in mowers). If a staple or pin cannot be driven into the soil because the underlying soil is too hard or rocky, then an alternative BMP should be selected.
- If used for temporary erosion control, RECPs should be removed and disposed of prior to application of permanent soil stabilization measures.
- The use of plastic sheeting should be limited to covering stockpiles or very small graded areas for short periods of time (such as through one imminent storm event) until other measures, such as seeding and mulching, may be installed.
  - Plastic sheeting is easily vandalized, easily torn, photodegradable, and must be disposed of at a landfill.
  - Plastic sheeting results in 100% runoff, which may cause serious erosion problems in the areas receiving the increased flow.
- According to the State Water Board's *CGP Review, Issue #2*, only RECPs that either do not contain plastic netting or contain netting manufactured from 100% biodegradable non-plastic materials, such as jute, sisal, or coir fiber should be used due to plastic pollution and wildlife concerns. If a plastic-netted product is used for temporary stabilization, it must be promptly removed when no longer needed and removed or replaced with non-plastic netted RECPs for final stabilization.
- RECPs may have limitations based on soil type, slope gradient, or channel flow rate; consult the manufacturer for proper selection.
- Not suitable for areas that have foot traffic (tripping hazard) – e.g., pad areas around buildings under construction.
- RECPs that incorporate a plastic netting (e.g. straw blanket typically uses a plastic netting to hold the straw in place) may not be suitable near known wildlife habitat. Wildlife can become trapped in the plastic netting. As per State Water Board guidance, RECPs that

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contain plastic netting are discouraged for temporary controls and are not acceptable alternatives for permanent controls. RECPs that do not contain plastic netting or contain netting manufactured from 100% biodegradable non-plastic materials such as jute, sisal, or coir fiber should be used.

- RECPs may have limitations in extremely windy climates; they are susceptible to wind damage and displacement. However, when RECPs are properly trenched at the top and bottom and stapled in accordance with the manufacturer's recommendations, problems with wind can be minimized.

Implementation

Material Selection

- Natural RECPs have been found to be effective where re-vegetation will be provided by re-seeding. The choice of material should be based on the size of area, side slopes, surface conditions such as hardness, moisture, weed growth, and availability of materials.

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix B "Guidance on Selection of Temporary Slope Stabilization Techniques" of the CASQA Construction BMP Handbook.

- The following natural and synthetic RECPs are commonly used:

Geotextiles

- Material can be a woven or a non-woven polypropylene fabric with minimum thickness of 0.06 in., minimum width of 12 ft and should have minimum tensile strength of 150 lbs (warp), 80 lbs (fill) in conformance with the requirements in ASTM Designation: D 4632. The permittivity of the fabric should be approximately 0.07 sec^{-1} in conformance with the requirements in ASTM Designation: D4491. The fabric should have an ultraviolet (UV) stability of 70 percent in conformance with the requirements in ASTM designation: D4355. Geotextile blankets must be secured in place with wire staples or sandbags and by keying into tops of slopes to prevent infiltration of surface waters under geotextile. Staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- Geotextiles may be reused if they are suitable for the use intended.

Plastic Covers

- Generally plastic sheeting should only be used as stockpile covering or for very small graded areas for short periods of time (such as through one imminent storm event). If plastic sheeting must be used, choose a plastic that will withstand photo degradation.

- Plastic sheeting should have a minimum thickness of 6 mils and must be keyed in at the top of slope (when used as a temporary slope protection) and firmly held in place with sandbags or other weights placed no more than 10 ft apart. Seams are typically taped or weighted down their entire length, and there should be at least a 12 in. to 24 in. overlap of all seams. Edges should be embedded a minimum of 6 in. in soil (when used as a temporary slope protection).

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- All sheeting must be inspected periodically after installation and after significant rainstorms to check for erosion, undermining, and anchorage failure. Any failures must be repaired immediately. If washout or breakages occur, the material should be re-installed after repairing the damage to the slope.

Erosion Control Blankets/Mats

- Biodegradable RECPs are typically composed of jute fibers, curled wood fibers, straw, coconut fiber, or a combination of these materials. In order for an RECP to be considered 100% biodegradable, the netting, sewing or adhesive system that holds the biodegradable mulch fibers together must also be biodegradable. See typical installation details at the end of this fact sheet.

  - **Jute** is a natural fiber that is made into a yarn that is loosely woven into a biodegradable mesh. The performance of jute as a stand-alone RECP is low. Most other RECPs outperform jute as a temporary erosion control product and therefore jute is not commonly used. It is designed to be used in conjunction with vegetation. The material is supplied in rolled strips, which should be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Excelsior** (curled wood fiber) blanket material should consist of machine produced mats of curled wood excelsior with 80 percent of the fiber 6 in. or longer. The excelsior blanket should be of consistent thickness. The wood fiber must be evenly distributed over the entire area of the blanket. The top surface of the blanket should be covered with a photodegradable extruded plastic mesh. The blanket should be smolder resistant without the use of chemical additives and should be non-toxic and non-injurious to plant and animal life. Excelsior blankets should be furnished in rolled strips, a minimum of 48 in. wide, and should have an average weight of 0.8 lb/yd^2, ±10 percent, at the time of manufacture. Excelsior blankets must be secured in place with wire staples. Staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

  - **Straw blanket** should be machine produced mats of straw with a lightweight biodegradable netting top layer. The straw should be attached to the netting with biodegradable thread or glue strips. The straw blanket should be of consistent thickness. The straw should be evenly distributed over the entire area of the blanket. Straw blanket should be furnished in rolled strips a minimum of 6.5 ft wide, a minimum of 80 ft long and a minimum of 0.5 lb/yd^2. Straw blankets must be secured in place with wire staples. Staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

  - **Wood fiber blanket** is composed of biodegradable fiber mulch with extruded plastic netting held together with adhesives. The material is designed to enhance re-vegetation. The material is furnished in rolled strips, which must be secured to the ground with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Coconut fiber blanket** should be a machine produced mat of 100 percent coconut fiber with biodegradable netting on the top and bottom. The coconut fiber should be attached to the netting with biodegradable thread or glue strips. The coconut fiber blanket should be of consistent thickness. The coconut fiber should be evenly distributed

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over the entire area of the blanket. Coconut fiber blanket should be furnished in rolled strips with a minimum of 6.5 ft wide, a minimum of 80 ft. long and a minimum of 0.5 lb/yd^2. Coconut fiber blankets must be secured in place with wire staples. Staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- **Coconut fiber mesh** is a thin permeable membrane made from coconut or corn fiber that is spun into a yarn and woven into a biodegradable mat. It is designed to be used in conjunction with vegetation and typically has longevity of several years. The material is supplied in rolled strips, which must be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

- **Straw coconut fiber blanket** should be machine produced mats of 70 percent straw and 30 percent coconut fiber with a biodegradable netting top layer and a biodegradable bottom net. The straw and coconut fiber should be attached to the netting with biodegradable thread or glue strips. The straw coconut fiber blanket should be of consistent thickness. The straw and coconut fiber should be evenly distributed over the entire area of the blanket. Straw coconut fiber blanket should be furnished in rolled strips a minimum of 6.5 ft wide, a minimum of 80 ft long and a minimum of 0.5 lb/yd^2. Straw coconut fiber blankets must be secured in place with wire staples. Staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- Non-biodegradable RECPs are typically composed of polypropylene, polyethylene, nylon or other synthetic fibers. In some cases, a combination of biodegradable and synthetic fibers is used to construct the RECP. Netting used to hold these fibers together is typically non-biodegradable as well. Only biodegradable RECPs can remain on a site applying for a Notice of Termination due to plastic pollution and wild life concerns (State Waterboard, 2016). RECPs containing plastic that are used on a site must be disposed of for final stabilization.

  - **Plastic netting** is a lightweight biaxially oriented netting designed for securing loose mulches like straw or paper to soil surfaces to establish vegetation. The netting is photodegradable. The netting is supplied in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Plastic mesh** is an open weave geotextile that is composed of an extruded synthetic fiber woven into a mesh with an opening size of less than ¼ in. It is used with re-vegetation or may be used to secure loose fiber such as straw to the ground. The material is supplied in rolled strips, which must be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Synthetic fiber with netting** is a mat that is composed of durable synthetic fibers treated to resist chemicals and ultraviolet light. The mat is a dense, three-dimensional mesh of synthetic (typically polyolefin) fibers stitched between two polypropylene nets. The mats are designed to be re-vegetated and provide a permanent composite system of soil, roots, and geomatrix. The material is furnished in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

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- **Bonded synthetic fibers** consist of a three-dimensional geometric nylon (or other synthetic) matting. Typically, it has more than 90 percent open area, which facilitates root growth. It's tough root reinforcing system anchors vegetation and protects against hydraulic lift and shear forces created by high volume discharges. It can be installed over prepared soil, followed by seeding into the mat. Once vegetated, it becomes an invisible composite system of soil, roots, and geomatrix. The material is furnished in rolled strips that must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

- **Combination synthetic and biodegradable RECPs** consist of biodegradable fibers, such as wood fiber or coconut fiber, with a heavy polypropylene net stitched to the top and a high strength continuous filament geomatrix or net stitched to the bottom. The material is designed to enhance re-vegetation. The material is furnished in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

Site Preparation

- Proper soil preparation is essential to ensure complete contact of the RECP with the soil. Soil Roughening is not recommended in areas where RECPs will be installed.
- Grade and shape the area of installation.
- Remove all rocks, clods, vegetation or other obstructions so that the installed blankets or mats will have complete, direct contact with the soil.
- Prepare seedbed by loosening 2 to 3 in. of topsoil.

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Seeding/Planting

Seed the area before blanket installation for erosion control and re-vegetation. Seeding after mat installation is often specified for turf reinforcement application. When seeding prior to blanket installation, all areas disturbed during blanket installation must be re-seeded. Where soil filling is specified for turf reinforcement mats (TRMs), seed the matting and the entire disturbed area after installation and prior to filling the mat with soil.

Fertilize and seed in accordance with seeding specifications or other types of landscaping plans. The protective matting can be laid over areas where grass has been planted and the seedlings have emerged. Where vines or other ground covers are to be planted, lay the protective matting first and then plant through matting according to design of planting.

Check Slots

Check slots shall be installed as required by the manufacturer.

Laying and Securing Matting

- Before laying the matting, all check slots should be installed and the seedbed should be friable, made free from clods, rocks, and roots. The surface should be compacted and finished according to the requirements of the manufacturer's recommendations.

- Mechanical or manual lay down equipment should be capable of handling full rolls of fabric and laying the fabric smoothly without wrinkles or folds. The equipment should meet the fabric manufacturer's recommendations or equivalent standards.

Anchoring

- U-shaped wire staples, metal geotextile stake pins, or triangular wooden stakes can be used to anchor mats and blankets to the ground surface.
- Wire staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.
- Metal stake pins should be 0.188 in. diameter steel with a 1.5 in. steel washer at the head of the pin, and 8 in. in length.
- Wire staples and metal stakes should be driven flush to the soil surface.

Installation on Slopes

Installation should be in accordance with the manufacturer's recommendations. In general, these will be as follows:

- Begin at the top of the slope and anchor the blanket in a 6 in. deep by 6 in. wide trench. Backfill trench and tamp earth firmly.
- Unroll blanket down slope in the direction of water flow.
- Overlap the edges of adjacent parallel rolls 2 to 3 in. and staple every 3 ft (or greater, per manufacturer's specifications).
- When blankets must be spliced, place blankets end over end (shingle style) with 6 in. overlap. Staple through overlapped area, approximately 12 in. apart.
- Lay blankets loosely and maintain direct contact with the soil. Do not stretch.
- Staple blankets sufficiently to anchor blanket and maintain contact with the soil. Staples should be placed down the center and staggered with the staples placed along the edges. Steep slopes, 1:1 (H:V) to 2:1 (H:V), require a minimum of 2 staples/yd^2. Moderate slopes, 2:1 (H:V) to 3:1 (H:V), require a minimum of 1 ½ staples/yd^2. Check manufacturer's specifications to determine if a higher density staple pattern is required.

Installation in Channels

Installation should be in accordance with the manufacturer's recommendations. In general, these will be as follows:

- Dig initial anchor trench 12 in. deep and 6 in. wide across the channel at the lower end of the project area.
- Excavate intermittent check slots, 6 in. deep and 6 in. wide across the channel at 25 to 30 ft intervals along the channels.

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- Cut longitudinal channel anchor trenches 4 in. deep and 4 in. wide along each side of the installation to bury edges of matting, whenever possible extend matting 2 to 3 in. above the crest of the channel side slopes.
- Beginning at the downstream end and in the center of the channel, place the initial end of the first roll in the anchor trench and secure with fastening devices at 12 in. intervals. Note: matting will initially be upside down in anchor trench.
- In the same manner, position adjacent rolls in anchor trench, overlapping the preceding roll a minimum of 3 in.
- Secure these initial ends of mats with anchors at 12 in. intervals, backfill and compact soil.
- Unroll center strip of matting upstream. Stop at next check slot or terminal anchor trench. Unroll adjacent mats upstream in similar fashion, maintaining a 3 in. overlap.
- Fold and secure all rolls of matting snugly into all transverse check slots. Lay mat in the bottom of the slot then fold back against itself. Anchor through both layers of mat at 12 in. intervals, then backfill and compact soil. Continue rolling all mat widths upstream to the next check slot or terminal anchor trench.
- Alternate method for non-critical installations: Place two rows of anchors on 6 in. centers at 25 to 30 ft. intervals in lieu of excavated check slots.
- Staple shingled lap spliced ends a minimum of 12 in. apart on 12 in. intervals.
- Place edges of outside mats in previously excavated longitudinal slots; anchor using prescribed staple pattern, backfill, and compact soil.
- Anchor, fill, and compact upstream end of mat in a 12 in. by 6 in. terminal trench.
- Secure mat to ground surface using U-shaped wire staples, geotextile pins, or wooden stakes.
- Seed and fill turf reinforcement matting with soil, if specified.

Soil Filling (if specified for turf reinforcement mat (TRM))

Installation should be in accordance with the manufacturer's recommendations. Typical installation guidelines are as follows:

- After seeding, spread and lightly rake ½-3/4 inches of fine topsoil into the TRM apertures to completely fill TRM thickness. Use backside of rake or other flat implement.
- Alternatively, if allowed by product specifications, spread topsoil using lightweight loader, backhoe, or other power equipment. Avoid sharp turns with equipment.
- Always consult the manufacturer's recommendations for installation.
- Do not drive tracked or heavy equipment over mat.
- Avoid any traffic over matting if loose or wet soil conditions exist.

FOR BIDDING PURPOSES ONLY

- Use shovels, rakes, or brooms for fine grading and touch up.
- Smooth out soil filling just exposing top netting of mat.

Temporary Soil Stabilization Removal

- Temporary soil stabilization removed from the site of the work must be disposed of if necessary.

Inspection and Maintenance

- RECPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident shall be repaired and BMPs reapplied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require reapplication of BMPs.
- If washout or breakage occurs, re-install the material after repairing the damage to the slope or channel.
- Make sure matting is uniformly in contact with the soil.
- Check that all the lap joints are secure.
- Check that staples are flush with the ground.

FOR BIDDING PURPOSES ONLY

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

CGP Review #2, State Water Resources Control Board, 2014. Available online at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/training/cgp_review_issue2.pdf.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Erosion Control Pilot Study Report, State of California Department of Transportation (Caltrans), June 2000.

Guidance for Temporary Soil Stabilization, California Department of Transportation (Caltrans), July 2003.

Guides for Erosion and Sediment Controls in California, USDA Soils Conservation Service, January 1991.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for The Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

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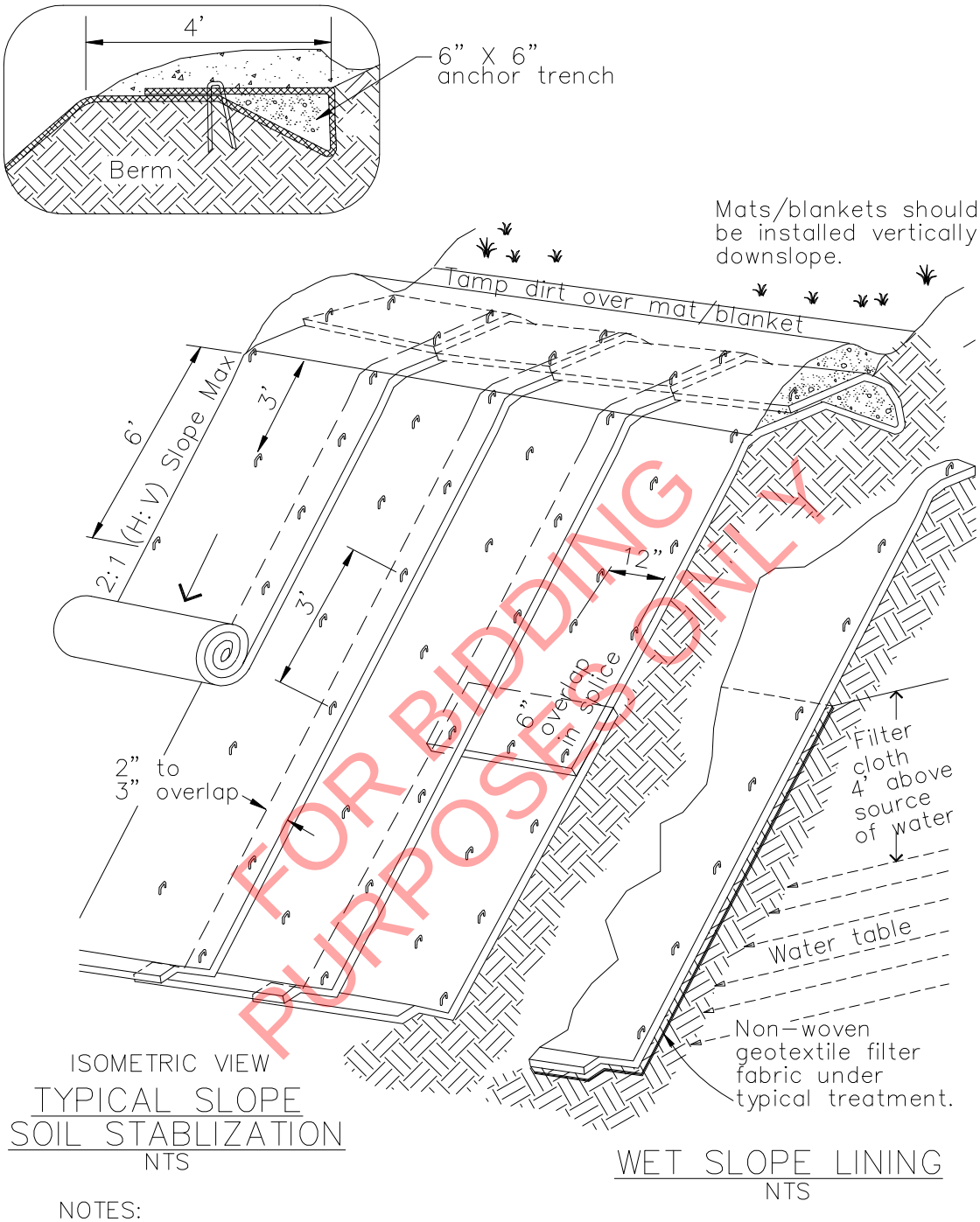


ISOMETRIC VIEW

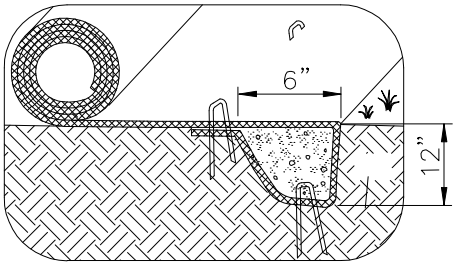
TYPICAL SLOPE
SOIL STABLIZATION
NTS

WET SLOPE LINING
NTS

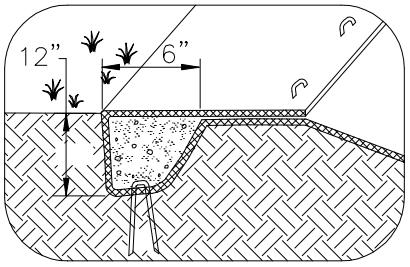
NOTES:

1. Slope surface shall be free of rocks, clods, sticks and grass. Mats/blankets shall have good soil contact.
2. Lay blankets loosely and stake or staple to maintain direct contact with the soil. Do not stretch.
3. Install per manufacturer's recommendations

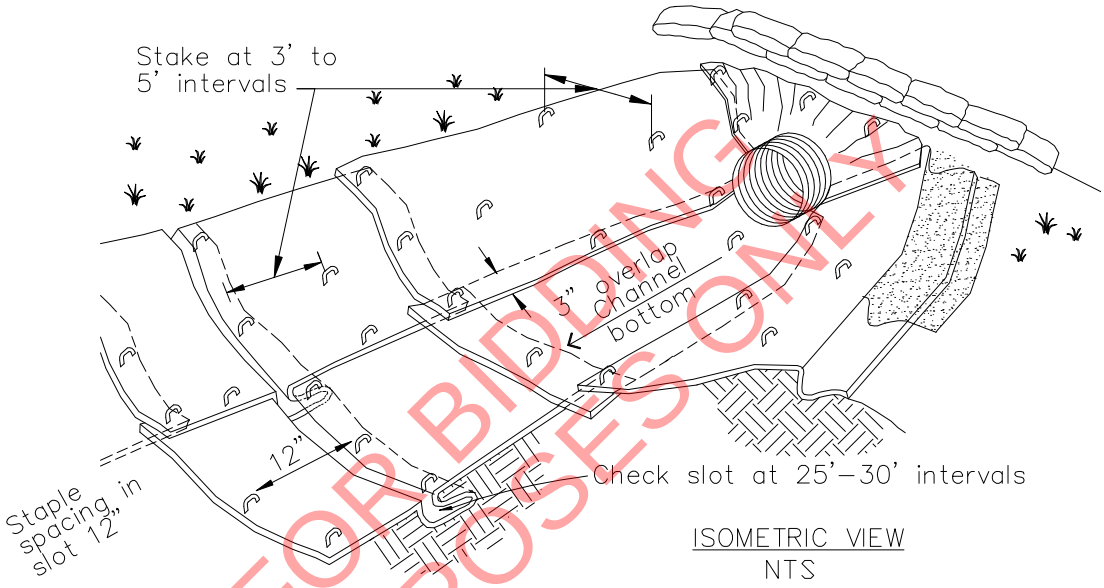
TYPICAL INSTALLATION DETAIL



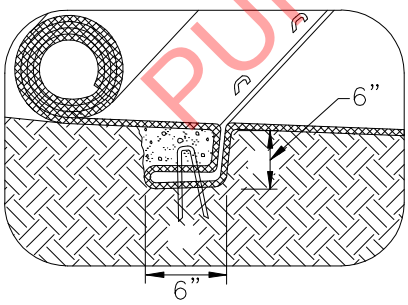
INITIAL CHANNEL ANCHOR TRENCH
NTS



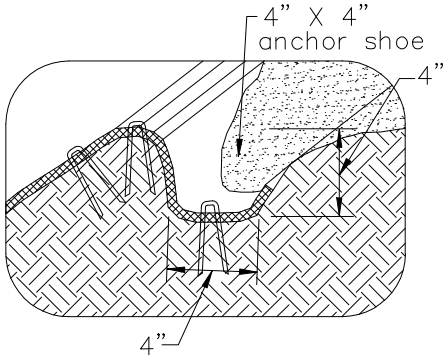
TERMINAL SLOPE AND CHANNEL ANCHOR TRENCH
NTS



ISOMETRIC VIEW
NTS



INTERMITTENT CHECK SLOT
NTS



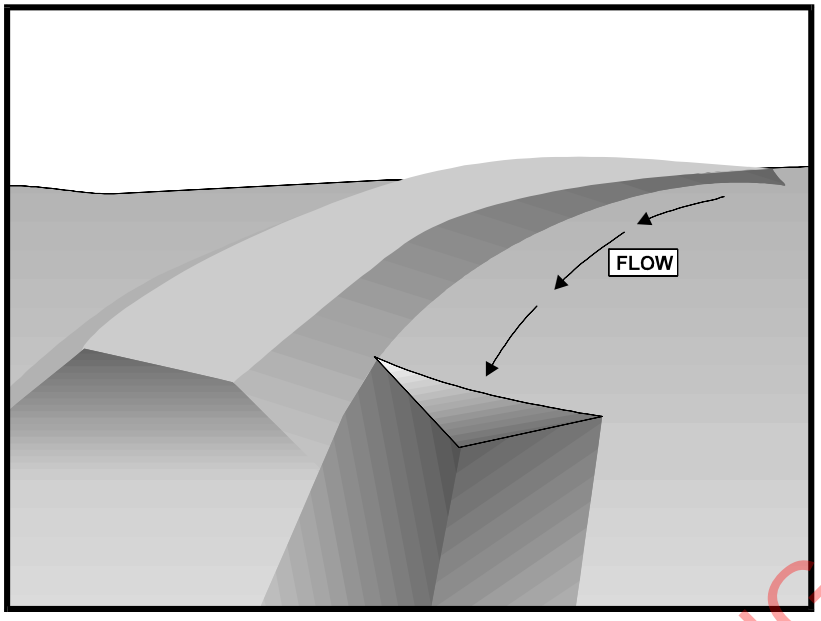
LONGITUDINAL ANCHOR TRENCH
NTS

NOTES:
1. Check slots to be constructed per manufacturers specifications.
2. Staking or stapling layout per manufacturers specifications.
3. Install per manufacturer's recommendations

TYPICAL INSTALLATION DETAIL

FOR BIDDING PURPOSES ONLY

Earth Dikes and Drainage Swales EC-9



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

An earth dike is a temporary berm or ridge of compacted soil used to divert runoff or channel water to a desired location. A drainage swale is a shaped and sloped depression in the soil surface used to convey runoff to a desired location. Earth dikes and drainage swales are used to divert off site runoff around the construction site, divert runoff from stabilized areas and disturbed areas, and direct runoff into sediment basins or traps.

Suitable Applications

Earth dikes and drainage swales are suitable for use, individually or together, where runoff needs to be diverted from one area and conveyed to another.

- Earth dikes and drainage swales may be used:
  - To convey surface runoff down sloping land
  - To intercept and divert runoff to avoid sheet flow over sloped surfaces
  - To divert and direct runoff towards a stabilized watercourse, drainage pipe or channel
  - To intercept runoff from paved surfaces
  - To intercept and divert run-on
  - Below steep grades where runoff begins to concentrate

- Along roadways and facility improvements subject to flood drainage
- At the top of slopes to divert runon from adjacent or undisturbed slopes
- At bottom and mid slope locations to intercept sheet flow and convey concentrated flows
- Divert sediment laden runoff into sediment basins or traps

Limitations

Dikes should not be used for drainage areas greater than 10 acres or along slopes greater than 10 percent. For larger areas more permanent drainage structures should be built. All drainage structures should be built in compliance with local municipal requirements.

- Earth dikes may create more disturbed area on site and become barriers to construction equipment.
- Earth dikes must be stabilized immediately, which adds cost and maintenance concerns.
- Diverted stormwater may cause downstream flood damage.
- Dikes should not be constructed of soils that may be easily eroded.
- Regrading the site to remove the dike may add additional cost.
- Temporary drains and swales or any other diversion of runoff should not adversely impact upstream or downstream properties.
- Temporary drains and swales must conform to local floodplain management requirements.
- Earth dikes/drainage swales are not suitable as sediment trapping devices.
- It may be necessary to use other soil stabilization and sediment controls such as check dams, plastics, and blankets, to prevent scour and erosion in newly graded dikes, swales, and ditches.
- Sediment accumulation, scour depressions, and/or persistent non-stormwater discharges can result in areas of standing water suitable for mosquito production in drainage swales.

FOR BIDDING PURPOSES ONLY

Implementation

The temporary earth dike is a berm or ridge of compacted soil, located in such a manner as to divert stormwater to a sediment trapping device or a stabilized outlet, thereby reducing the potential for erosion and offsite sedimentation. Earth dikes can also be used to divert runoff from off site and from undisturbed areas away from disturbed areas and to divert sheet flows away from unprotected slopes.

An earth dike does not itself control erosion or remove sediment from runoff. A dike prevents erosion by directing runoff to an erosion control device such as a sediment trap or directing runoff away from an erodible area. Temporary diversion dikes should not adversely impact adjacent properties and must conform to local floodplain management regulations and should not be used in areas with slopes steeper than 10%.

Slopes that are formed during cut and fill operations should be protected from erosion by runoff. A combination of a temporary drainage swale and an earth dike at the top of a slope can divert runoff to a location where it can be brought to the bottom of the slope (see EC-11, Slope Drains). A combination dike and swale is easily constructed by a single pass of a bulldozer or grader and compacted by a second pass of the tracks or wheels over the ridge. Diversion structures should be installed when the site is initially graded and remain in place until post construction BMPs are installed and the slopes are stabilized.

Diversion practices concentrate surface runoff, increasing its velocity and erosive force. Thus, the flow out of the drain or swale must be directed onto a stabilized area or into a grade stabilization structure. If significant erosion will occur, a swale should be stabilized using vegetation, chemical treatment, rock rip-rap, matting, or other physical means of stabilization. Any drain or swale that conveys sediment laden runoff must be diverted into a sediment basin or trap before it is discharged from the site.

General

- Care must be applied to correctly size and locate earth dikes, drainage swales. Excessively steep, unlined dikes, and swales are subject to erosion and gully formation.
- Conveyances should be stabilized.
- Use a lined ditch for high flow velocities.
- Select flow velocity based on careful evaluation of the risks due to erosion of the measure, soil types, overtopping, flow backups, washout, and drainage flow patterns for each project site.
- Compact any fills to prevent unequal settlement.
- Do not divert runoff onto other property without securing written authorization from the property owner.
- When possible, install and utilize permanent dikes, swales, and ditches early in the construction process.
- Provide stabilized outlets.

FOR BIDDING PURPOSES ONLY

Earth Dikes

Temporary earth dikes are a practical, inexpensive BMP used to divert stormwater runoff. Temporary diversion dikes should be installed in the following manner:

- All dikes should be compacted by earth moving equipment.
- All dikes should have positive drainage to an outlet.
- All dikes should have 2:1 or flatter side slopes, 18 in. minimum height, and a minimum top width of 24 in. Wide top widths and flat slopes are usually needed at crossings for construction traffic.

- May be covered with hydro mulch, hydroseed, wood mulch, compost blanket, or RECP for stabilization.
- The outlet from the earth dike must function with a minimum of erosion. Runoff should be conveyed to a sediment trapping device such as a Sediment Trap (SE-3) or Sediment Basin (SE-2) when either the dike channel or the drainage area above the dike are not adequately stabilized.
- Temporary stabilization may be achieved using seed and mulching for slopes less than 5% and either rip-rap or sod for slopes in excess of 5%. In either case, stabilization of the earth dike should be completed immediately after construction or prior to the first rain.
- If riprap is used to stabilize the channel formed along the toe of the dike, the following typical specifications apply:

Channel Grade	Riprap Stabilization
0.5-1.0%	4 in. Rock
1.1-2.0%	6 in. Rock
2.1-4.0%	8 in. Rock
4.1-5.0%	8 in. -12 in. Riprap

- The stone riprap, recycled concrete, etc. used for stabilization should be pressed into the soil with construction equipment.
- Filter cloth may be used to cover dikes in use for long periods.
- Construction activity on the earth dike should be kept to a minimum.

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Drainage Swales

Drainage swales are only effective if they are properly installed. Swales are more effective than dikes because they tend to be more stable. The combination of a swale with a dike on the downhill side is the most cost-effective diversion.

Standard engineering design criteria for small open channel and closed conveyance systems should be used (see the local drainage design manual). Unless local drainage design criteria state otherwise, drainage swales should be designed as follows:

- No more than 5 acres may drain to a temporary drainage swale.
- Place drainage swales above or below, not on, a cut or fill slope.
- Swale bottom width should be at least 2 ft.
- Depth of the swale should be at least 18 in.
- Side slopes should be 2:1 or flatter.
- Drainage or swales should be laid at a grade of at least 1 %, but not more than 15 %.

- The swale must not be overtopped by the peak discharge from a 10-year storm, irrespective of the design criteria stated above.
- Remove all trees, stumps, obstructions, and other objectionable material from the swale when it is built.
- Compact any fill material along the path of the swale.
- Stabilize all swales immediately. Seed and mulch swales at a slope of less than 5 % and use rip-rap or sod for swales with a slope between 5 and 15 %. For temporary swales, geotextiles and mats (EC-7) may provide immediate stabilization.
- Irrigation may be required to establish sufficient vegetation to prevent erosion.
- Do not operate construction vehicles across a swale unless a stabilized crossing is provided.
- Permanent drainage facilities must be designed by a professional engineer (see the local drainage design criteria for proper design).
- At a minimum, the drainage swale should conform to predevelopment drainage patterns and capacities.
- Construct the drainage swale with a positive grade to a stabilized outlet.
- Provide erosion protection or energy dissipation measures if the flow out of the drainage swale can reach an erosive velocity.

FOR BIDDING PURPOSES ONLY

Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspect ditches and berms for washouts. Replace lost riprap, damaged linings or soil stabilizers as needed.
- Inspect channel linings, embankments, and beds of ditches and berms for erosion and accumulation of debris and sediment. Remove debris and sediment and repair linings and embankments as needed.
- Temporary conveyances should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Erosion and Sediment Control Handbook, S.J. Goldman, K. Jackson, T.A. Bursetynsky, P.E., McGraw Hill Book Company, 1986.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Metzger, M.E. 2004. Managing mosquitoes in stormwater treatment devices. University of California Division of Agriculture and Natural Resources, Publication 8125. On-line: http://anrcatalog.ucdavis.edu/pdf/8125.pdf

National Association of Home Builders (NAHB). Stormwater Runoff & Nonpoint Source Pollution Control Guide for Builders and Developers. National Association of Home Builders, Washington, D.C., 1995

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Southeastern Wisconsin Regional Planning Commission (SWRPC). Costs of Urban Nonpoint Source Water Pollution Control Measures. Technical Report No. 31. Southeastern Wisconsin Regional Planning Commission, Waukesha, WI. 1991

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

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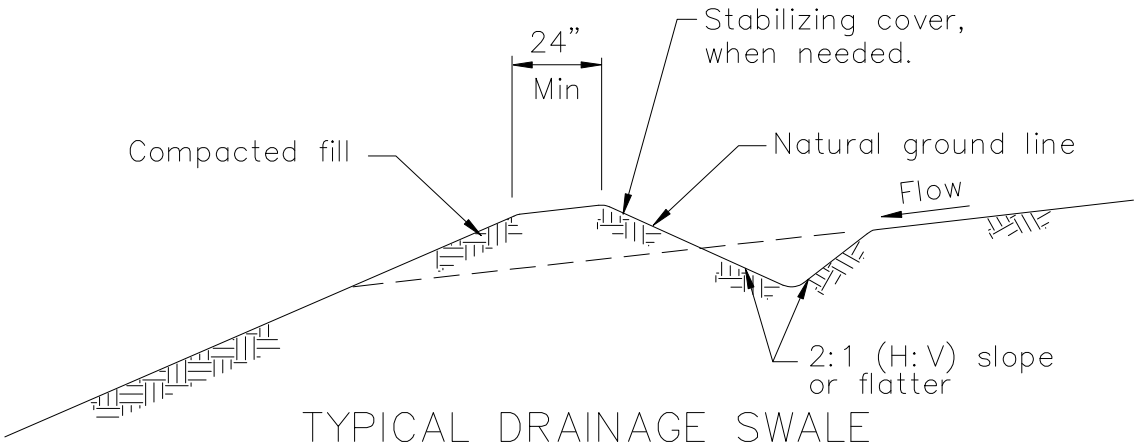

TYPICAL DRAINAGE SWALE
NOT TO SCALE

NOTES:
1. Stabilize inlet, outlets and slopes.
2. Properly compact the subgrade.

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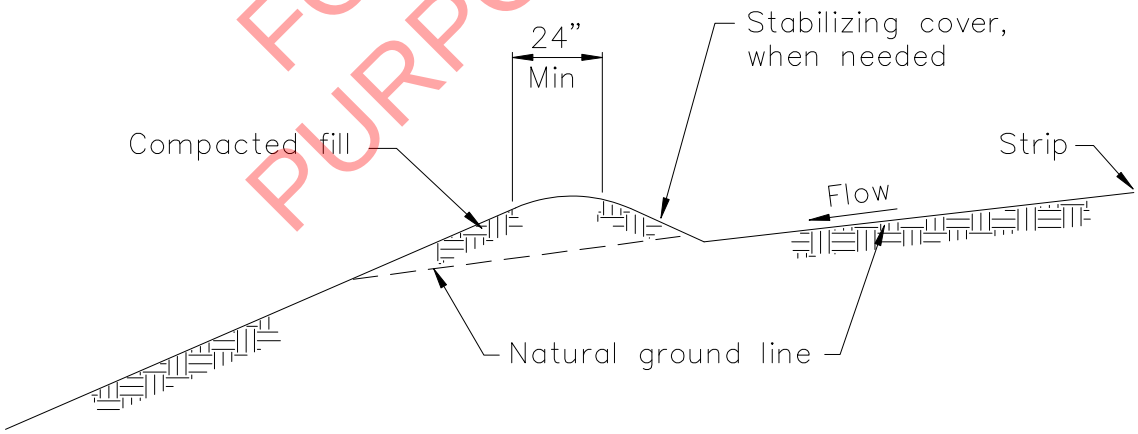

TYPICAL EARTH DIKE
NOT TO SCALE

Soil Preparation/Roughening EC-15



Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-5 Soil Binders

EC-7 Geotextiles and Mats

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Description and Purpose

Soil Preparation/Roughening involves assessment and preparation of surface soils for BMP installation. This can include soil testing (for seed base, soil characteristics, or nutrients), as well as roughening surface soils by mechanical methods (including sheepsfoot rolling, track walking, scarifying, stair stepping, and imprinting) to prepare soil for additional BMPs, or to break up sheet flow. Soil Preparation can also involve tilling topsoil to prepare a seed bed and/or incorporation of soil amendments, to enhance vegetative establishment.

FOR BIDDING PURPOSES ONLY

Suitable Applications

Soil preparation: Soil preparation is essential to proper vegetative establishment. In particular, soil preparation (i.e. tilling, raking, and amendment) is suitable for use in combination with any soil stabilization method, including Rolled Erosion Control Products (RECPs) or sod. Soil preparation should not be confused with roughening.

Roughening: Soil roughening is generally referred to as track walking (sometimes called imprinting) a slope, where treads from heavy equipment run parallel to the contours of the slope and act as mini terraces. Soil preparation is most effective when used in combination with erosion controls. Soil Roughening is suitable for use as a complementary process for controlling erosion on a site. Roughening is not intended to be used as a stand-alone BMP, and should be used with perimeter controls, additional erosion control measures, grade breaks, and vegetative establishment for maximum effectiveness. Roughening is intended to only affect surface soils and should not compromise slope stability or overall compaction. Suitable applications for soil roughening include:

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- Along any disturbed slopes, including temporary stockpiles, sediment basins, or compacted soil diversion berms and swales.

- Roughening should be used in combination with hydraulically applied stabilization methods, compost blanket, or straw mulch; but should not be used in combination with RECPs or sod because roughening is intended to leave terraces on the slope.

Limitations

- Preparation and roughening must take place prior to installing other erosion controls (such as hydraulically applied stabilizers) or sediment controls (such as fiber rolls) on the faces of slopes.

- In such cases where slope preparation is minimal, erosion control/revegetation BMPs that do not require extensive soil preparation - such as hydraulic mulching and seeding applications - should be employed.

- Consideration should be given to the type of erosion control BMP that follows surface preparation, as some BMPs are not designed to be installed over various types of tillage/roughening, i.e., RECPs should not be used with soil roughening due to a "bridging" effect, which suspends the blanket above the seed bed.

- Surface roughness has an effect on the amount of mulch material that needs to be applied, which shows up as a general increase in mulch material due to an increase in surface area (Topographic Index -see EC-3 Hydraulic Mulch).

Implementation

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

General

A roughened surface can significantly reduce erosion. Based on tests done at the San Diego State Erosion Research Laboratory, various roughening techniques on slopes can result in a 12 - 76% reduction in the erosion rate versus smooth slopes.

Materials

Minimal materials are required unless amendments and/or seed are added to the soil. The majority of soil roughening/preparation can be done with equipment that is on hand at a normal construction site, such as bull dozers and compaction equipment.

Installation Guidelines

Soil Preparation

- Where appropriate or feasible, soil should be prepared to receive the seed by disking or otherwise scarifying the surface to eliminate crust, improve air and water infiltration and create a more favorable environment for germination and growth.

- Based upon soil testing conducted, apply additional soil amendments (e.g., fertilizers, additional seed) to the soil to help with germination. Follow EC-4, Hydroseeding, when selecting and applying seed and fertilizers.

FOR BIDDING PURPOSES ONLY

Cut Slope Roughening:

- Stair-step grade or groove the cut slopes that are steeper than 3:1.
- Use stair-step grading on any erodible material soft enough to be ripped with a bulldozer. Slopes consisting of soft rock with some subsoil are particularly suited to stair-step grading.
- Make the vertical cut distance less than the horizontal distance, and slightly slope the horizontal position of the "step" in toward the vertical wall.
- Do not make individual vertical cuts more than 2 ft. (0.6 m) high in soft materials or more than 3 ft. (0.9 m) high in rocky materials.
- Groove the slope using machinery to create a series of ridges and depressions that run across the slope, on the contour.

Fill Slope Roughening:

- Place on fill slopes with a gradient steeper than 3:1 in lifts not to exceed 8 in. (0.2 m), and make sure each lift is properly compacted.
- Ensure that the face of the slope consists of loose, uncompacted fill 4-6 in. (0.1-0.2 m) deep.
- Use grooving or tracking to roughen the face of the slopes, if necessary.
- Do not blade or scrape the final slope face.

Roughening for Slopes to be Mowed:

- Slopes that require mowing activities should not be steeper than 3:1.
- Roughen these areas to shallow grooves by track walking, scarifying, sheepsfoot rolling, or imprinting.
- Make grooves close together (less than 10 in.), and not less than 1 in. deep, and perpendicular to the direction of runoff (i.e., parallel to the slope contours).
- Excessive roughness is undesirable where mowing is planned.

Roughening with Tracked Machinery:

- Limit roughening with tracked machinery to soils with a sandy textural component to avoid undue compaction of the soil surface.
- Operate tracked machinery up and down the slope to leave horizontal depressions in the soil. Do not back-blade during the final grading operation.
- Seed and mulch roughened areas as soon as possible to obtain optimum seed germination and growth.

FOR BIDDING PURPOSES ONLY

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check the seeded slopes for signs of erosion such as rills and gullies. Fill these areas slightly above the original grade, then reseed and mulch as soon as possible.
- Inspect BMPs weekly during normal operations, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

References and Additional Resources

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

FOR BIDDING PURPOSES ONLY

Non-Vegetative Stabilization EC-16



Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TR	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

Non-vegetative stabilization methods are used for temporary or permanent stabilization of areas prone to erosion and should be used only where vegetative options are not feasible; examples include:

- Areas of vehicular or pedestrian traffic such as roads or paths;
- Arid environments where vegetation would not provide timely ground coverage, or would require excessive irrigation;
- Rocky substrate, infertile or droughty soils where vegetation would be difficult to establish; and
- Areas where vegetation will not grow adequately within the construction time frame.

There are several non-vegetative stabilization methods and selection should be based on site-specific conditions.

Decomposed Granite (DG) is a permanent erosion protection method that consists of a layer of stabilized decomposed granite placed over an erodible surface.

Degradable Mulches of various types (see EC-3, EC-6, EC-8) can be used for temporary non-vegetative stabilization; examples include straw mulch, compost, wood chips or hydraulic mulch.

Geotextiles and Mats can be used for temporary non-vegetative stabilization (see EC-7). These BMPs are typically manufactured from degradable or synthetic materials and are

designed and specified based on their functional longevity, i.e., how long they will persist and provide erosion protection. All geotextiles and mats should be replaced when they exceed their functional longevity or when permanent stabilization methods are instituted.

Gravel Mulch is a non-degradable erosion control product that is composed of washed and screened coarse to very coarse gravel, 16 mm to 64 mm (0.6" - 2.5"), similar to an AASHTO No. 3 coarse aggregate.

Rock Slope Protection consists of utilizing large rock or rip-rap (4"- 24") to stabilize slopes with a high erosion potential and those subject to scour along waterways.

Soil Binders can be used for temporary non-vegetative stabilization (see EC-5). The key to their use is functional longevity. In most cases, the soil binder will need to be routinely monitored and re-applied to maintain an erosion-resistant coverage.

Suitable Applications

Non-vegetated stabilization methods are suitable for use on disturbed soil areas and on material stockpiles that need to be temporarily or permanently protected from erosion by water and wind. Non-vegetated stabilization should only be utilized when vegetation cannot be established in the required timeframe, due to soil or climactic conditions, or where vegetation may be a potential fire hazard.

FOR BIDDING PURPOSES ONLY

Decomposed Granite (DG) and Gravel Mulch are suitable for use in areas where vegetation establishment is difficult, on flat surfaces, trails and pathways, and when used in conjunction with a stabilizer or tackifier, on shallow slopes (i.e., 10:1 [H:V]). DG and gravel can also be used on shallow rocky slopes where vegetation cannot be established for permanent erosion control.

Degradable Mulches can be used to cover and protect soil surfaces from erosion both in temporary and permanent applications. In many cases, the use of mulches by themselves requires routine inspection and re-application. See EC-3 Hydraulic Mulch, EC-6 Straw Mulch, EC-8 Wood Mulch, or EC-14 Compost Blankets for more information.

Geotextiles and Mats can be used as a temporary stand-alone soil stabilization method. Depending on material selection, geotextiles and mats can be a short-term (3 mos – 1 year) or long-term (1-2 years) temporary stabilization method. For more information on geotextiles and mats see EC-7 Geotextiles and Mats.

Rock Slope Protection can be used when the slopes are subject to scour or have a high erosion potential, such as slopes adjacent to flowing waterways or slopes subject to overflow from detention facilities (spillways).

Soil Binders can be used for temporary stabilization of stockpiles and disturbed areas not subject to heavy traffic. See EC-5 Soil Binders for more information.

Limitations

General

- Refer to EC-3, EC-6, EC-8, and EC-14 for limitations on use of mulches. Refer to EC-7 for limitations on use of geotextiles and mats. Refer to EC-5 for limitations on use of Soil Binders.

Decomposed Granite

- Not available in some geographic regions.
- If not tackified, material may be susceptible to erosion even on slight slopes (e.g., 30:1 [H:V]).
- Installed costs may be more expensive than vegetative stabilization methods.

Gravel Mulch

- Availability is limited in some geographic regions.
- If not properly screened and washed, can contain fine material that can erode and/or create dust problems.
- If inadequately sized, material may be susceptible to erosion on sloped areas.
- Pore spaces fill with dirt and debris over time; may provide a growing medium for weeds.

Rock Slope Protection

- Installation is labor intensive.
- Installed costs can be significantly higher than vegetative stabilization methods.
- Rounded stones may not be used on slopes greater than 2:1 [H:V].

Implementation

General

Non-vegetated stabilization should be used in accordance with the following general guidance:

- Should be used in conjunction with other BMPs, including drainage, erosion controls and sediment controls.
- Refer to EC-3, EC-6, EC-8, and EC-14 for implementation details for mulches. Refer to EC-7 for implementation details for geotextiles and mats. Refer to EC-5 for implementation details for soil binders.
- Non-vegetated stabilization measures should be implemented as soon as the disturbance in the areas they are intended to protect has ceased.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Decomposed Granite Stabilization

- If used for a road or path should be installed on a prepared base.
- Should be mixed with a stabilizer if used for roads or pathways, or on slope applications.
- Though porous it is recommended to prevent standing water on or next to a decomposed granite road or pathway.

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Gravel Mulch

- Should be sized based on slope, rainfall, and upgradient run-on conditions. Stone size should be increased as potential for erosion increases (steeper slopes, high intensity rainfall).
- If permanent, a weed control fabric should be placed prior to installation.
- Should be installed at a minimum 2" depth.
- Should completely cover all exposed surfaces.

Rock Slope Protection

- Rock slope protection installation should follow Caltrans Standard Specification 72-2: Rock Slope Protection. Refer to the specification for rock conformity requirements and installation methods.
- When using rock slope protection, rock size and installation method should be specified by an Engineer.
- A geotextile fabric should be placed prior to installation.

Inspection and Maintenance

General

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- For permanent installation, require inspection periodically and after major storm events to look for signs of erosion or damage to the stabilization.
- All damage should be repaired immediately.
- Refer to EC-3, EC-6, EC-8, and EC-14 for inspection and maintenance requirements for mulches. Refer to EC-7 for inspection and maintenance requirements for geotextiles and mats. Refer to EC-5 for inspection and maintenance requirements for soil binders.

Decomposed Granite and Gravel Mulch Stabilization

- Rake out and add decomposed granite or gravel as needed to areas subject to rill erosion. Inspect upgradient drainage controls and repair/modify as necessary.
- Should remain stable under loose surface material. Any significant problem areas should be repaired to restore uniformity to the installation.

References and Additional Resources

Arid Zone Forestry: A Guide for Field Technicians. Food and Agriculture Organization of the United Nations, 1989.

FOR BIDDING PURPOSES ONLY

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Design of Roadside Channels with Flexible Linings, Hydraulic Engineering Circular Number 15, Third Edition, Federal Highway Administration, 2007.

Design Standards for Urban Infrastructure - Soft Landscape Design, Department of Territory and Municipal Services - Australian Capital Territory http://www.tams.act.gov.au/work/standards_and_procedures/design_standards_for_urban_infrastructure

Erosion and Sediment Control Handbook: A Guide for Protection of State Waters through the use of Best Management Practices during Land Disturbing Activities, Tennessee Department of Environment and Conservation, 2002.

Gravel Mulch, Landscape Architecture Non-Standard Specification 10-2, California Department of Transportation (Caltrans), http://www.dot.ca.gov/hq/LandArch/roadside/detail-gm.htm

Maine Erosion and Sediment Control BMPs, DEPLW0588, Maine Department of Environmental Protection: Bureau of Land and Water Quality, 2003.

National Menu of Best Management Practices, US Environmental Protection Agency, 2006.

Standard Specification 72-2: Rock Slope Protection. California Department of Transportation, 2006.

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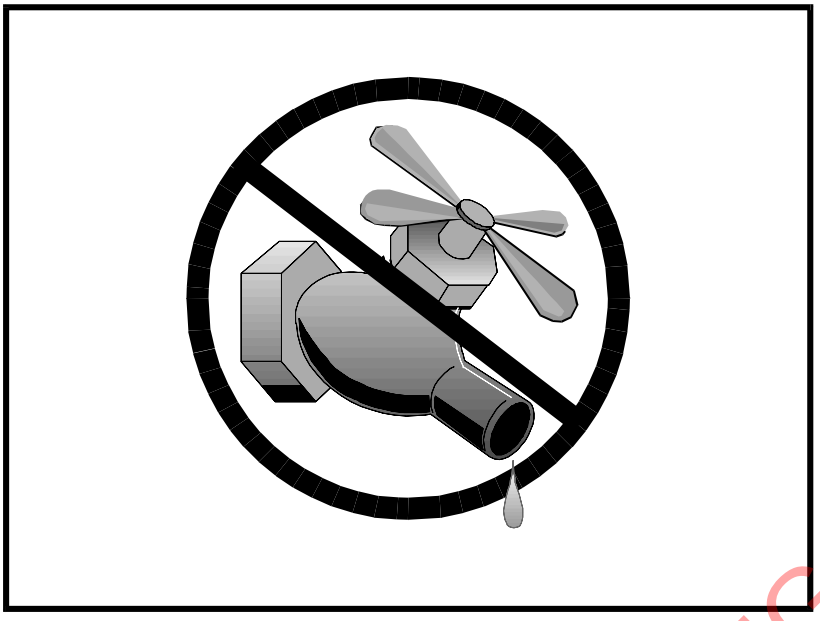
Water Conservation Practices NS-1



Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

Suitable Applications

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

Limitations

- None identified.

Implementation

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.

- Direct construction water runoff to areas where it can soak into the ground or be collected and used.
- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized use.

Inspection and Maintenance

- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges.
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occuring.
- Repair water equipment as needed to prevent unintended discharges.
  - Water trucks
  - Water reservoirs (water buffalos)
  - Irrigation systems
  - Hydrant connections

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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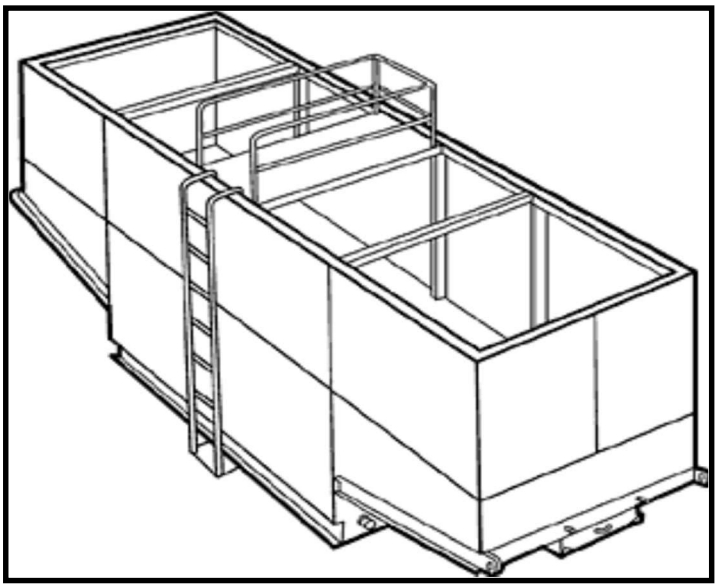
Dewatering Operations NS-2



Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

SE-5: Fiber Roll

SE-13: Compost Sock/Berm

SE-6: Gravel Bag Berm

NS-5: Clear Water Diversion

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Description and Purpose

Dewatering operations are practices that manage the discharge of pollutants when non-stormwater, non-potable water, and accumulated precipitation (stormwater) is removed from a work location to proceed with construction work or to provide vector control.

The 2022 General Permit defines dewatering as the process of removing excess water in an excavation or impoundment by pumping or other mechanical means. Dewatering discharges authorized by the 2022 General Permit include mechanical pumping or syphoning of non-potable water from sources including, but not limited to: excavations, trenches, foundations, vaults, groundwater removal specifically related to the construction activities, and/or water collected in impoundments (e.g., ponds, puddles, low points on the active site, or other similar accumulation points).

This factsheet specifically incorporates the 2022 General Permit, Attachment J requirements. Dewatering activities subject to a separate National Pollutant Discharge Elimination System (NPDES) permit (e.g., de minimis and low threat discharges) are not subject to the dewatering requirements of Attachment J; obtain separate coverage as required by the State Water Resources Control Board (SWRCB) or the applicable Regional Water Quality Control Board (RWQCB). Potentially applicable NPDES Permits for Dewatering Discharges are listed in the SWRCB's Dewatering Discharge Notification Guidance (SWRCB, 2024). Ensure that dewatering activities not subject to a separate NPDES permit comply with the dewatering requirements in Attachment J (Section IV.M. of the 2022 General Permit).

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The General Permit incorporates Numeric Action Levels (NALs) for pH and turbidity for dewatering discharges. Discharges from dewatering operations can contain high levels of fine sediment that, if not properly treated, could lead to exceedances of the General Permit requirements or Basin Plan standards.

The dewatering operations described in this fact sheet are not Active Treatment Systems (ATS) SE-11) and do not include the use of chemical coagulants, chemical flocculants or electrocoagulants. ATS that are not subject to a separate NPDES permit must comply with the ATS requirements in Attachment F of the 2022 General Permit.

Discharges from Sediment Basins (SE-2) and Sediment Traps (SE-3) may be subject to the dewatering requirements of Attachment J of the 2022 General Permit. Sediment basin and sediment trap configuration and valve design, required drawdown time for vector control, operational drawdown in case of more frequent storms or storms larger than the design storm, or other unforeseen site conditions may result in the need to dewater a sediment basin and/or sediment trap, thus triggering Attachment J. Sediment basins and sediment traps that discharge under gravity flow with no mechanical pumping or syphoning, for example containing a skimmer or standpipe outlet structure, are not considered dewatering practices that would trigger the requirements of Attachment J.

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Suitable Applications

Dewatering practices are implemented for discharges of non-stormwater, non-potable water, and accumulated stormwater by mechanical pumping or syphoning from construction sites.

Non-stormwaters include, but are not limited to, groundwater, water from cofferdams, water diversions, and waters used during construction activities that must be removed from a work area to facilitate construction.

Practices identified in this section are also appropriate for implementation when managing the removal of accumulated precipitation (stormwater) from depressed areas at a construction site.

Stormwater mixed with non-stormwater or non-potable water should be managed as non-stormwater.

A clear water diversion is typically implemented where appropriate permits (401 Certification, 1602 Agreement, etc.) have been secured and work must be performed in a flowing stream or water body. If dewatering associated with a clear water diversion is required for your project, refer to Clear Water Diversion (NS-5).

Limitations

- Dewatering operations need to comply with applicable local and project-specific permits and regulations. In some areas, all dewatering activities require a dewatering permit.
- The discharge must be absent of pollutants in quantities that threaten to cause pollution or a nuisance.[1]
- The dewatering activity may only take place in an area without known soil and/or groundwater contamination (including, but not limited to information from: GeoTracker,[2]

[1] 40 Code of Federal Regulations section 131.12, and SWRCB Resolution No. 68-16.
[2] https://geotracker.waterboards.ca.gov/

local permitting authorities, RWQCBs, etc.) where that contamination could cause an exceedance of receiving water limitations.

- The dewatering activity must be in compliance with the receiving water limitations listed in General Permit, Section IV.D, including applicable TMDLs listed in Attachment H.
- Utilize outlet structures that withdraw water from the surface when conducting dewatering activity from sediment basins or similar impoundments, unless infeasible.
- Site conditions will dictate the design and use of dewatering operations.
- The controls discussed in this fact sheet primarily address sediment. Other secondary pollutant removal benefits are discussed where applicable.

Implementation

- Avoid dewatering discharges where possible by using the water, with appropriate approvals or permits, for onsite dust control, pumping to an onsite area for infiltration, disposing off, or site discharging to the sanitary sewer.
- Include dewatering monitoring in the Construction Site Monitoring Plan (CSMP) in the project Stormwater Pollution Prevention Plan (SWPPP).
- At least 24 hours prior to beginning a dewatering discharge notify the applicable RWQCB stormwater staff via email of the anticipated dewatering discharge. The general stormwater staff email addresses for each RWQCB may be found in Attachment C of the 2022 CGP or at the SWRCB website (https://www.waterboards.ca.gov/water_issues/programs/stormwater/contact.html).
- A separate notification is required if there are changes to the dewatering activities (SWRCB, 2024).
- Analyze the dewatering effluent for pH and turbidity at the discharge location within the first hour of discharge and daily for continuous dewatering discharges. Each sample must instantaneously comply with the NALs for pH (within 6.5-8.5 standard pH units) and turbidity (250 nephelometric turbidity units).
- Cease discharge when the NALs are exceeded in a single sample, as follows:
  - Through an automated sampling device capable of ceasing the discharge if a single sample concentration/level exceeds the NALs;
  - By a Qualified SWPPP Practitioner (QSP) or trained QSP-delegate who is present during the dewatering activity and can halt dewatering if a NAL is exceeded for a single sample;

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  - If discharge cannot be ceased due to the need to protect human life or health or to prevent severe property damage, notify the RWQCB and local stormwater agency within 24 hours; or
  - If discharge that exceeds pH and turbidity NALs cannot be stopped, notify the RWQCB and local stormwater agency within 24 hours.

- Following the NAL exceedance the Qualified SWPPP Developer (QSD) will revise the SWPPP to incorporate corrective actions to prevent further exceedances, within 10 days of the exceedance.
- The SWRCB and RWQCB, upon written notice, may:
  - Require additional constituents to be monitored;
  - Require additional or more frequent monitoring;
  - Require additional or different sampling locations;
  - Require treatment of the discharge with ATS (in accordance with Attachment F of the General Permit; and/or
  - Revoke authorization of dewatering discharges under the General Permit and require separate NPDES permit coverage for dewatering discharges to Waters of the U.S.
- The destination of discharge from dewatering activities will typically determine the type of permit required for the discharge. For example, when discharging to a water of the U.S., a dewatering permit may be required through the site's governing RWQCB. When discharging to a sanitary sewer a permit may need to be obtained from the owner of the sanitary sewer. When discharging to a Municipal Separate Storm Sewer System (MS4) a permit from the MS4 may be needed in addition to obtaining an RWQCB dewatering permit. Additional permits or permissions from other agencies may be required for dewatering cofferdams or diversions.
- Dewatering discharges may not cause erosion at the discharge point. Potential BMPs to limit erosion include:
  - Directly piping discharge to a storm drain inlet or hardened channel,
  - Geotextiles and Mats (EC-7),
  - Velocity Dissipation Devices (EC-10), Slope Drains (EC-11), and
  - Check Dams (SE-4).
- Appropriate BMPs must be implemented to maintain compliance with all applicable permits.
- Per the requirements of Attachment J, the QSD must update the site-specific SWPPP onsite at least 24 hours prior to the beginning of a dewatering discharge and upload the amended

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SWPPP to SMARTS within 14 days with current information required. The revised SWPPP must be uploaded as part of a Change of Information through SMARTS.

- Maintain dewatering records in accordance with all local and project-specific permits and regulations.

Inspection and Maintenance

- Inspect and verify that dewatering BMPs are in place and functioning prior to the commencement of activities requiring dewatering.
- Inspect dewatering BMPs daily while dewatering activities are being conducted.
- Inspect all equipment before use. Monitor dewatering operations to ensure they do not cause offsite discharge or erosion.
- Sample and monitor dewatering discharges as required by the General Permit.
- Unit-specific maintenance requirements are included with the description of each unit.
- Sediment removed during the maintenance of a dewatering device may be either spread onsite and stabilized or disposed of at a disposal site as approved by the owner and documented in the SWPPP.
- Sediment that is commingled with other pollutants will be disposed of in accordance with all applicable laws and regulations and as approved by the owner.

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Sediment Removal

A variety of methods can be used to treat water during dewatering operations. Several devices are presented below and provide options to achieve sediment removal. The sediment particle size and permit or receiving water limitations on sediment or turbidity are key considerations for selecting sediment treatment option(s); in some cases, the use of multiple devices may be appropriate. Use of other enhanced treatment methods (i.e., introduction of chemicals or electric current to enhance flocculation and removal of sediment) must comply with: 1) for storm drain or surface water discharges, the requirements for ATS (see SE-11 and Attachment F of the General Permit); 2) for storm drain or surface water discharges, the requirements for Passive Treatment (see SE-15 and Attachment G of the General Permit); or 3) for sanitary sewer discharges, the requirements of applicable sanitary sewer discharge permits.

Sediment Basin (see also SE-2)

Description:

- A sediment basin is a temporary basin with a controlled release structure that is formed by excavation or construction of an embankment to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment basins are larger than Sediment Traps (SE-3) and have a designed outlet structure.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, silt, some metals that settle out with the sediment.

Implementation:

- Excavation and construction of related facilities is required.
- Temporary sediment basins should be fenced if safety is a concern.
- Outlet protection is required to prevent erosion at the outfall location.
- Discharges from sediment basins containing a skimmer or standpipe outlet structure that occur as a result of gravity flow with no mechanical pumping or syphoning, are not considered dewatering practices that would trigger the requirements of Attachment J.
- Discharges from sediment basins containing a skimmer or standpipe outlet structure that occur as a result of mechanical pumping or syphoning are considered dewatering practices that would trigger the requirements of Attachment J.

Maintenance:

- Maintenance is required for safety fencing, vegetation, embankment, inlet and outlet structures, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Sediment Trap (See also SE-3)

Description:

- A sediment trap is a temporary basin formed by excavation and/or construction of an earthen embankment across a waterway or low drainage area to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment traps are smaller than Sediment Basins (SE-2) and do not have a designed outlet (but do have a spillway or overflow).

Appropriate Applications:

- Effective for the removal of large and medium sized particles (sand and gravel) and some metals that settle out with the sediment.

Implementation:

- Excavation and construction of related facilities is required.
- Trap inlets should be located to maximize the travel distance to the trap outlet.
- Use rock or vegetation to protect the trap outlets against erosion.
- Discharges from sediment traps containing a skimmer or standpipe outlet structure that occur as a result of gravity flow with no mechanical pumping or syphoning are not considered dewatering practices that would trigger the requirements of Attachment J.
- Discharges from sediment traps containing a skimmer or standpipe outlet structure that occur as a result of mechanical pumping or syphoning are considered dewatering practices that would trigger the requirements of Attachment J.

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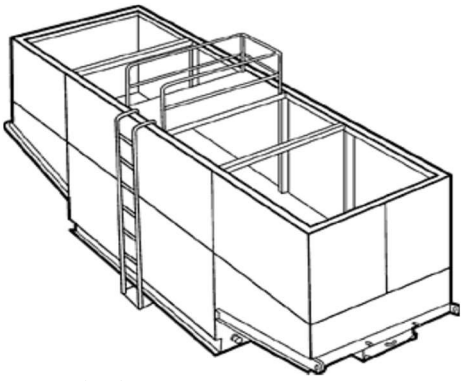
Maintenance:

- Maintenance is required for vegetation, embankment, inlet and outfall structures, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Weir Tanks



Description:

- A weir tank separates water and waste by using weirs. The configuration of the weirs (over and under weirs) maximizes the residence time in the tank and determines the waste to be removed from the water, such as oil, grease, and sediments.

Appropriate Applications:

- The tank removes trash, some settleable solids (gravel, sand, and silt), some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.
- Treatment capacity (i.e., volume and number of tanks) should provide at a minimum the required volume for discrete particle settling for treatment design flows.
- Discharges from weir tanks that occur as a result of gravity flow with no mechanical pumping or syphoning are not considered dewatering practices that would trigger the requirements of Attachment J.
- Discharges from weir tanks that occur as a result of mechanical pumping or syphoning are considered dewatering practices that would trigger the requirements of Attachment J.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.

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- Use a licensed waste disposal company to dispose of oil and grease.

Dewatering Tanks



Description:

- A dewatering tank removes debris and sediment. Flow enters the tank through the top, passes through a fabric filter, and is discharged through the bottom of the tank. The filter separates the solids from the liquids.

Appropriate Applications:

- The tank removes trash, gravel, sand, and silt, some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.
- Discharges from dewatering tanks through mechanical pumping or syphoning are considered dewatering practices that would trigger the requirements of Attachment J.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Use a licensed waste disposal company to dispose of oil and grease.

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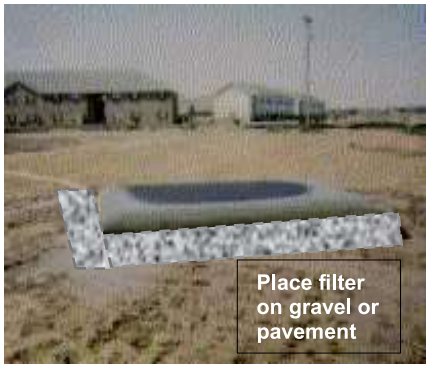
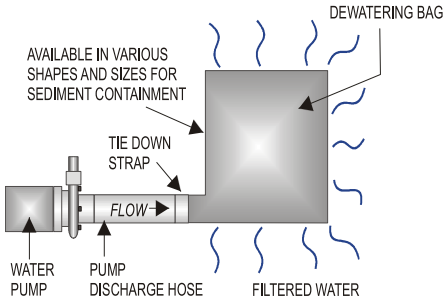
Gravity Bag Filter





Description:

- A gravity bag filter, also referred to as a dewatering bag, is a square or rectangular bag made of non-woven geotextile fabric that collects gravel, sand, silt, and fines.

Appropriate Applications:

- Effective for the removal of sediments (gravel, sand, and silt). Gravity bag filters may be ineffective for the removal of fines and clays, especially in the initial stages of discharge.
- Some metals are removed with the sediment.

Implementation:

- Water is pumped into one side of the bag and seeps through the top, bottom, and sides of the bag.
- Place the filter bag on pavement or a gravel bed or paved surface. Avoid placing a dewatering bag on unprotected bare soil. If placing the bag on bare soil is unavoidable, a secondary barrier should be used, such as a rock filter bed placed beneath and beyond the edges of the bag to prevent erosion and capture sediments that escape the bag.
- Implement perimeter controls around the downstream end of the bag. Secondary sediment controls are important especially in the initial stages of discharge, which tend to allow fines to pass through the bag.
- Discharges from filter bags through gravity flow are not considered dewatering practices that would trigger the requirements of Attachment J.

Maintenance:

- Inspections of the flow conditions, bag condition, bag capacity, and the secondary barrier (as applicable) are required as per the manufacturer's recommendation.
- Replace the bag when it no longer filters sediment or passes water at a reasonable rate.
- Caution should be taken when removing and disposing of the bag, to prevent the release of captured sediment.

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- Properly dispose of the bag offsite. If sediment is removed from the bag prior to disposal (bags can potentially be reused depending upon their condition), dispose of sediment in accordance with the general maintenance procedures described in this BMP Fact Sheet.

Sand Media Particulate Filter





Description:

- Water is treated by passing it through canisters filled with sand media. Generally, sand filters provide a final level of treatment. They are often used as a secondary or higher level of treatment after a significant amount of sediment and other pollutants have been removed using other methods.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, and silt, and some metals, as well as the reduction of biochemical oxygen demand (BOD) and turbidity.
- Sand filters can be used for stand-alone treatment or in conjunction with bag and cartridge filtration if further treatment is required.
- Sand filters can also be used to provide additional treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.
- Discharges from sand filters through mechanical pumping or syphoning are considered dewatering practices that would trigger the requirements of Attachment J.

Maintenance:

- The filters require regular service to monitor and maintain the level of the sand media. If subjected to high loading rates, filters can plug quickly.
- Vendors generally provide data on maximum head loss through the filter. Monitor the filter daily while in use and cleaned when head loss reaches target levels.

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- If cleaned by backwashing, the backwash water may need to be hauled away for disposal or returned to the upper end of the treatment train for another pass through the series of dewatering BMPs.

Pressurized Bag Filter





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Description:

- A pressurized bag filter is a unit composed of single filter bags made from polyester felt material. The water filters through the unit and is discharged through a header. Vendors provide bag filters in a variety of configurations. Some units include a combination of bag filters and cartridge filters for enhanced contaminant removal.

Appropriate Applications:

- Effective for the removal of sediment (sand and silt) and some metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Oil absorbent bags are available for hydrocarbon removal.
- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.
- Discharges from pressurized bag filter through mechanical pumping or syphoning are considered dewatering practices that would trigger the requirements of Attachment J.

Maintenance:

- The filter bags require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Cartridge Filter



Description:

- Cartridge filters provide a high degree of pollutant removal by utilizing a number of individual cartridges as part of a larger filtering unit. They are often used as a secondary or higher (polishing) level of treatment after a significant amount of sediment and other pollutants are removed. Units come with various cartridge configurations (for use in series with bag filters) or with a larger single cartridge filtration unit (with multiple filters within).

Appropriate Applications:

- Effective for the removal of sediment (sand, silt, and some clays) and metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Hydrocarbons can effectively be removed with special resin cartridges.
- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance.
- Discharges from cartridge filters through mechanical pumping or syphoning are considered dewatering practices that would trigger the requirements of Attachment J.

Maintenance:

- The cartridges require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

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References and Additional Resources

California Department of Transportation (Caltrans). 2024. Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1.

California State Water Resources Control Board (SWRCB). 2022. Order 2022-0057-DWQ, NPDES General Permit No. CAS000002: National Pollutant Discharge Elimination System (NDPES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit).

California State Water Resources Control Board (SWRCB). 2024. Dewatering Discharge Notification Guidance available at https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.html

U.S. Environmental Protection Agency (EPA). 2007. Developing Your Pollution Prevention Plan, EPA 833-R-06-004.

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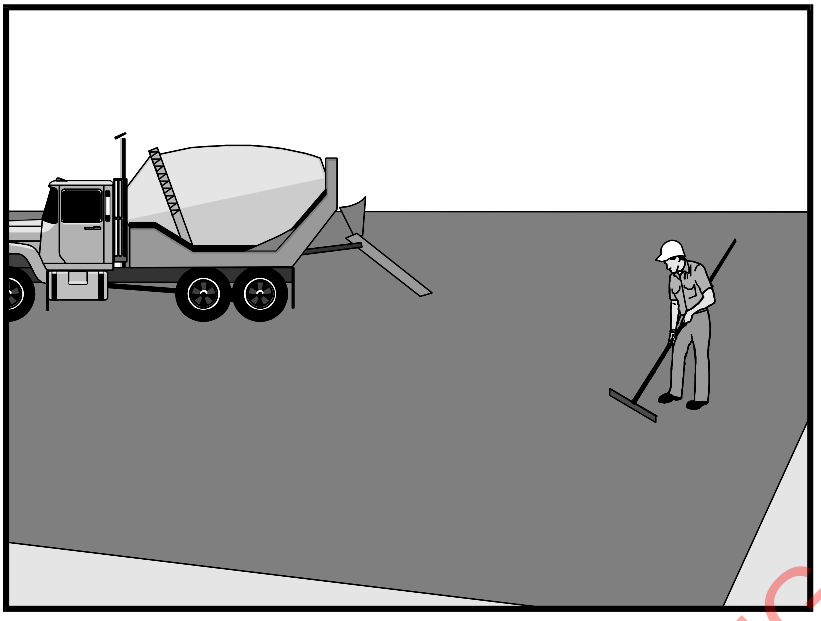
Paving and Grinding Operations NS-3



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☒

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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Description and Purpose

Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent runon and runoff pollution, properly disposing of wastes, and training employees and subcontractors.

The General Permit incorporates Numeric Action Levels (NAL) for pH and turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials associated with paving and grinding operations, including mortar, concrete, and cement and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

Limitations

- Paving opportunities may be limited during wet weather.
- Discharges of freshly paved surfaces may raise pH to environmentally harmful levels and trigger permit violations.

Implementation

General

- Avoid paving during the wet season when feasible.
- Reschedule paving and grinding activities if rain is forecasted.
- Train employees and sub-contractors in pollution prevention and reduction.
- Store materials away from drainage courses to prevent stormwater runon (see WM-1, Material Delivery and Storage).
- Protect drainage courses, particularly in areas with a grade, by employing BMPs to divert runoff or to trap and filter sediment.
- Stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses. These materials should be stored consistent with WM-3, Stockpile Management.
- Disposal of PCC (Portland cement concrete) and AC (asphalt concrete) waste should be in conformance with WM-8, Concrete Waste Management.

Saw Cutting, Grinding, and Pavement Removal

- Shovel or vacuum saw-cut slurry and remove from site. Cover or barricade storm drains during saw cutting to contain slurry.
- When paving involves AC, the following steps should be implemented to prevent the discharge of grinding residue, uncompacted or loose AC, tack coats, equipment cleaners, or unrelated paving materials:
  - AC grindings, pieces, or chunks used in embankments or shoulder backing should not be allowed to enter any storm drains or watercourses. Install inlet protection and perimeter controls until area is stabilized (i.e. cutting, grinding or other removal activities are complete and loose material has been properly removed and disposed of)or permanent controls are in place. Examples of temporary perimeter controls can be found in EC-9, Earth Dikes and Drainage Swales; SE-1, Silt Fence; SE-5, Fiber Rolls, or SE-13 Compost Socks and Berms
  - Collect and remove all broken asphalt and recycle when practical. Old or spilled asphalt should be recycled or disposed of properly.
- Do not allow saw-cut slurry to enter storm drains or watercourses. Residue from grinding operations should be picked up by a vacuum attachment to the grinding machine, or by sweeping, should not be allowed to flow across the pavement, and should not be left on the

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surface of the pavement. See also WM-8, Concrete Waste Management, and WM-10, Liquid Waste Management.

- Pavement removal activities should not be conducted in the rain.
- Collect removed pavement material by mechanical or manual methods. This material may be recycled for use as shoulder backing or base material.
- If removed pavement material cannot be recycled, transport the material back to an approved storage site.

Asphaltic Concrete Paving

- If paving involves asphaltic cement concrete, follow these steps:
  - Do not allow sand or gravel placed over new asphalt to wash into storm drains, streets, or creeks. Vacuum or sweep loose sand and gravel and properly dispose of this waste by referring to WM-5, Solid Waste Management.
  - Old asphalt should be disposed of properly. Collect and remove all broken asphalt from the site and recycle whenever possible.

Portland Cement Concrete Paving

- Do not wash sweepings from exposed aggregate concrete into a storm drain system. Collect waste materials by dry methods, such as sweeping or shoveling, and return to aggregate base stockpile or dispose of properly. Allow aggregate rinse to settle. Then, either allow rinse water to dry in a temporary pit as described in WM-8, Concrete Waste Management, or pump the water to the sanitary sewer if authorized by the local wastewater authority.

Sealing Operations

- During chip seal application and sweeping operations, petroleum or petroleum covered aggregate should not be allowed to enter any storm drain or water courses. Apply temporary perimeter controls until structure is stabilized (i.e. all sealing operations are complete and cured and loose materials have been properly removed and disposed).
- Inlet protection (SE-10, Storm Drain Inlet Protection) should be used during application of seal coat, tack coat, slurry seal, and fog seal.
- Seal coat, tack coat, slurry seal, or fog seal should not be applied if rainfall is predicted to occur during the application or curing period.

Paving Equipment

- Leaks and spills from paving equipment can contain toxic levels of heavy metals and oil and grease. Place drip pans or absorbent materials under paving equipment when not in use. Clean up spills with absorbent materials and dispose of in accordance with the applicable regulations. See NS-10, Vehicle and Equipment Maintenance, WM-4, Spill Prevention and Control, and WM-10, Liquid Waste Management.
- Substances used to coat asphalt transport trucks and asphalt spreading equipment should not contain soap and should be non-foaming and non-toxic.

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- Paving equipment parked onsite should be parked over plastic to prevent soil contamination.
- Clean asphalt coated equipment offsite whenever possible. When cleaning dry, hardened asphalt from equipment, manage hardened asphalt debris as described in WM-5, Solid Waste Management. Any cleaning onsite should follow NS-8, Vehicle and Equipment Cleaning.

Thermoplastic Striping

- Thermoplastic striper and pre-heater equipment shutoff valves should be inspected to ensure that they are working properly to prevent leaking thermoplastic from entering drain inlets, the stormwater drainage system, or watercourses.
- Pre-heaters should be filled carefully to prevent splashing or spilling of hot thermoplastic. Leave six inches of space at the top of the pre-heater container when filling thermoplastic to allow room for material to move.
- Do not pre-heat, transfer, or load thermoplastic near drain inlets or watercourses.
- Clean truck beds daily of loose debris and melted thermoplastic. When possible, recycle thermoplastic material.

Raised/Recessed Pavement Marker Application and Removal

- Do not transfer or load bituminous material near drain inlets, the stormwater drainage system, or watercourses.
- Melting tanks should be loaded with care and not filled to beyond six inches from the top to leave room for splashing.
- When servicing or filling melting tanks, ensure all pressure is released before removing lids to avoid spills.
- On large-scale projects, use mechanical or manual methods to collect excess bituminous material from the roadway after removal of markers.

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Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of paving and grinding operations.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Sample stormwater runoff required by the General Permit.
- Keep ample supplies of drip pans or absorbent materials onsite.
- Inspect and maintain machinery regularly to minimize leaks and drips.

References and Additional Resources

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Hot Mix Asphalt-Paving Handbook AC 150/5370-14, Appendix I, U.S. Army Corps of Engineers, July 1991.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

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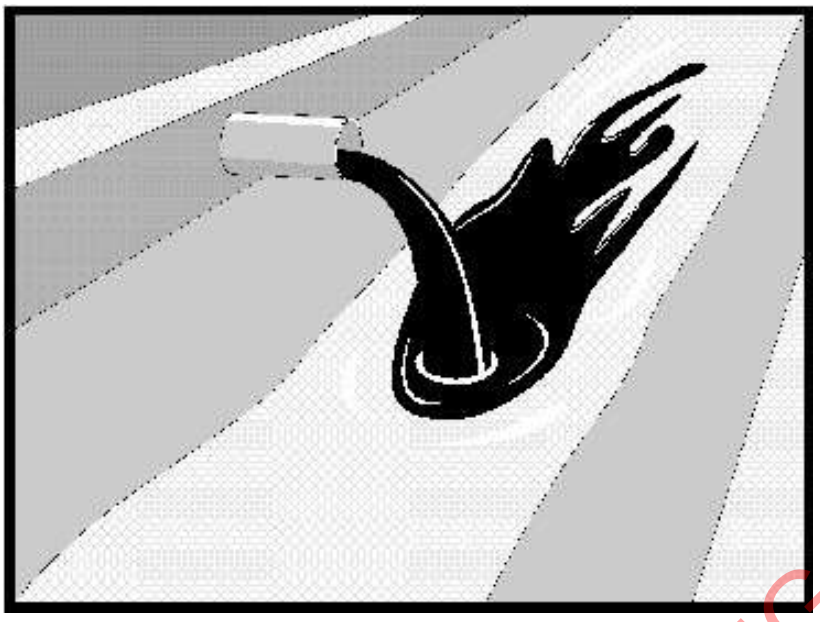
Illicit Connection/Discharge NS-6



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
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WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered, or illegally dumped material is found on the construction site.

Limitations

Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor. If pre-existing hazardous materials or wastes are known to exist onsite, they should be identified in the SWPPP and handled as set forth in the SWPPP.

Implementation

Planning

- Review the SWPPP. Pre-existing areas of contamination should be identified and documented in the SWPPP.
- Inspect site before beginning the job for evidence of illicit connections, illegal dumping or discharges. Document any pre-existing conditions and notify the owner.

- Inspect site regularly during project execution for evidence of illicit connections, illegal dumping or discharges.
- Observe site perimeter for evidence for potential of illicitly discharged or illegally dumped material, which may enter the job site.

Identification of Illicit Connections and Illegal Dumping or Discharges

- **General –** unlabeled and unidentifiable material should be treated as hazardous.
- **Solids -** Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- **Liquids -** signs of illegal liquid dumping or discharge can include:
  - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Abnormal water flow during the dry weather season
- **Urban Areas -** Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season
  - Unusual flows in sub drain systems used for dewatering
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Excessive sediment deposits, particularly adjacent to or near active offsite construction projects
- **Rural Areas -** Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
  - Abnormal water flow during the non-irrigation season
  - Non-standard junction structures
  - Broken concrete or other disturbances at or near junction structures

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Reporting

Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. For illicit connections or discharges to the storm drain system, notify the local stormwater management agency. For illegal dumping, notify the local law enforcement agency.

Cleanup and Removal

The responsibility for cleanup and removal of illicit or illegal dumping or discharges will vary by location. Contact the local stormwater management agency for further information.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect the site regularly to check for any illegal dumping or discharge.
- Prohibit employees and subcontractors from disposing of non-job-related debris or materials at the construction site.
- Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

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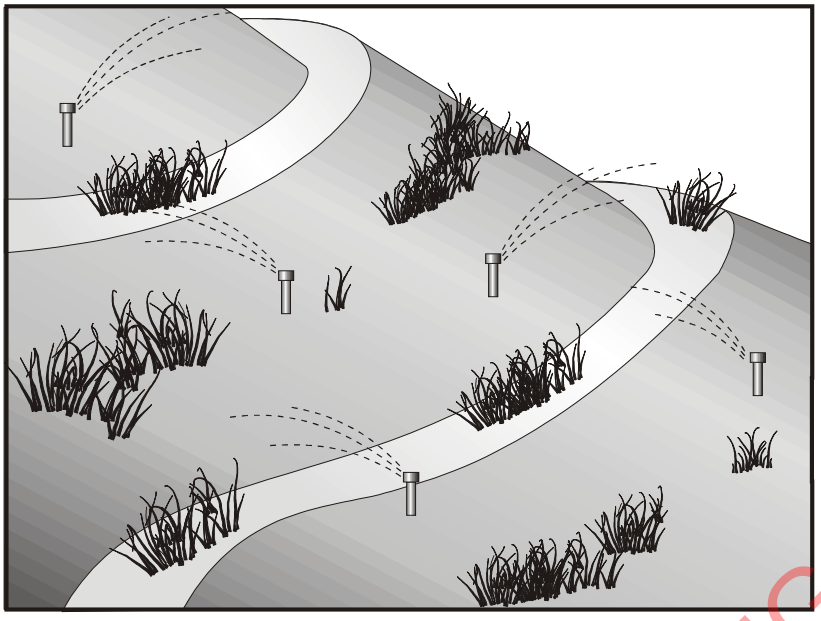
Potable Water/Irrigation NS-7



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

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Description and Purpose

Potable Water/Irrigation consists of practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing.

Suitable Applications

Implement this BMP whenever potable water or irrigation water discharges occur at or enter a construction site.

Limitations

None identified.

Implementation

- Direct water from offsite sources around or through a construction site, where feasible, in a way that minimizes contact with the construction site.
- Discharges from water line flushing should be reused for landscaping purposes where feasible.
- Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow.
- Protect downstream stormwater drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines.

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- Inspect irrigated areas within the construction limits for excess watering. Adjust watering times and schedules to ensure that the appropriate amount of water is being used and to minimize runoff. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Repair broken water lines as soon as possible.
- Inspect irrigated areas regularly for signs of erosion and/or discharge.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

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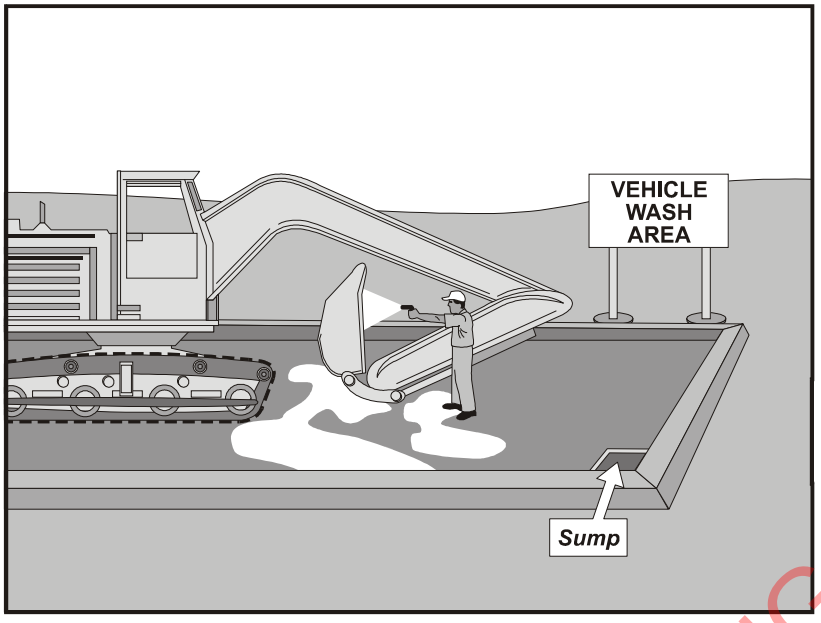
Vehicle and Equipment Cleaning NS-8



Categories

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Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Vehicle and equipment cleaning procedures and practices eliminate or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning operations. Procedures and practices include but are not limited to: using offsite facilities; washing in designated, contained areas only; eliminating discharges to the storm drain by infiltrating the wash water; and training employees and subcontractors in proper cleaning procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment cleaning is performed.

Limitations

Even phosphate-free, biodegradable soaps have been shown to be toxic to fish before the soap degrades. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Implementation

Other options to washing equipment onsite include contracting with either an offsite or mobile commercial washing business. These businesses may be better equipped to handle and dispose of the wash waters properly. Performing this work offsite can also be economical by eliminating the need for a separate washing operation onsite.

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If washing operations are to take place onsite, then:

- Use phosphate-free, biodegradable soaps.
- Educate employees and subcontractors on pollution prevention measures.
- Do not permit steam cleaning onsite. Steam cleaning can generate significant pollutant concentrates.
- Cleaning of vehicles and equipment with soap, solvents or steam should not occur on the project site unless resulting wastes are fully contained and disposed of. Resulting wastes should not be discharged or buried and must be captured and recycled or disposed according to the requirements of WM-10, Liquid Waste Management or WM-6, Hazardous Waste Management, depending on the waste characteristics. Minimize use of solvents. Use of diesel for vehicle and equipment cleaning is prohibited.
- All vehicles and equipment that regularly enter and leave the construction site must be cleaned offsite.
- When vehicle and equipment washing and cleaning must occur onsite, and the operation cannot be located within a structure or building equipped with appropriate disposal facilities, the outside cleaning area should have the following characteristics:
  - Located away from storm drain inlets, drainage facilities, or watercourses
  - Paved with concrete or asphalt and bermed to contain wash waters and to prevent runon and runoff
  - Configured with a sump to allow collection and disposal of wash water
  - No discharge of wash waters to storm drains or watercourses
  - Used only when necessary
- When cleaning vehicles and equipment with water:
  - Use as little water as possible. High-pressure sprayers may use less water than a hose and should be considered
  - Use positive shutoff valve to minimize water usage
  - Facility wash racks should discharge to a sanitary sewer, recycle system or other approved discharge system and must not discharge to the storm drainage system, watercourses, or to groundwater

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Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspection and maintenance are minimal, although some berm repair may be necessary.
- Monitor employees and subcontractors throughout the duration of the construction project to ensure appropriate practices are being implemented.
- Inspect sump regularly and remove liquids and sediment as needed.
- Prohibit employees and subcontractors from washing personal vehicles and equipment on the construction site.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Swisher, R.D. Surfactant Biodegradation, Marcel Decker Corporation, 1987.

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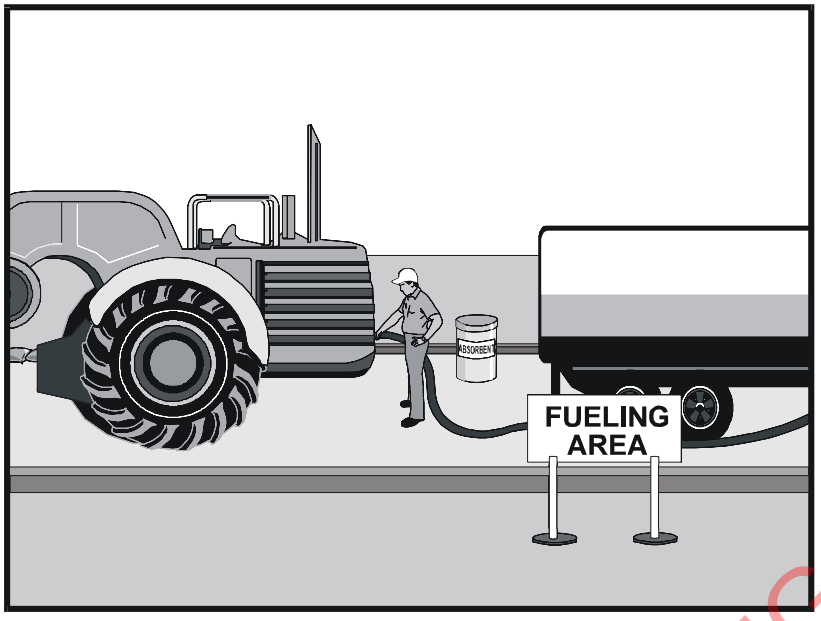
Vehicle and Equipment Fueling NS-9



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Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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Description and Purpose

Vehicle equipment fueling procedures and practices are designed to prevent fuel spills and leaks and reduce or eliminate contamination of stormwater. This can be accomplished by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors in proper fueling procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment fueling takes place.

Limitations

Onsite vehicle and equipment fueling should only be used where it is impractical to send vehicles and equipment offsite for fueling. Sending vehicles and equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/ Exit.

Implementation

- Use offsite fueling stations as much as possible. These businesses are better equipped to handle fuel and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate fueling area at a site.
- Discourage “topping-off” of fuel tanks.

- Absorbent spill cleanup materials and spill kits should be available in fueling areas and on fueling trucks and should be disposed of properly after use.
- Drip pans or absorbent pads should be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Use absorbent materials on small spills. Do not hose down or bury the spill. Remove the adsorbent materials promptly and dispose of properly.
- Avoid mobile fueling of mobile construction equipment around the site; rather, transport the equipment to designated fueling areas. With the exception of tracked equipment such as bulldozers and large excavators, most vehicles should be able to travel to a designated area with little lost time.
- Train employees and subcontractors in proper fueling and cleanup procedures.
- When fueling must take place onsite, designate an area away from drainage courses to be used. Fueling areas should be identified in the SWPPP.
- Dedicated fueling areas should be protected from stormwater runon and runoff and should be located at least 50 ft away from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
- Protect fueling areas with berms and dikes to prevent runon, runoff, and to contain spills.
- Nozzles used in vehicle and equipment fueling should be equipped with an automatic shutoff to control drips. Fueling operations should not be left unattended.
- Use vapor recovery nozzles to help control drips as well as air pollution where required by Air Quality Management Districts (AQMD).
- Federal, state, and local requirements should be observed for any stationary above ground storage tanks.

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Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Vehicles and equipment should be inspected each day of use for leaks. Leaks should be repaired immediately, or problem vehicles or equipment should be removed from the project site.
- Keep ample supplies of spill cleanup materials onsite.
- Immediately clean up spills and properly dispose of contaminated soil and cleanup materials.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

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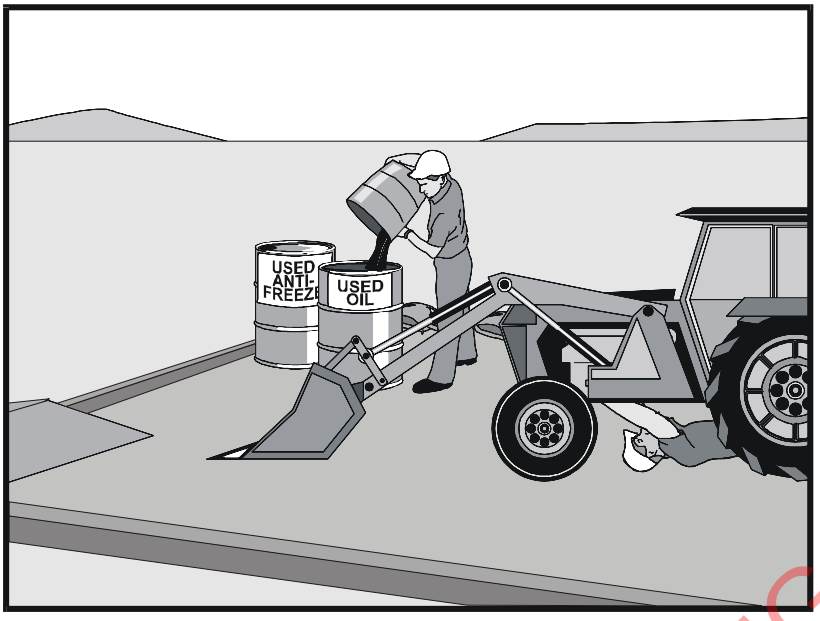
Vehicle & Equipment Maintenance NS-10



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☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a "dry and clean site". The best option would be to perform maintenance activities at an offsite facility. If this option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. Employees and subcontractors must be trained in proper procedures.

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Suitable Applications

These procedures are suitable on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.

Limitations

Onsite vehicle and equipment maintenance should only be used where it is impractical to send vehicles and equipment offsite for maintenance and repair. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Outdoor vehicle or equipment maintenance is a potentially significant source of stormwater pollution. Activities that can contaminate stormwater include engine repair and service, changing or replacement of fluids, and outdoor equipment storage and parking (engine fluid leaks). For further information on vehicle or equipment servicing, see NS-8,

Vehicle and Equipment Cleaning, and NS-9, Vehicle and Equipment Fueling.

Implementation

- Use offsite repair shops as much as possible. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate maintenance area.
- If maintenance must occur onsite, use designated areas, located away from drainage courses. Dedicated maintenance areas should be protected from stormwater runon and runoff and should be located at least 50 ft from downstream drainage facilities and watercourses.
- Drip pans or absorbent pads should be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices.
- Use adsorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- Inspect onsite vehicles and equipment daily at startup for leaks, and repair immediately.
- Keep vehicles and equipment clean; do not allow excessive build-up of oil and grease.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids. Provide secondary containment and covers for these materials if stored onsite.
- Train employees and subcontractors in proper maintenance and spill cleanup procedures.
- Drip pans or plastic sheeting should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- For long-term projects, consider using portable tents or covers over maintenance areas if maintenance cannot be performed offsite.
- Consider use of new, alternative greases and lubricants, such as adhesive greases, for chassis lubrication and fifth-wheel lubrication.
- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
- Do not place used oil in a dumpster or pour into a storm drain or watercourse.
- Properly dispose of or recycle used batteries.
- Do not bury used tires.

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- Repair leaks of fluids and oil immediately.

Listed below is further information if you must perform vehicle or equipment maintenance onsite.

Safer Alternative Products

- Consider products that are less toxic or hazardous than regular products. These products are often sold under an "environmentally friendly" label.
- Consider use of grease substitutes for lubrication of truck fifth-wheels. Follow manufacturers label for details on specific uses.
- Consider use of plastic friction plates on truck fifth-wheels in lieu of grease. Follow manufacturers label for details on specific uses.

Waste Reduction

Parts are often cleaned using solvents such as trichloroethylene, trichloroethane, or methylene chloride. Many of these cleaners are listed in California Toxic Rule as priority pollutants. These materials are harmful and must not contaminate stormwater. They must be disposed of as a hazardous waste. Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents. Also, if possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. For example, replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check the list of active ingredients to see whether it contains chlorinated solvents. The "chlor" term indicates that the solvent is chlorinated. Also, try substituting a wire brush for solvents to clean parts.

FOR BIDDING PURPOSES ONLY

Recycling and Disposal

Separating wastes allows for easier recycling and may reduce disposal costs. Keep hazardous wastes separate, do not mix used oil solvents, and keep chlorinated solvents (like,-trichloroethane) separate from non-chlorinated solvents (like kerosene and mineral spirits). Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around. Provide cover and secondary containment until these materials can be removed from the site.

Oil filters can be recycled. Ask your oil supplier or recycler about recycling oil filters.

Do not dispose of extra paints and coatings by dumping liquid onto the ground or throwing it into dumpsters. Allow coatings to dry or harden before disposal into covered dumpsters.

Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs

in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Keep ample supplies of spill cleanup materials onsite.
- Maintain waste fluid containers in leak proof condition.
- Vehicles and equipment should be inspected on each day of use. Leaks should be repaired immediately, or the problem vehicle(s) or equipment should be removed from the project site.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

References and Additional Resources

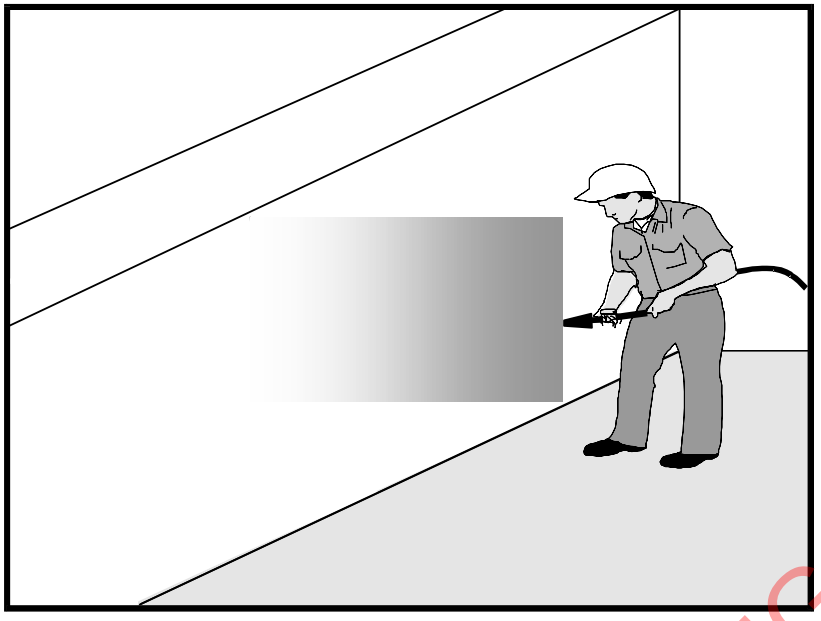
Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

FOR BIDDING PURPOSES ONLY

Concrete Curing NS-12



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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FOR BIDDING PURPOSES ONLY

Description and Purpose

Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods.

Concrete and its associated curing materials have basic chemical properties that can raise the pH of water to levels outside of the permitted range. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Proper procedures and care should be taken when managing concrete curing materials to prevent them from coming into contact with stormwater flows, which could result in a high pH discharge.

Suitable Applications

Suitable applications include all projects where Portland Cement Concrete (PCC) and concrete curing chemicals are placed where they can be exposed to rainfall, runoff from other areas, or where runoff from the PCC will leave the site.

Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

Chemical Curing

- Avoid over spray of curing compounds.
- Minimize the drift by applying the curing compound close to the concrete surface. Apply an amount of compound that covers the surface but does not allow any runoff of the compound.
- Use proper storage and handling techniques for concrete curing compounds. Refer to WM-1, Material Delivery and Storage.
- Protect drain inlets prior to the application of curing compounds.
- Refer to WM-4, Spill Prevention and Control.

Water Curing for Bridge Decks, Retaining Walls, and other Structures

- Direct cure water away from inlets and watercourses to collection areas for evaporation or other means of removal in accordance with all applicable permits. See WM-8 Concrete Waste Management.
- Collect cure water at the top of slopes and transport to a concrete waste management area in a non-erosive manner. See EC-9 Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water.

Education

- Educate employees, subcontractors, and suppliers on proper concrete curing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete curing procedures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts uncured and partially cured concrete as required by the General Permit.

FOR BIDDING PURPOSES ONLY

- Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds.
- Inspect cure containers and spraying equipment for leaks.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

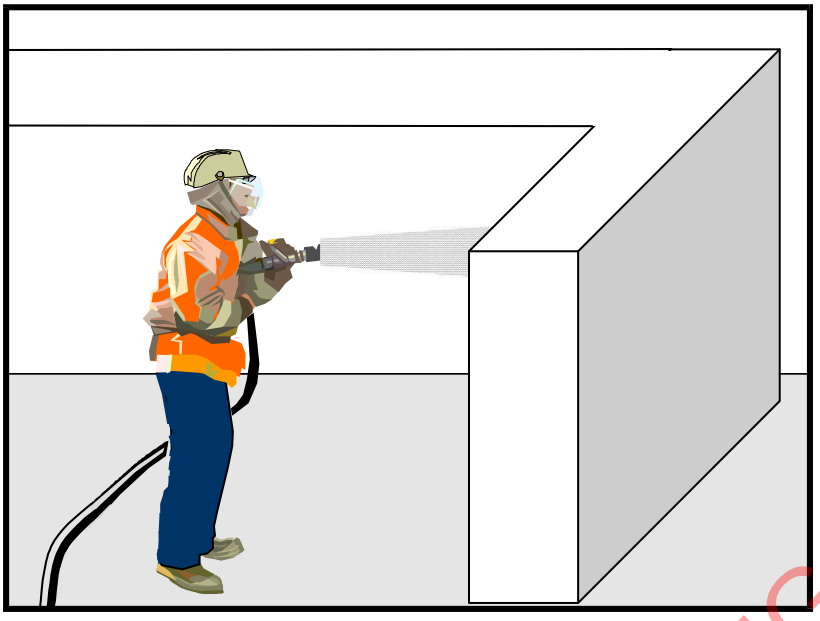
Blue Print for a Clean Bay-Construction-Related Industries: Best Management Practices for Stormwater Pollution Prevention; Santa Clara Valley Non-Point Source Pollution Control Program, 1992.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

FOR BIDDING PURPOSES ONLY

Concrete Finishing NS-13



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

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FOR BIDDING PURPOSES ONLY

Description and Purpose

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high-pressure water blasting. Stormwater and non-stormwater exposed to concrete finishing by-products may have a high pH and may contain chemicals, metals, and fines. Proper procedures and implementation of appropriate BMPs can minimize the impact that concrete-finishing methods may have on stormwater and non-stormwater discharges.

The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Concrete and its associated curing materials have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures apply to all construction locations where concrete finishing operations are performed.

Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

- Collect and properly dispose of water from high-pressure water blasting operations.
- Collect contaminated water from blasting operations at the top of slopes. Transport or dispose of contaminated water while using BMPs such as those for erosion control. Refer to EC-9, Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Direct water from blasting operations away from inlets and watercourses to collection areas for infiltration or other means of removal (dewatering). Refer to NS-2 Dewatering Operations.
- Protect inlets during sandblasting operations. Refer to SE-10, Storm Drain Inlet Protection.
- Refer to WM-8, Concrete Waste Management for disposal of concrete debris.
- Minimize the drift of dust and blast material as much as possible by keeping the blasting nozzle close to the surface.
- When blast residue contains a potentially hazardous waste, refer to WM-6, Hazardous Waste Management.

Education

- Educate employees, subcontractors, and suppliers on proper concrete finishing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete finishing procedures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts concrete dust and debris as required by the General Permit.
- Sweep or vacuum up debris from sandblasting at the end of each shift.

FOR BIDDING PURPOSES ONLY

- At the end of each work shift, remove and contain liquid and solid waste from containment structures, if any, and from the general work area.
- Inspect containment structures for damage prior to use and prior to onset of forecasted rain.

References and Additional Resources

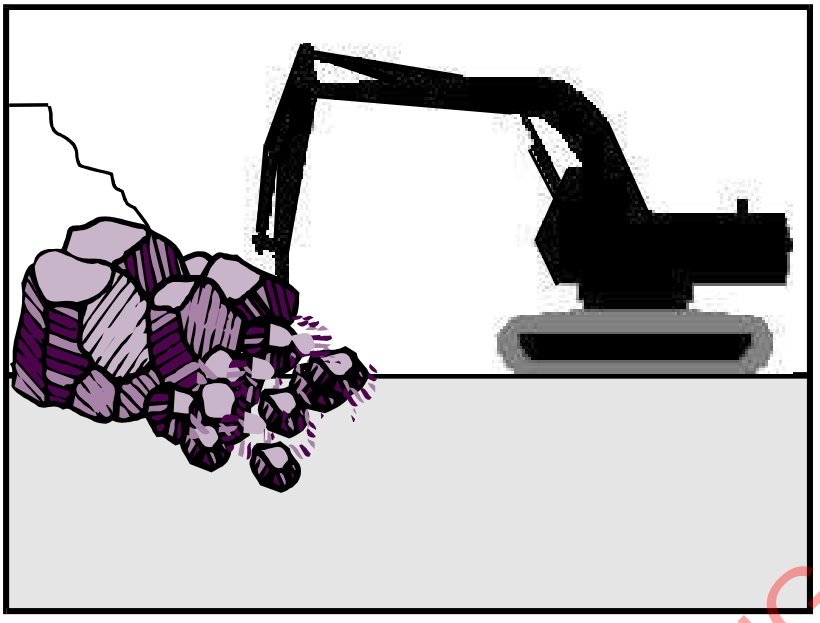
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

FOR BIDDING PURPOSES ONLY

Demolition Adjacent to Water NS-15



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

FOR BIDDING PURPOSES ONLY

Description and Purpose

Procedures to protect water bodies from debris and wastes associated with structure demolition or removal over or adjacent to watercourses.

Suitable Applications

Full bridge demolition and removal, partial bridge removal (barrier rail, edge of deck) associated with bridge widening projects, concrete channel removal, or any other structure removal that could potentially affect water quality.

Limitations

None identified.

Implementation

- Refer to NS-5, Clear Water Diversion, to direct water away from work areas.
- Use attachments on construction equipment such as backhoes to catch debris from small demolition operations.
- Use covers or platforms to collect debris.
- Platforms and covers are to be approved by the owner.
- Stockpile accumulated debris and waste generated during demolition away from watercourses and in accordance with WM-3, Stockpile Management.
- Ensure safe passage of wildlife, as necessary.

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- Discharges to waterways shall be reported to the Regional Water Quality Control Board immediately upon discovery. A written discharge notification must follow within 7 days. Follow the spill reporting procedures in the SWPPP.

- For structures containing hazardous materials, i.e., lead paint or asbestos, refer to BMP WM-6, Hazardous Waste Management. For demolition work involving soil excavation around lead-painted structures, refer to WM-7, Contaminated Soil Management.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.

- Any debris-catching devices shall be emptied regularly. Collected debris shall be removed and stored away from the watercourse and protected from runon and runoff.

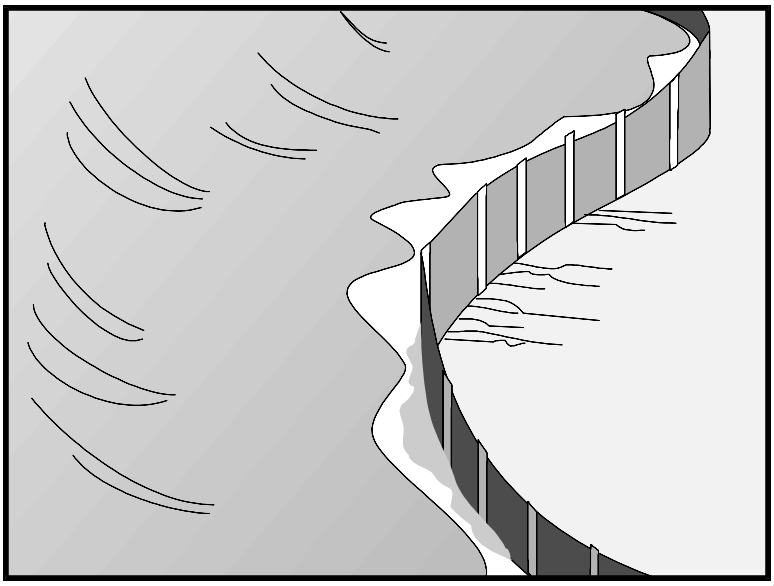
References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

FOR BIDDING PURPOSES ONLY

Silt Fence SE-1



Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Description and Purpose

A silt fence is made of a woven geotextile that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains water, promoting sedimentation of coarse sediment behind the fence. Silt fence does not retain soil fine particles like clays or silts.

Suitable Applications

Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They could also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion and around inlets within disturbed areas (Storm Drain Inlet Protection, SE-10). Silt fences should not be used in locations where the flow is concentrated. Silt fences should always be used in combination with erosion controls. Suitable applications include:

- At perimeter of a project (although they should not be installed up and down slopes).
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Around inlets.
- Below other small cleared areas.

Targeted Constituents

Sediment (coarse sediment)	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm SE-12 Manufactured Linear Sediment Controls

SE-13 Compost Socks and Berms

SE-14 Biofilter Bags

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Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.
- Do not use in locations where ponded water may cause a flooding hazard.
- Do not use silt fence to divert water flows or place across any contour line.
- Improperly installed fences are subject to failure from undercutting, overtopping, or collapsing.
- Must be trenched and keyed in.
- According to the State Water Board's *CGP Review, Issue #2* (2014), silt fences reinforced with metal or plastic mesh should be avoided due to plastic pollution and wildlife concerns.
- Not intended for use as a substitute for Fiber Rolls (SE-5), when fiber rolls are being used as a slope interruption device.
- Do not use on slopes subject to creeping, slumping, or landslides.

Implementation

General

A silt fence is a temporary sediment barrier consisting of woven geotextile stretched across and attached to supporting posts, trenched-in, and, depending upon the strength of fabric used, supported with plastic or wire mesh fence. Silt fences trap coarse sediment by intercepting and detaining sediment-laden runoff from disturbed areas in order to promote sedimentation behind the fence.

FOR BIDDING PURPOSES ONLY

The following layout and installation guidance can improve performance and should be followed:

- Silt fence should be used in combination with erosion controls up-slope in order to provide the most effective sediment control.
- Silt fence alone is not effective at reducing turbidity. (Barrett and Malina, 2004)
- Designers should consider diverting sediment laden water to a temporary sediment basin or trap. (EPA, 2012)
- Use principally in areas where sheet flow occurs.
- Install along a level contour, so water does not pond more than 1.5 ft. at any point along the silt fence.
- Provide sufficient room for runoff to pond behind the fence and to allow sediment removal equipment to pass between the silt fence and toes of slopes or other obstructions. About 1200 ft.^{2} of ponding area should be provided for every acre draining to the fence.
- Efficiency of silt fences is primarily dependent on the detention time of the runoff behind the control. (Barrett and Malina, 2004)

- The drainage area above any fence should not exceed a quarter of an acre. (Rule of Thumb-100-feet of silt fence per 10,000 ft.^{2} of disturbed area.) (EPA, 2012)
- The maximum length of slope draining to any point along the silt fence should be 100 ft. per ft of silt fence.
- Turn the ends of the filter fence uphill to prevent stormwater from flowing around the fence.
- Leave an undisturbed or stabilized area immediately down slope from the fence where feasible.
- Silt fences should remain in place until the disturbed area draining to the silt fence is permanently stabilized, after which, the silt fence fabric and posts should be removed and properly disposed.
- J-hooks, which have ends turning up the slope to break up long runs of fence and provide multiple storage areas that work like mini-retention areas, may be used to increase the effectiveness of silt fence.
- Be aware of local regulations regarding the type and installation requirements of silt fence, which may differ from those presented in this fact sheet.

Design and Layout

In areas where high winds are anticipated the fence should be supported by a plastic or wire mesh. The geotextile fabric of the silt fence should contain ultraviolet inhibitors and stabilizers to provide longevity equivalent to the project life or replacement schedule.

- Layout in accordance with the attached figures.
- For slopes that contain a high number of rocks or large dirt clods that tend to dislodge, it may be necessary to protect silt fence from rocks (e.g., rockfall netting) ensure the integrity of the silt fence installation.

Standard vs. Heavy Duty Silt Fence

Standard Silt Fence

- Generally applicable in cases where the area draining to fence produces moderate sediment loads.

Heavy Duty Silt Fence

- Heavy duty silt fence usually has 1 or more of the following characteristics, not possessed by standard silt fence.
  - Fabric is reinforced with wire backing or additional support.
  - Posts are spaced closer than pre-manufactured, standard silt fence products.
- Use is generally limited to areas affected by high winds.
- Area draining to fence produces moderate sediment loads.

Materials

Standard Silt Fence

- Silt fence material should be woven geotextile with a minimum width of 36 in. The fabric should conform to the requirements in ASTM designation D6461.

FOR BIDDING PURPOSES ONLY

- Wooden stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.

- Staples used to fasten the fence fabric to the stakes should be not less than 1.75 in. long and should be fabricated from 15-gauge or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence should be 9 gauge or heavier wire. Galvanizing of the fastening wire will not be required.

Heavy-Duty Silt Fence

- Some silt fence has a wire backing to provide additional support, and there are products that may use prefabricated plastic holders for the silt fence and use metal posts instead of wood stakes.

Installation Guidelines – Traditional Method

Silt fences are to be constructed on a level contour. Sufficient area should exist behind the fence for ponding to occur without flooding or overtopping the fence.

- A trench should be excavated approximately 6 in. wide and 6 in. deep along the line of the proposed silt fence (trenches should not be excavated wider or deeper than necessary for proper silt fence installation).

- Bottom of the silt fence should be keyed-in a minimum of 12 in.

- Posts should be spaced a maximum of 6 ft. apart and driven securely into the ground a minimum of 18 in. or 12 in. below the bottom of the trench.

- When standard strength geotextile is used, a plastic or wire mesh support fence should be fastened securely to the upslope side of posts using heavy–duty wire staples at least 1 in. long. The mesh should extend into the trench.

- When extra-strength geotextile and closer post spacing are used, the mesh support fence may be eliminated.

- Woven geotextile should be purchased in a long roll, then cut to the length of the barrier. When joints are necessary, geotextile should be spliced together only at a support post, with a minimum 6 in. overlap and both ends securely fastened to the post.

- The trench should be backfilled with native material and compacted.

- Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the barrier; in no case should the reach exceed 500 ft.

- Cross barriers should be a minimum of 1/3 and a maximum of ½ the height of the linear barrier.

- See typical installation details at the end of this fact sheet.

FOR BIDDING PURPOSES ONLY

Installation Guidelines - Static Slicing Method

- Static Slicing is defined as insertion of a narrow blade pulled behind a tractor, similar to a plow blade, at least 10 in. into the soil while at the same time pulling silt geotextile fabric into the ground through the opening created by the blade to the depth of the blade. Once the geotextile is installed, the soil is compacted using tractor tires.
- This method will not work with pre-fabricated, wire backed silt fence.
- Benefits:
    - Ease of installation (most often done with a 2-person crew).
    - Minimal soil disturbance.
    - Better level of compaction along fence, less susceptible to undercutting
    - Uniform installation.
- Limitations:
    - Does not work in shallow or rocky soils.
    - Complete removal of geotextile material after use is difficult.
    - Be cautious when digging near potential underground utilities.

FOR BIDDING PURPOSES ONLY

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair undercut silt fences.
- Repair or replace split, torn, slumping, or weathered fabric. The lifespan of silt fence fabric is generally 5 to 8 months.
- Silt fences that are damaged and become unsuitable for the intended purpose should be removed from the site of work, disposed, and replaced with new silt fence barriers.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches 1/3 of the barrier height.
- Silt fences should be left in place until the upgradient area is permanently stabilized. Until then, the silt fence should be inspected and maintained regularly.
- Remove silt fence when upgradient areas are stabilized. Fill and compact post holes and anchor trench, remove sediment accumulation, grade fence alignment to blend with adjacent ground, and stabilize disturbed area.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

CGP Review #2, State Water Resources Control Board, 2014. Available online at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/training/cgp_review_issue2.pdf.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Monitoring Data on Effectiveness of Sediment Control Techniques, Proceedings of World Water and Environmental Resources Congress, Barrett M. and Malina J. 2004.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group-Working Paper, USEPA, April 1992.

Sedimentation and Erosion Control Practices, and Inventory of Current Practices (Draft), USEPA, 1990.

Southeastern Wisconsin Regional Planning Commission (SWRPC). Costs of Urban Nonpoint Source Water Pollution Control Measures. Technical Report No. 31. Southeastern Wisconsin Regional Planning Commission, Waukesha, WI. 1991.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

U.S. Environmental Protection Agency (USEPA). Stormwater Best Management Practices: Silt Fences. U.S. Environmental Protection Agency, Office of Water, Washington, DC, 2012.

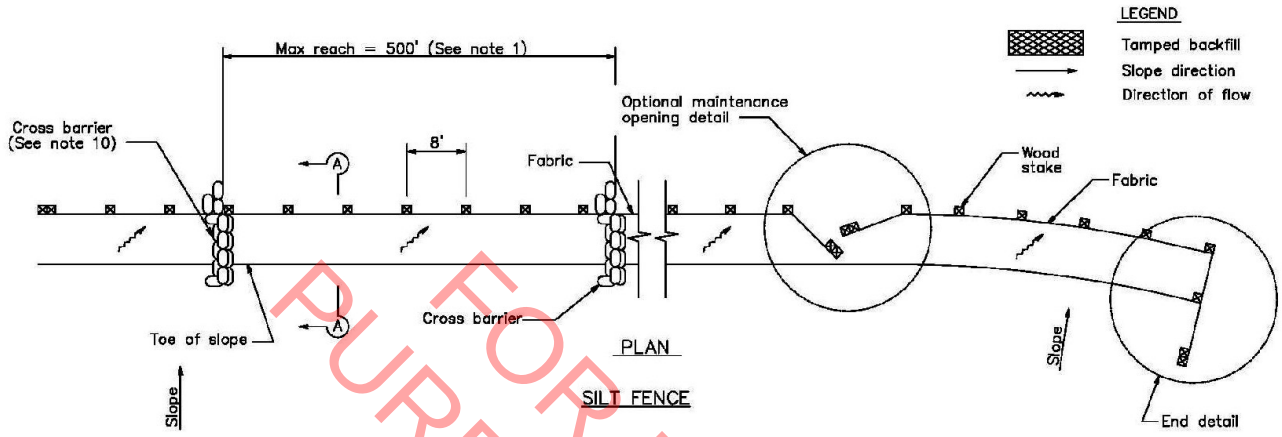
U.S. Environmental Protection Agency (USEPA). Stormwater Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices. U.S. Environmental Protection Agency, Office of Water, Washington, DC, 1992.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

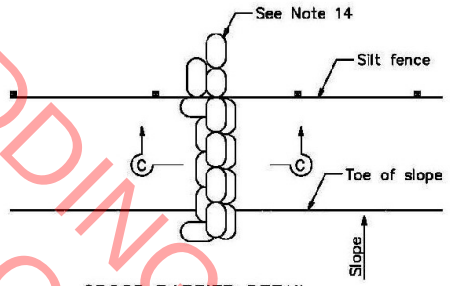
Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

FOR BIDDING PURPOSES ONLY

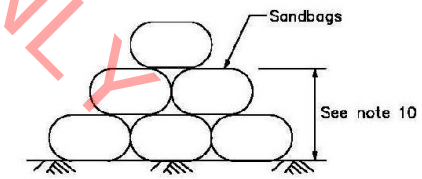


PLAN

SILT FENCE



CROSS BARRIER DETAIL



SECTION C–C

NOTES

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the linear barrier, in no case shall the reach length exceed 500'.
2. The last 8'–0" of fence shall be turned up slope.
3. Stake dimensions are nominal.
4. Dimension may vary to fit field condition.
5. Stakes shall be spaced at 8'–0" maximum and shall be positioned on downstream side of fence.
6. Stakes to overlap and fence fabric to fold around each stake one full turn. Secure fabric to stake with 4 staples.
7. Stakes shall be driven tightly together to prevent potential flow–through of sediment at joint. The tops of the stakes shall be secured with wire.
8. For end stake, fence fabric shall be folded around two stakes one full turn and secured with 4 staples.
9. Minimum 4 staples per stake. Dimensions shown are typical.
10. Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
11. Maintenance openings shall be constructed in a manner to ensure sediment remains behind silt fence.
12. Joining sections shall not be placed at sump locations.
13. Sandbag rows and layers shall be offset to eliminate gaps.
14. Add 3–4 bags to cross barrier on downgradient side of silt fence as needed to prevent bypass or undermining and as allowable based on site limits of disturbance.

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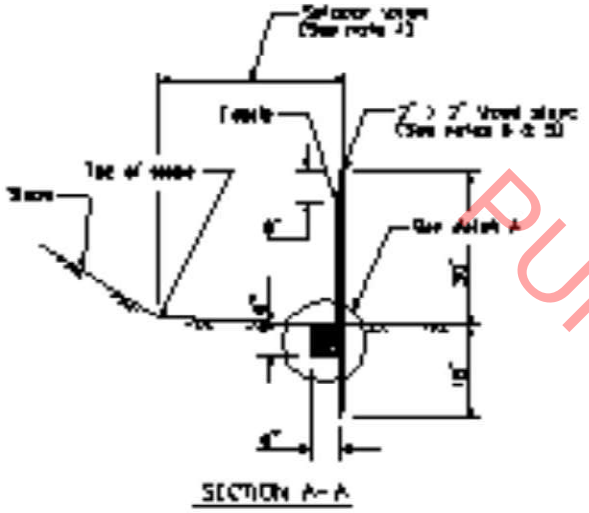
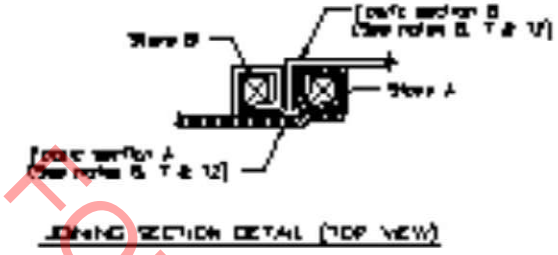
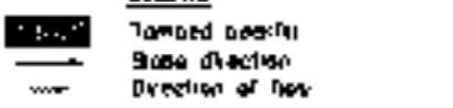


SECTION A-A

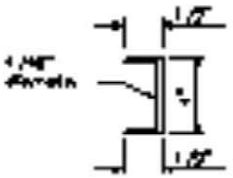


JOINING SECTION DETAIL (TOP VIEW)

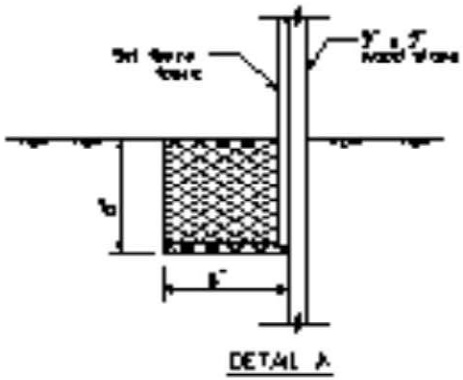




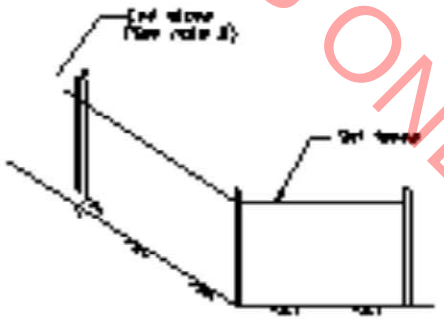
END STAKE DETAIL (TOP VIEW)



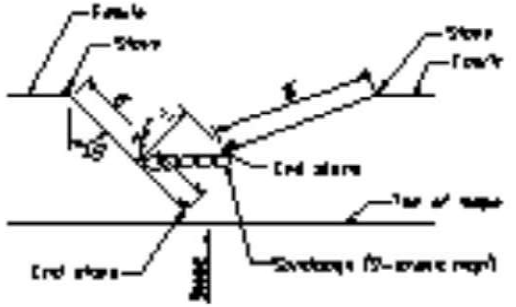
STAPLE DETAIL
(SEE NOTE 9)



DETAIL A



END DETAIL



OPTIONAL MAINTENANCE OPENING DETAIL
(SEE NOTE 11)

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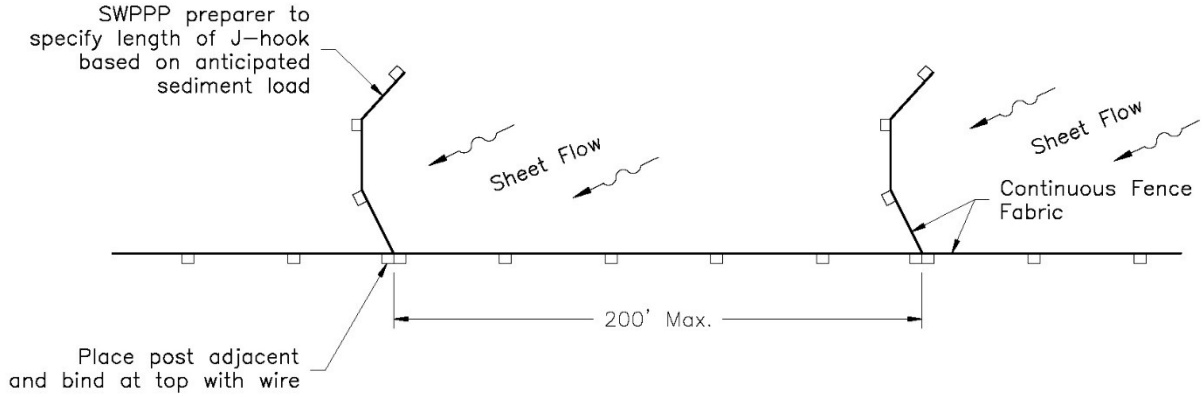

Plan

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Plan

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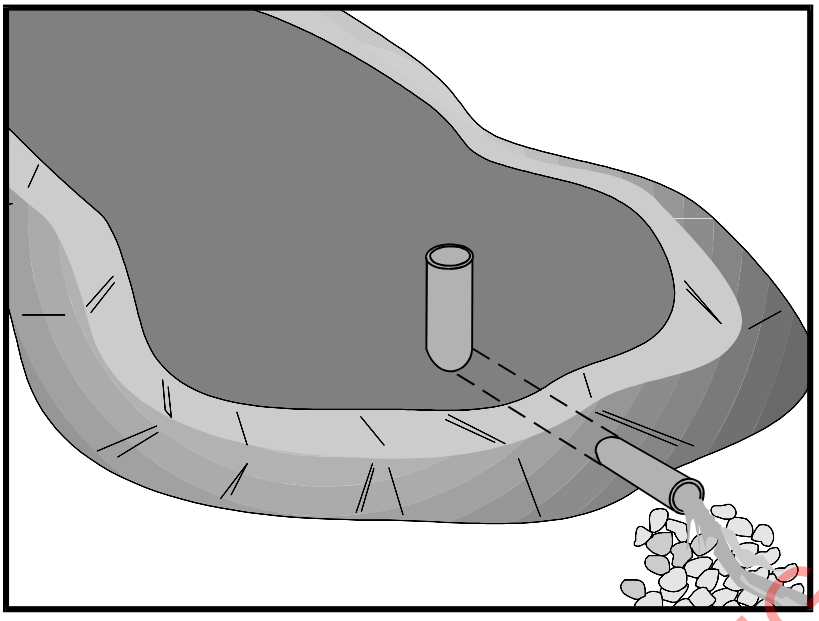
Sediment Basin SE-2



Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-3 Sediment Trap (for smaller areas)

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Description and Purpose

A sediment basin is a temporary basin formed by excavation or by constructing an embankment so that sediment-laden runoff is temporarily detained under quiescent conditions, allowing sediment to settle out before the runoff is released.

Sediment basin design guidance presented in this fact sheet is intended to provide options, methods, and techniques to optimize temporary sediment basin performance and basin sediment removal. Basin design guidance provided in this fact sheet is not intended to guarantee basin effluent compliance with numeric discharge limits (numeric action levels or numeric effluent limits for turbidity). Compliance with discharge limits requires a thoughtful approach to comprehensive BMP planning, implementation, and maintenance. Therefore, optimally designed and maintained sediment basins should be used in conjunction with a comprehensive system of BMPs that includes:

- Diverting runoff from undisturbed areas away from the basin
- Erosion control practices to minimize disturbed areas on-site and to provide temporary stabilization and interim sediment controls (e.g., stockpile perimeter control, check dams, perimeter controls around individual lots) to reduce the basin's influent sediment concentration.

At some sites, sediment basin design enhancements may be required to adequately remove sediment. Traditional

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(a.k.a. “physical”) enhancements such as alternative outlet configurations or flow deflection baffles increase detention time and other techniques such as outlet skimmers preferentially drain flows with lower sediment concentrations. These “physical” enhancement techniques are described in this fact sheet. To further enhance sediment removal particularly at sites with fine soils or turbidity sensitive receiving waters, some projects may need to consider implementing Active Treatment Systems (ATS) whereby coagulants and flocculants are used to enhance settling and removal of suspended sediments. Guidance on implementing ATS is provided in SE-11.

Suitable Applications

Sediment basins may be suitable for use on larger projects with sufficient space for constructing the basin. Sediment basins should be considered for use:

- Where sediment-laden water may enter the drainage system or watercourses
- On construction projects with disturbed areas during the rainy season
- At the outlet of disturbed watersheds between 5 acres and 75 acres and evaluated on a site by site basis
- Where post construction detention basins are required
- In association with dikes, temporary channels, and pipes used to convey runoff from disturbed areas

Limitations

Sediment basins must be installed only within the property limits and where failure of the structure will not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities. In addition, sediment basins are attractive to children and can be very dangerous. Local ordinances regarding health and safety must be adhered to. If fencing of the basin is required, the type of fence and its location should be shown in the SWPPP and in the construction specifications.

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- As a general guideline, sediment basins are suitable for drainage areas of 5 acres or more, but not appropriate for drainage areas greater than 75 acres. However, the tributary area should be evaluated on a site by site basis.
- Sediment basins may become an “attractive nuisance” and care must be taken to adhere to all safety practices. If safety is a concern, basin may require protective fencing.
- Sediment basins designed according to this fact sheet are only effective in removing sediment down to about the silt size fraction. Sediment-laden runoff with smaller size fractions (fine silt and clay) may not be adequately treated unless chemical (or other appropriate method) treatment is used in addition to the sediment basin.
- Basins with a height of 25 ft or more or an impounding capacity of 50 ac-ft or more must obtain approval from California Department of Water Resources Division of Safety of Dams (http://www.water.ca.gov/damsafety/).

- Water that stands in sediment basins longer than 96 hours may become a source of mosquitoes (and midges), particularly along perimeter edges, in shallow zones, in scour or below-grade pools, around inlet pipes, along low-flow channels, and among protected habitats created by emergent or floating vegetation (e.g. cattails, water hyacinth), algal mats, riprap, etc.

- Basins require large surface areas to permit settling of sediment. Size may be limited by the available area.

Implementation

General

A sediment basin is a controlled stormwater release structure formed by excavation or by construction of an embankment of compacted soil across a drainage way, or other suitable location. It is intended to trap sediment before it leaves the construction site. The basin is a temporary measure expected to be used during active construction in most cases and is to be maintained until the site area is permanently protected against erosion or a permanent detention basin is constructed.

Sediment basins are suitable for nearly all types of construction projects. Whenever possible, construct the sediment basins before clearing and grading work begins. Basins should be located at the stormwater outlet from the site but not in any natural or undisturbed stream. A typical application would include temporary dikes, pipes, and/or channels to convey runoff to the basin inlet.

Many development projects in California are required by local ordinances to provide a stormwater detention basin for post-construction flood control, desilting, or stormwater pollution control. A temporary sediment basin may be constructed by rough grading the post-construction control basins early in the project.

Sediment basins if properly designed and maintained can trap a significant amount of the sediment that flows into them. However, traditional basins do not remove all inflowing sediment. Therefore, they should be used in conjunction with erosion control practices such as temporary seeding, mulching, diversion dikes, etc., to reduce the amount of sediment flowing into the basin.

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Planning

To improve the effectiveness of the basin, it should be located to intercept runoff from the largest possible amount of disturbed area. Locations best suited for a sediment basin are generally in lower elevation areas of the site (or basin tributary area) where site drainage would not require significant diversion or other means to direct water to the basin but outside jurisdictional waterways. However, as necessary, drainage into the basin can be improved by the use of earth dikes and drainage swales (see BMP EC-9). . The basin should not be located where its failure would result in the loss of life or interruption of the use or service of public utilities or roads.

Construct before clearing and grading work begins when feasible.

- Do not locate the basin in a jurisdictional stream.

- Basin sites should be located where failure of the structure will not cause loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities.
- Basins with a height of 25 ft or more or an impounding capacity of 50 ac-ft must obtain approval from the Division of Dam Safety. Local dam safety requirements may be more stringent.
- Limit the contributing area to the sediment basin to only the runoff from the disturbed soil areas. Use temporary concentrated flow conveyance controls to divert runoff from undisturbed areas away from the sediment basin.
- The basin should be located: (1) by excavating a suitable area or where a low embankment can be constructed across a swale, (2) where post-construction (permanent) detention basins will be constructed, and (3) where the basins can be maintained on a year-round basis to provide access for maintenance, including sediment removal and sediment stockpiling in a protected area, and to maintain the basin to provide the required capacity.

Design

When designing a sediment basin, designers should evaluate the site constraints that could affect the efficiency of the BMP. Some of these constraints include: the relationship between basin capacity, anticipated sediment load, and freeboard, available footprint for the basin, maintenance frequency and access, and hydraulic capacity and efficiency of the temporary outlet infrastructure. Sediment basins should be designed to maximize sediment removal and to consider sediment load retained by the basin as it affects basin performance.

Three Basin Design Options (Part A) are presented below along with a Typical Sediment/Detention Basin Design Methodology (Part B). Regardless of the design option that is selected, designers also need to evaluate the sediment basin capacity with respect to sediment accumulation (See "*Step 3. Evaluate the Capacity of the Sediment Basin") and* should incorporate approaches identified in "*Step 4. Other Design Considerations*" to enhance basin performance.

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A) Basin Design Options:

Option 1:

Design sediment basin(s) using the standard equation:

$$A_s = \frac{1.2Q}{V_s} \qquad \text{(Eq. 1)}$$

Where:

A_s = Minimum surface area for trapping soil particles of a certain size

V_s = Settling velocity of the design particle size chosen (V_s = 0.00028 ft/s for a design particle size of 0.01 mm at 68°F)

1.2 = Factor of safety recommended by EPA to account for the reduction in basin efficiency caused due to turbulence and other non ideal conditions.

$Q = CIA$ (Eq.2)

Where

Q = Peak basin influent flow rate measured in cubic feet per second (ft^3/s)

C = Runoff coefficient (unitless)

I = Peak rainfall intensity for the 10-year, 6-hour rain event (in/hr)

A = Area draining into the sediment basin in acres

The design particle size should be the smallest soil grain size determined by wet sieve analysis, or the fine silt sized (0.01 mm [or 0.0004 in.]) particle, and the Vs used should be 100 percent of the calculated settling velocity.

This sizing basin method is dependent on the outlet structure design or the total basin length with an appropriate outlet. If the designer chooses to utilize the outlet structure to control the flow duration in the basin, the basin length (distance between the inlet and the outlet) should be a minimum of twice the basin width; the depth should not be less than 3 ft nor greater than 5 ft for safety reasons and for maximum efficiency (2 ft of sediment storage, 2 ft of capacity). If the designer chooses to utilize the basin length (with appropriate basin outlet) to control the flow duration in the basin, the basin length (distance between the inlet and the outlet) should be a specifically designed to capture 100% of the design particle size; the depth should not be less than 3 ft nor greater than 5 ft for safety reasons and for maximum efficiency (2 ft of sediment storage, 2 ft of capacity).

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Basin design guidance provided herein assumes standard water properties (e.g., estimated average water temperature, kinematic viscosity, etc.) as a basis of the design. Designers can use an alternative design (Option 3) with site specific water properties as long as the design is as protective as Option 1.

The design guidance uses the peak influent flow rate to size sediment basins. Designers can use an alternative design (Option 3) with site specific average flow rates as long as the design is as protective as Option 1.

The basin should be located on the site where it can be maintained on a year-round basis and should be maintained on a schedule to retain the 2 ft of capacity.

Option 2:

Design pursuant to local ordinance for sediment basin design and maintenance, provided that the design efficiency is as protective or more protective of water quality than Option 1.

Option 3:

The use of an equivalent surface area design or equation provided that the design efficiency is as protective or more protective of water quality than Option 1.

B) Typical Sediment/Detention Basin Design Methodology:

Design of a sediment basin requires the designer to have an understanding of the site constraints, knowledge of the local soil (e.g., particle size distribution of potentially contributing soils), drainage area of the basin, and local hydrology. Designers should not assume that a sediment basin for location A is applicable to location B. Therefore, designers can use this factsheet as guidance but will need to apply professional judgment and knowledge of the site to design an effective and efficient sediment basin. The following provides a general overview of typical design methodologies:

Step 1. Hydrologic Design

- Evaluate the site constraints and assess the drainage area for the sediment basin. Designers should consider on- and off-site flows as well as changes in the drainage area associated with site construction/disturbance. To minimize additional construction during the course of the project, the designer should consider identifying the maximum drainage area when calculating the basin dimensions.
- If a local hydrology manual is not available, it is recommended to follow standard rational method procedures to estimate the flow rate. The references section of this factsheet provides a reference to standard hydrology textbooks that can provide standard methodologies. If local rainfall depths are not available, values can be obtained from standard precipitation frequency maps from NOAA (downloaded from http://www.wrcc.dri.edu/pcpnfreq.html).

Step 2. Hydraulic Design

- Calculate the surface area required for the sediment basin using Equation 1. In which the flow rate is estimated for a 10-yr 6-hr event using rational method procedure listed in local hydrology manual and Vs is estimated using Stokes Law presented in Equation 3.

$$V_s = 2.81d^2 \qquad \text{(Eq.3)}$$

Where

V_s = Settling velocity in feet per second at 68˚F

d = diameter of sediment particle in millimeters (smallest soil grain size determined by wet sieve analysis or fine silt (0.01 mm [or 0.0004 in.])

- In general, the basin outlet design requires an iterative trial and error approach that considered the maximum water surface elevation, the elevation versus volume (stage-storage) relationship, the elevation verses basin outflow (a.k.a.-discharge) relationship, and the estimated inflow hydrograph. To adequately design the basins to settle sediment, the outlet configuration and associated outflow rates can be estimated by numerous methodologies. The following provides some guidance for design the basin outlet:
  - An outlet should have more than one orifice.
  - An outlet design typically utilizes multiple horizontal rows of orifices (approximately 3 or more) with at least 2 orifices per row (see Figures 1 and 2 at the end of this fact sheet).

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- Orifices can vary in shape.
- Select the appropriate orifice diameter and number of perforations per row with the objective of minimizing the number of rows while maximizing the detention time.
- The diameter of each orifice is typically a maximum of 3-4 inches and a minimum of 0.25-0.5 inches.
- If a rectangular orifice is used, it is recommended to have minimum height of 0.5 inches and a maximum height of 6 inches.
- Rows are typically spaced at three times the diameter center to center vertically with a minimum distance of approximately 4 inches on center and a maximum distance of 1 foot on center.
- To estimate the outflow rate, each row is calculated separately based on the flow through a single orifice then multiplied by the number of orifices in the row. This step is repeated for each of the rows. Once all of the orifices are estimated, the total outflow rate versus elevation (stage-discharge curve) is developed to evaluate the detention time within the basin.
- Flow through a single orifice can be estimated using an Equation 4:

$$Q = BC'A(2gH)^{0.5} \qquad \text{(Eq.4)}$$

Where
Q = Outflow rate in ft^3/s
C′ = Orifice coefficient (unitless)
A = Area of the orifice (ft^2)
g = acceleration due to gravity (ft^3/s)
H = Head above the orifice (ft)
B = Anticipated Blockage or clogging factor (unitless), It is dependent on anticipated sediment and debris load, trash rack configuration etc, so the value is dependent on design engineer's professional judgment and/or local requirements (B is never greater than 1 and a value of 0.5 is generally used)

- Care must be taken in the selection of orifice coefficient ("C′"); 0.60 is most often recommended and used. However, based on actual tests, Young and Graziano (1989), "Outlet Hydraulics of Extended Detention Facilities for Northern Virginia Planning District Commission", recommends the following:
  - C′ = 0.66 for thin materials; where the thickness is equal to or less than the orifice diameter, or
  - C′ = 0.80 when the material is thicker than the orifice diameter
- If different sizes of orifices are used along the riser then they have to be sized such that not more than 50 percent of the design storm event drains in one-third of the drawdown time (to provide adequate settling time for events smaller than the design storm event)

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and the entire volume drains within 96 hours or as regulated by the local vector control agency. If a basin fails to drain within 96 hours, the basin must be pumped dry.

- Because basins are not maintained for infiltration, water loss by infiltration should be disregarded when designing the hydraulic capacity of the outlet structure.

- Floating Outlet Skimmer: The floating skimmer (see Figure 3 at the end of this fact sheet is an alternative outlet configuration (patented) that drains water from upper portion of the water column. This configuration has been used for temporary and permanent basins and can improve basin performance by eliminating bottom orifices which have the potential of discharging solids. Some design considerations for this alternative outlet device includes the addition of a sand filter or perforated under drain at the low point in the basin and near the floating skimmer. These secondary drains allow the basin to fully drain. More detailed guidelines for sizing the skimmer can be downloaded from http://www.fairclothskimmer.com/.

- Hold and Release Valve: An ideal sediment/detention basin would hold all flows to the design storm level for sufficient time to settle solids, and then slowly release the storm water. Implementing a reliable valve system for releasing detention basins is critical to eliminate the potential for flooding in such a system. Some variations of hold and release valves include manual valves, bladder devices or electrically operated valves. When a precipitation event is forecast, the valve would be close for the duration of the storm and appropriate settling time. When the settling duration is met (approximately 24 or 48 hours), the valve would be opened and allow the stormwater to be released at a rate that does not resuspend settled solids and in a non-erosive manner. If this type of system is used the valve should be designed to empty the entire basin within 96 hours or as stipulated by local vector control regulations.

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Step 3. Evaluate the Capacity of the Sediment Basin

- Typically, sediment basins do not perform as designed when they are not properly maintained or the sediment yield to the basin is larger than expected. As part of a good sediment basin design, designers should consider maintenance cycles, estimated soil loss and/or sediment yield, and basin sediment storage volume. The two equations below can be used to quantify the amount of soil entering the basin.

- The Revised Universal Soil Loss Equation (RUSLE, Eq.5) can be used to estimate annual soil loss and the Modified Universal Soil Equation (MUSLE, Eq.6) can be used to estimate sediment yield from a single storm event.

$$A = R \times K \times LS \times C \times P \qquad \text{(Eq.5)}$$

$$Y = 95(Q \times q_p)^{0.56} \times K \times LS \times C \times P \qquad \text{(Eq.6)}$$

Where:

A = annual soil loss, tons/acre-year

R = rainfall erosion index, in 100 ft. Tons/acre.in/hr.

K = soil erodibility factor, tons/acre per unit of R

LS = slope length and steepness factor (unitless)

C = vegetative cover factor (unitless)

P = erosion control practice factor (unitless)

Y = single storm sediment yield in tons

Q = runoff volume in acre-feet

q_p = peak flow in cfs

- Detailed descriptions and methodologies for estimating the soil loss can be obtained from standard hydrology text books (See References section).
- Determination of the appropriate equation should consider construction duration and local environmental factors (soils, hydrology, etc.). For example, if a basin is planned for a project duration of 1 year and the designer specifies one maintenance cycle, RUSLE could be used to estimate the soil loss and thereby the designer could indicate that the sediment storage volume would be half of the soil loss value estimated. As an example, for use of MUSLE, a project may have a short construction duration thereby requiring fewer maintenance cycles and a reduced sediment storage volume. MUSLE would be used to estimate the anticipated soil loss based on a specific storm event to evaluate the sediment storage volume and appropriate maintenance frequency.
- The soil loss estimates are an essential step in the design, and it is essential that the designer provide construction contractors with enough information to understand maintenance frequency and/or depths within the basin that would trigger maintenance. Providing maintenance methods, frequency and specification should be included in design bid documents such as the SWPPP Site Map.
- Once the designer has quantified the amount of soil entering the basin, the depth required for sediment storage can be determined by dividing the estimated sediment loss by the surface area of the basin.

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Step 4. Other Design Considerations

- Consider designing the volume of the settling zone for the total storm volume associated with the 2-year event or other appropriate design storms specified by the local agency. This volume can be used as a guide for sizing the basin without iterative routing calculations. The depth of the settling zone can be estimated by dividing the estimated 2-yr storm volume by the surface area of the basin.
- The basin volume consists of two zones:
  - A sediment storage zone at least 1 ft deep.
  - A settling zone at least 2 ft deep.
  - The basin depth must be no less than 3 ft (not including freeboard).

- Proper hydraulic design of the outlet is critical to achieving the desired performance of the basin. The outlet should be designed to drain the basin within 24 to 96 hours (also referred to as "drawdown time"). The 24-hour limit is specified to provide adequate settling time; the 96-hour limit is specified to mitigate vector control concerns.

- Confirmation of the basin performance can be evaluated by routing the design storm (10-yr 6-hr, or as directed by local regulations) through the basin based on the basin volume (stage-storage curve) and the outlet design (stage-discharge curve based on the orifice configuration or equivalent outlet design).

- Sediment basins, regardless of size and storage volume, should include features to accommodate overflow or bypass flows that exceed the design storm event.

  - Include an emergency spillway to accommodate flows not carried by the principal spillway. The spillway should consist of an open channel (earthen or vegetated) over undisturbed material (not fill) or constructed of a non-erodible riprap (or equivalent protection) on fill slopes.

  - The spillway control section, which is a level portion of the spillway channel at the highest elevation in the channel, should be a minimum of 20 ft in length.

- Rock, vegetation or appropriate erosion control should be used to protect the basin inlet, outlet, and slopes against erosion.

- The total depth of the sediment basin should include the depth required for sediment storage, depth required for settling zone and freeboard of at least 1 foot or as regulated by local flood control agency for a flood event specified by the local agency.

- The basin alignment should be designed such that the length of the basin is more than twice the width of the basin; the length should be determined by measuring the distance between the inlet and the outlet. If the site topography does not allow for this configuration baffles should be installed so that the ratio is satisfied. If a basin has more than one inflow point, any inflow point that conveys more than 30 percent of the total peak inflow rate has to meet the required length to width ratio.

- An alternative basin sizing method proposed by Fifield (2004) can be consulted to estimate an alternative length to width ratio and basin configuration. These methods can be considered as part of Option 3 which allows for alternative designs that are protective or more protective of water quality.

- Baffles (see Figure 4 at the end of this fact sheet) can be considered at project sites where the existing topography or site constraints limit the length to width ratio. Baffles should be constructed of earthen berms or other structural material within the basin to divert flow in the basin, thus increasing the effective flow length from the basin inlet to the outlet riser. Baffles also reduce the change of short circuiting and allows for settling throughout the basin.

- Baffles are typically constructed from the invert of the basin to the crest of the emergency spillway (i.e., design event flows are meant to flow around the baffles and flows greater than the design event would flow over the baffles to the emergency spillway).

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- Use of other materials for construction of basin baffles (such as silt fence) may not be appropriate based on the material specifications and will require frequent maintenance (maintain after every storm event). Maintenance may not be feasible when required due to flooded conditions resulting from frequent (i.e., back to back) storm events. Use of alternative baffle materials should not deviate from the intended purpose of the material, as described by the manufacturer.
- Sediment basins are best used in conjunction with erosion controls.
- Basins with an impounding levee greater than 4.5 ft tall, measured from the lowest point to the impounding area to the highest point of the levee, and basins capable of impounding more than 35,000 ft^3, should be designed by a Registered Civil Engineer. The design should include maintenance requirements, including sediment and vegetation removal, to ensure continuous function of the basin outlet and bypass structures.
- A forebay, constructed upstream of the basin, may be provided to remove debris and larger particles.
- The outflow from the sediment basin should be provided with velocity dissipation devices (see BMP EC-10) to prevent erosion and scouring of the embankment and channel.
- The principal outlet should consist of a corrugated metal, high density polyethylene (HDPE), or reinforced concrete riser pipe with dewatering holes and an anti-vortex device and trash rack attached to the top of the riser, to prevent floating debris from flowing out of the basin or obstructing the system. This principal structure should be designed to accommodate the inflow design storm.
- A rock pile or rock-filled gabions can serve as alternatives to the debris screen, although the designer should be aware of the potential for extra maintenance involved should the pore spaces in the rock pile clog.
- The outlet structure should be placed on a firm, smooth foundation with the base securely anchored with concrete or other means to prevent floatation.
- Attach riser pipe (watertight connection) to a horizontal pipe (barrel). Provide anti-seep collars on the barrel.
- Cleanout level should be clearly marked on the riser pipe.

Installation

- Securely anchor and install an anti-seep collar on the outlet pipe/riser and provide an emergency spillway for passing major floods (see local flood control agency).
- Areas under embankments must be cleared and stripped of vegetation.
- Chain link fencing should be provided around each sediment basin to prevent unauthorized entry to the basin or if safety is a concern.

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Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level and as required by local requirements. It is recommended that at a minimum, basins be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Examine basin banks for seepage and structural soundness.
- Check inlet and outlet structures and spillway for any damage or obstructions. Repair damage and remove obstructions as needed.
- Check inlet and outlet area for erosion and stabilize if required.
- Check fencing for damage and repair as needed.
- Sediment that accumulates in the basin must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-half the designated sediment storage volume. Sediment removed during maintenance should be managed properly. The sediment should be appropriately evaluated and used or disposed of accordingly. Options include: incorporating sediment into earthwork on the site (only if there is no risk that sediment is contaminated); or off-site export/disposal at an appropriate location (e.g., sediment characterization and disposal to an appropriate landfill).
- Remove standing water from basin within 96 hours after accumulation.
- If the basin does not drain adequately (e.g., due to storms that are more frequent or larger than the design storm or other unforeseen site conditions), dewatering should be conducted in accordance with appropriate dewatering BMPs (see NS-2) and in accordance with local permits as applicable.
- To minimize vector production:
  - Remove accumulation of live and dead floating vegetation in basins during every inspection.
  - Remove excessive emergent and perimeter vegetation as needed or as advised by local or state vector control agencies.

FOR BIDDING PURPOSES ONLY

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

A Current Assessment of Urban Best Management Practices: Techniques for Reducing Nonpoint Source Pollution in the Coastal Zones, Metropolitan Washington Council of Governments, March 1992.

Draft-Sedimentation and Erosion Control, an Inventory of Current Practices, USEPA. April 1990.

U.S. Environmental Protection Agency (USEPA). Erosion and Sediment Control, Surface Mining in the Eastern U.S., U.S. Environmental Protection Agency, Office of Water, Washington, D.C., 1976.

Fifield, J.S. Designing for Effective Sediment and Erosion Control on Construction Sites. Forester Press, Santa Barbara, CA. 2004.

Goldman S.J., Jackson K. and Bursztynsky T.A. Erosion and Sediment Control Handbook. McGraw-Hill Book Company, 1986.

U.S. Environmental Protection Agency (USEPA). Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters. EPA 840-B-9-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC, 1993.

Guidelines for the Design and Construction of Small Embankment Dams, Division of Safety of Dams, California Department of Water Resources, March 1986.

Haan C.T., Barfield B.J. and Hayes J.C. Design Hydrology and Sedimentology for Small Catchments. Academic Press. 1994.

Inlet/Outlet Alternatives for Extended Detention Basins. State of California Department of Transportation (Caltrans), 2001.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

McLean, J., 2000. Mosquitoes in Constructed Wetlands: A Management Bugaboo? In T.R. Schueler and H.K. Holland [eds.], The Practice of Watershed Protection. pp. 29-33. Center for Watershed Protection, Ellicott City, MD, 2000.

Metzger, M.E., D. F. Messer, C. L. Beitia, C. M. Myers, and V. L. Kramer. The Dark Side of Stormwater Runoff Management: Disease Vectors Associated with Structural BMPs, 2002.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Water, Work Group-Working Paper, USEPA, April 1992.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for the Lake Tahoe Region, Volume II Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Young, G.K. and Graziano, F., Outlet Hydraulics of Extended Detention Facilities for Northern Virginia Planning District Commission, 1989.

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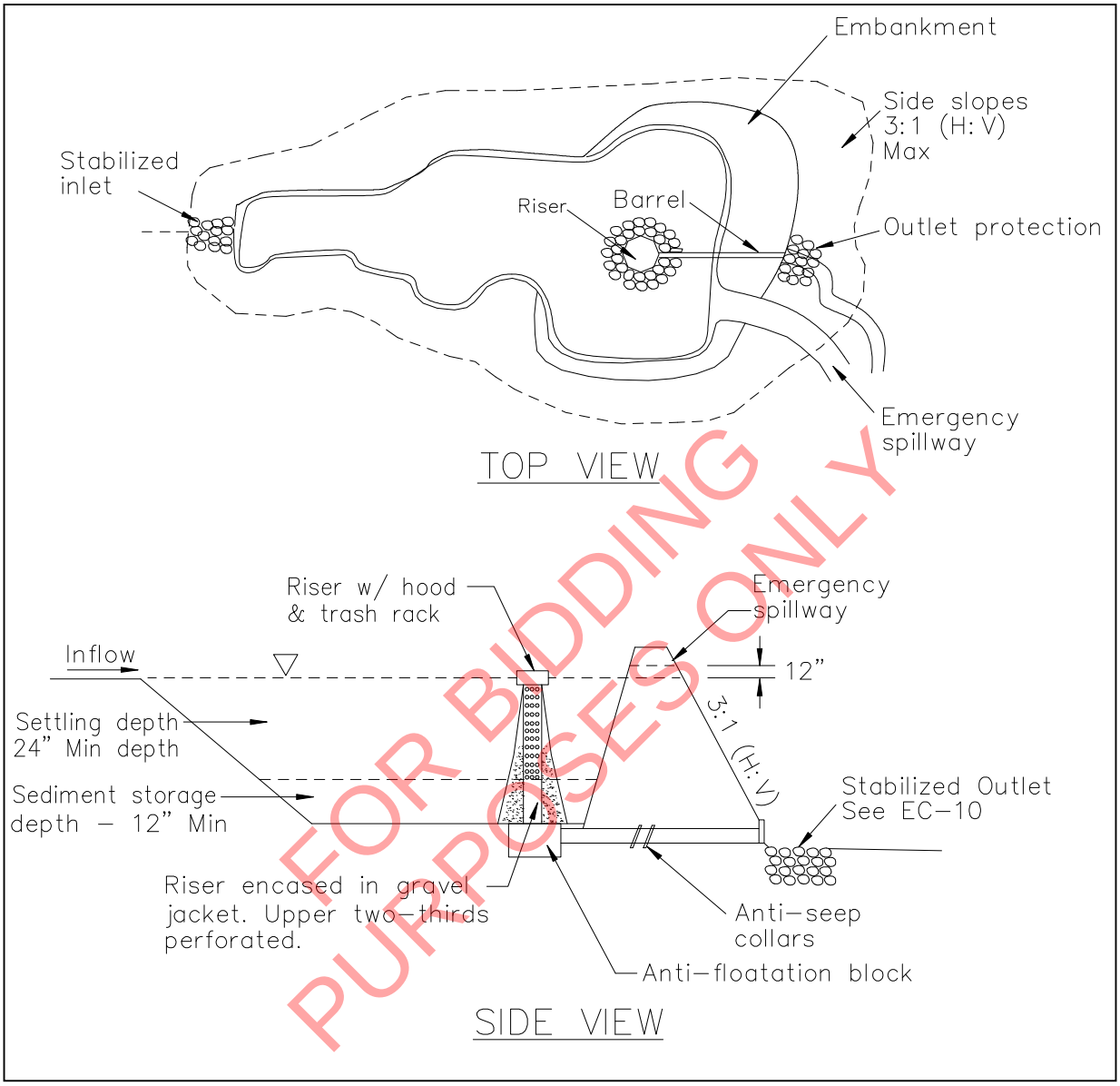

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FIGURE 1: TYPICAL TEMPORARY SEDIMENT BASIN
MULTIPLE ORIFICE DESIGN
NOT TO SCALE

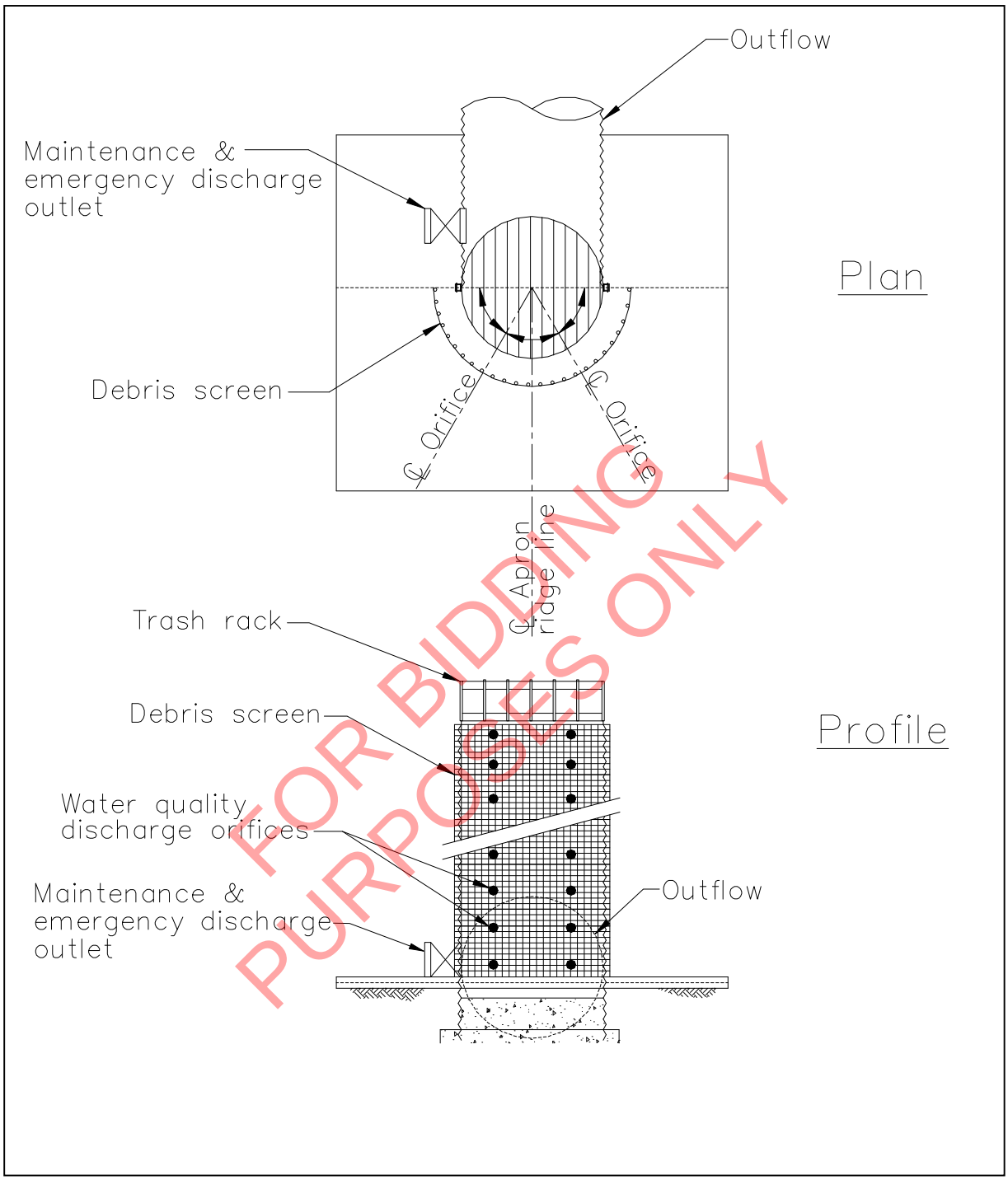

FIGURE 2: MULTIPLE ORIFICE OUTLET RISER
NOT TO SCALE

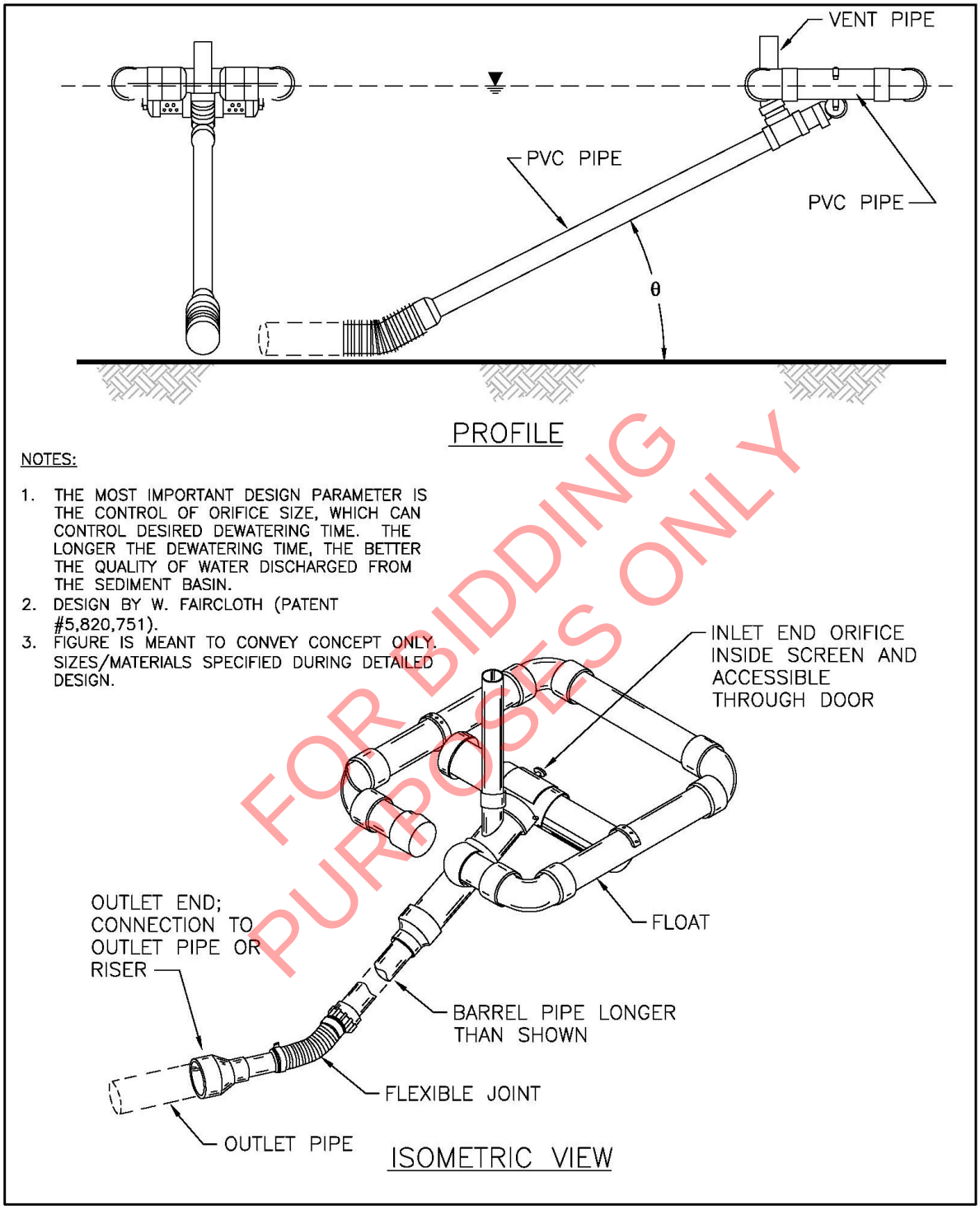

FIGURE 3: TYPICAL SKIMMER
NOT TO SCALE

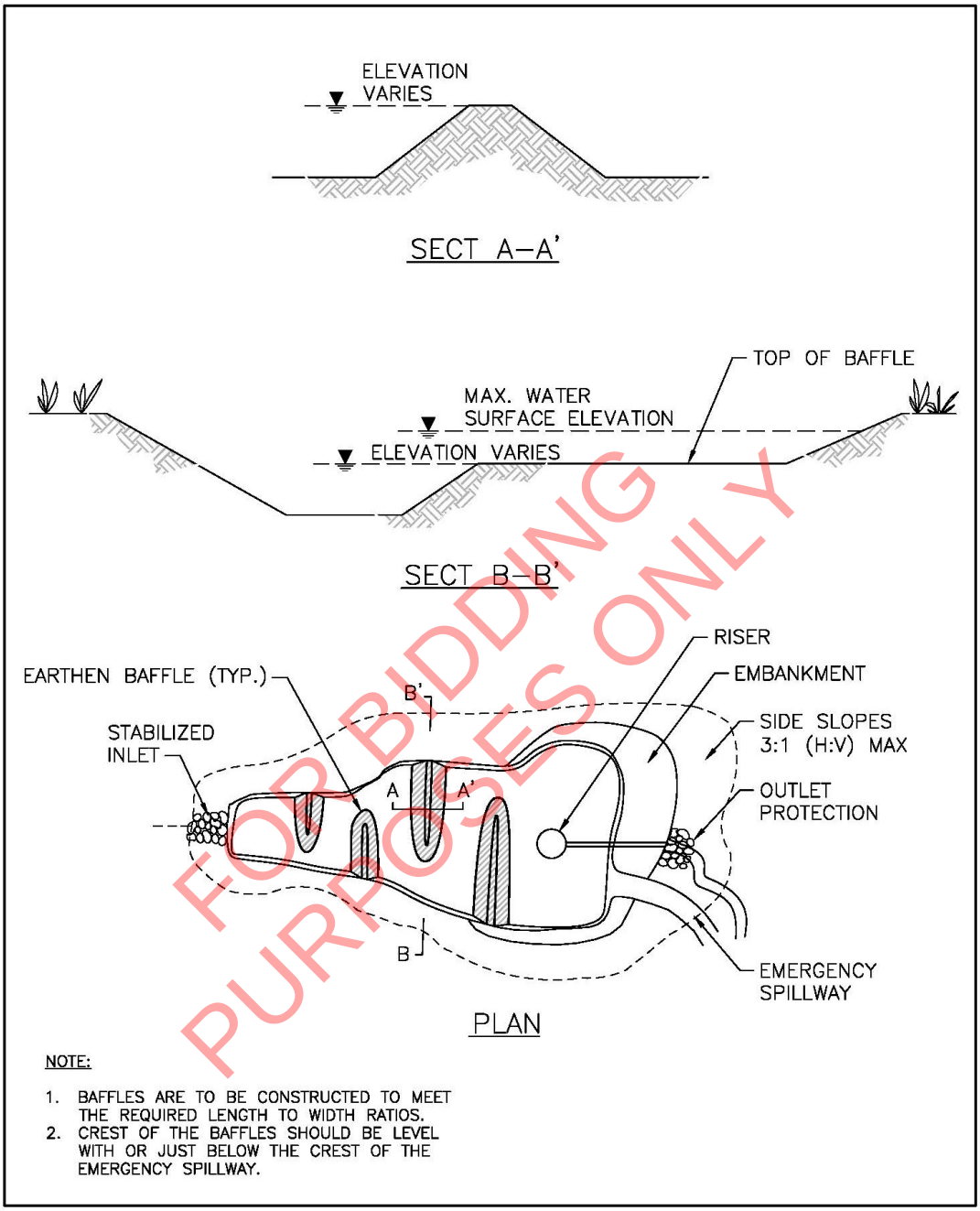

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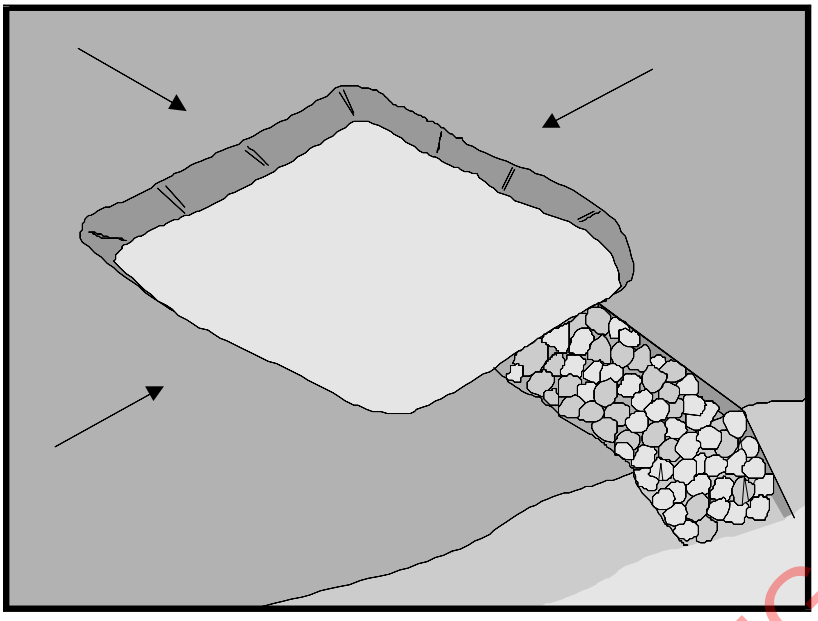
FIGURE 4: TYPICAL TEMPORARY SEDIMENT BASIN WITH BAFFLES
NOT TO SCALE

Sediment Trap SE-3



Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-2 Sediment Basin (for larger areas)

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Description and Purpose

A sediment trap is a containment area where sediment-laden runoff is temporarily detained under quiescent conditions, allowing sediment to settle out or before the runoff is discharged by gravity flow. Sediment traps are formed by excavating or constructing an earthen embankment across a waterway or low drainage area.

Trap design guidance provided in this fact sheet is not intended to guarantee compliance with numeric discharge limits (numeric action levels or numeric effluent limits for turbidity). Compliance with discharge limits requires a thoughtful approach to comprehensive BMP planning, implementation, and maintenance. Therefore, optimally designed and maintained sediment traps should be used in conjunction with a comprehensive system of BMPs.

Suitable Applications

Sediment traps should be considered for use:

- At the perimeter of the site at locations where sediment-laden runoff is discharged offsite.
- At multiple locations within the project site where sediment control is needed.
- Around or upslope from storm drain inlet protection measures.

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- Sediment traps may be used on construction projects where the drainage area is less than 5 acres. Traps would be placed where sediment-laden stormwater may enter a storm drain or watercourse. SE-2, Sediment Basins, must be used for drainage areas greater than 5 acres.
- As a supplemental control, sediment traps provide additional protection for a water body or for reducing sediment before it enters a drainage system.

Limitations

- Requires large surface areas to permit infiltration and settling of sediment.
- Not appropriate for drainage areas greater than 5 acres.
- Only removes large and medium sized particles and requires upstream erosion control.
- Attractive and dangerous to children, requiring protective fencing.
- Conducive to vector production.
- Should not be located in live streams.

Implementation

Design

A sediment trap is a small temporary ponding area, usually with a gravel outlet, formed by excavation or by construction of an earthen embankment. Its purpose is to collect and store sediment from sites cleared or graded during construction. It is intended for use on small drainage areas with no unusual drainage features and projected for a quick build-out time. It should help in removing coarse sediment from runoff. The trap is a temporary measure with a design life of approximately six months to one year and is to be maintained until the site area is permanently protected against erosion by vegetation and/or structures.

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Sediment traps should be used only for small drainage areas. If the contributing drainage area is greater than 5 acres, refer to SE-2, Sediment Basins, or subdivide the catchment area into smaller drainage basins.

Sediment usually must be removed from the trap after each rainfall event. The SWPPP should detail how this sediment is to be disposed, such as in fill areas onsite, or removal to an approved offsite dump. Sediment traps used as perimeter controls should be installed before any land disturbance takes place in the drainage area.

Sediment traps are usually small enough that a failure of the structure would not result in a loss of life, damage to home or buildings, or interruption in the use of public roads or utilities. However, sediment traps are attractive to children and can be dangerous. The following recommendations should be implemented to reduce risks:

- Install continuous fencing around the sediment trap or pond. Consult local ordinances regarding requirements for maintaining health and safety.
- Restrict basin side slopes to 3:1 or flatter.

Sediment trap size depends on the type of soil, size of the drainage area, and desired sediment removal efficiency (see SE-2, Sediment Basin). As a rule of thumb, the larger the basin volume the greater the sediment removal efficiency. Sizing criteria are typically established under the local grading ordinance or equivalent. The runoff volume from a 2-year storm is a common design criterion for a sediment trap. The sizing criteria below assume that this runoff volume is 0.042 acre-ft/acre (0.5 in. of runoff). While the climatic, topographic, and soil type extremes make it difficult to establish a statewide standard, the following criteria should trap moderate to high amounts of sediment in most areas of California:

- Locate sediment traps as near as practical to areas producing the sediment.
- Trap should be situated according to the following criteria: (1) by excavating a suitable area or where a low embankment can be constructed across a swale, (2) where failure would not cause loss of life or property damage, and (3) to provide access for maintenance, including sediment removal and sediment stockpiling in a protected area.
- Trap should be sized to accommodate a settling zone and sediment storage zone with recommended minimum volumes of 67 yd^3/acre and 33 yd^3/acre of contributing drainage area, respectively, based on 0.5 in. of runoff volume over a 24-hour period. In many cases, the size of an individual trap is limited by available space. Multiple traps or additional volume may be required to accommodate specific rainfall, soil, and site conditions.
- Traps with an impounding levee greater than 4.5 ft tall, measured from the lowest point to the impounding area to the highest point of the levee, and traps capable of impounding more than 35,000 ft^3, should be designed by a Registered Civil Engineer. The design should include maintenance requirements, including sediment and vegetation removal, to ensure continuous function of the trap outlet and bypass structures.
- The outlet pipe or open spillway must be designed to convey anticipated peak flows.
- Use rock or vegetation to protect the trap outlets against erosion.
- Fencing should be provided to prevent unauthorized entry.

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Installation

Sediment traps can be constructed by excavating a depression in the ground or creating an impoundment with a small embankment. Sediment traps should be installed outside the area being graded and should be built prior to the start of the grading activities or removal of vegetation. To minimize the area disturbed by them, sediment traps should be installed in natural depressions or in small swales or drainage ways. The following steps must be followed during installation:

- The area under the embankment must be cleared, grubbed, and stripped of any vegetation and root mat. The pool area should be cleared.
- The fill material for the embankment must be free of roots or other woody vegetation as well as oversized stones, rocks, organic material, or other objectionable material. The embankment may be compacted by traversing with equipment while it is being constructed.
- All cut-and-fill slopes should be 3:1 or flatter.

- When a riser is used, all pipe joints must be watertight.
- When a riser is used, at least the top two-thirds of the riser should be perforated with 0.5 in. diameter holes spaced 8 in. vertically and 10 to 12 in. horizontally. See SE-2, Sediment Basin.
- When an earth or stone outlet is used, the outlet crest elevation should be at least 1 ft below the top of the embankment.
- When crushed stone outlet is used, the crushed stone used in the outlet should meet AASHTO M43, size No. 2 or 24, or its equivalent such as MSHA No. 2. Gravel meeting the above gradation may be used if crushed stone is not available.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect outlet area for erosion and stabilize if required.
- Inspect trap banks for seepage and structural soundness, repair as needed.
- Inspect outlet structure and spillway for any damage or obstructions. Repair damage and remove obstructions as needed.
- Inspect fencing for damage and repair as needed.
- Inspect the sediment trap for area of standing water during every visit. Corrective measures should be taken if the BMP does not dewater completely in 96 hours or less to prevent vector production.
- Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the trap capacity. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed of at an appropriate location.
- Remove vegetation from the sediment trap when first detected to prevent pools of standing water and subsequent vector production.
- BMPs that require dewatering shall be continuously attended while dewatering takes place. Dewatering BMPs per NS-2 shall be implemented at all times during dewatering activities.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Brown, W., and T. Schueler. The Economics of Stormwater BMPs in the Mid-Atlantic Region. Prepared for Chesapeake Research Consortium, Edgewater, MD, by the Center for Watershed Protection, Ellicott City, MD, 1997.

FOR BIDDING PURPOSES ONLY

Draft – Sedimentation and Erosion Control, an Inventory of Current Practices, USEPA, April 1990.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Metzger, M.E., D.F. Messer, C.L. Beitia, C.M. Myers, and V.L. Kramer, The Dark Side of Stormwater Runoff Management: Disease Vectors Associated with Structural BMPs, 2002.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group-Working Paper, USEPA, April 1992.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

U.S. Environmental Protection Agency (USEPA). Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters. EPA 840-B-9-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC, 1993.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

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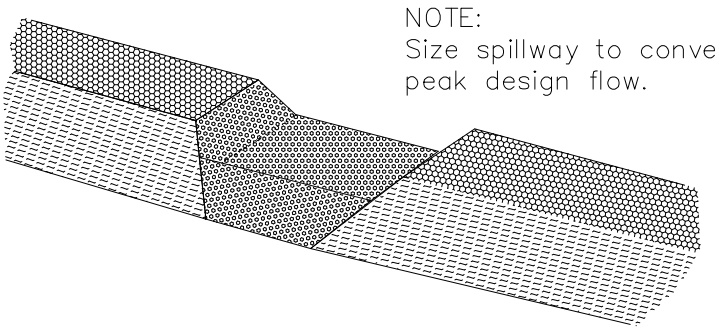
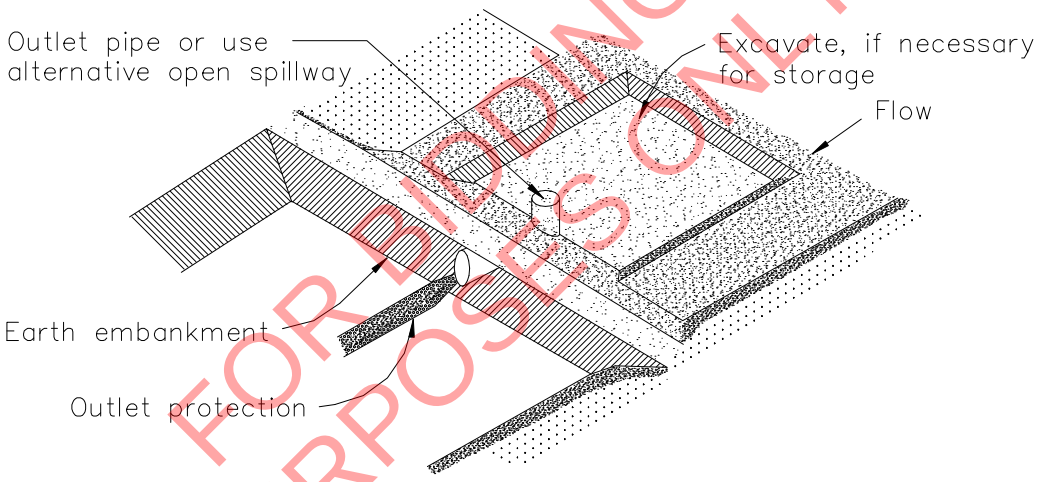
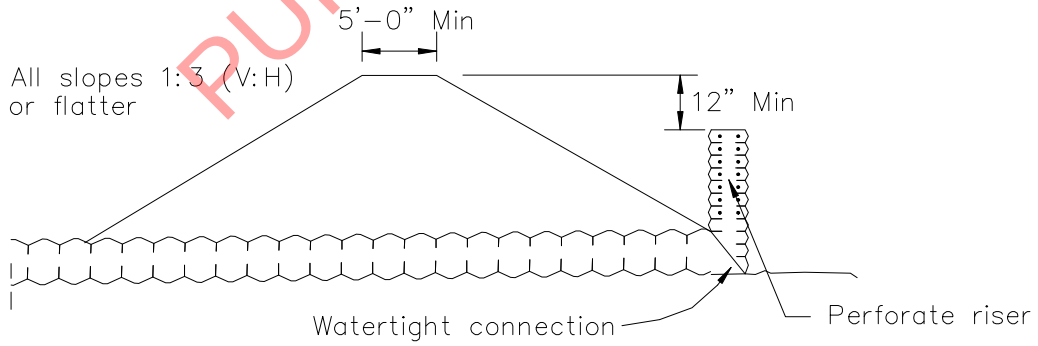


TYPICAL OPEN SPILLWAY





EMBANKMENT SECTION THRU RISER

TYPICAL SEDIMENT TRAP
NOT TO SCALE

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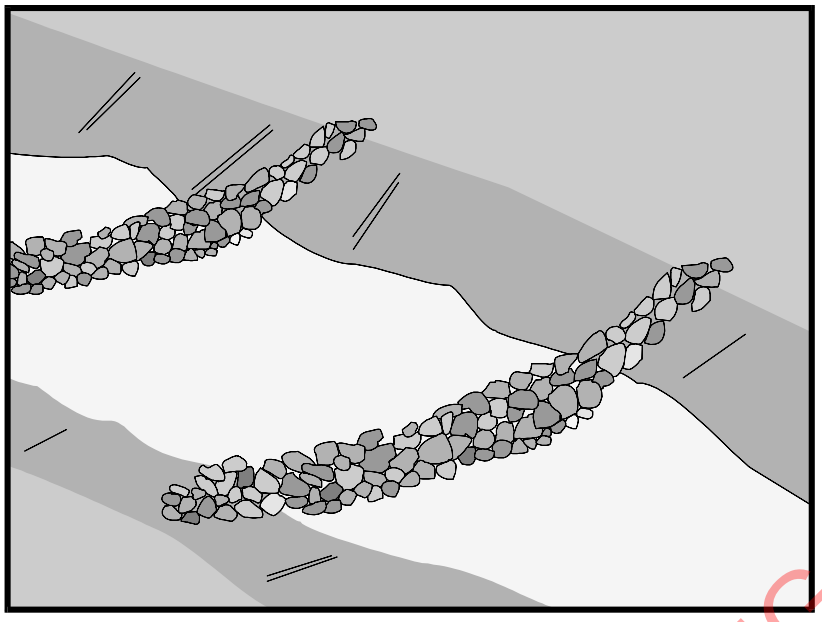
Check Dams SE-4



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- SE-5 Fiber Rolls
- SE-6 Gravel Bag Berm
- SE-8 Sandbag Barrier
- SE-12 Manufactured Linear Sediment Controls
- SE-14 Biofilter Bags

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Description and Purpose

A check dam is a small barrier constructed of rock, gravel bags, sandbags, fiber rolls, or other proprietary products, placed across a constructed swale or drainage ditch. Check dams reduce the effective slope of the channel, thereby reducing scour and channel erosion by reducing flow velocity and increasing residence time within the channel, allowing sediment to settle.

Suitable Applications

Check dams may be appropriate in the following situations:

- To promote sedimentation behind the dam.
- To prevent erosion by reducing the velocity of channel flow in small intermittent channels and temporary swales.
- In small open channels that drain 10 acres or less.
- In steep channels where stormwater runoff velocities exceed 5 ft/s.
- During the establishment of grass linings in drainage ditches or channels.
- In temporary ditches where the short length of service does not warrant establishment of erosion-resistant linings.
- To act as a grade control structure.

Limitations

- Not to be used in live streams or in channels with extended base flows.
- Not appropriate in channels that drain areas greater than 10 acres.
- Not appropriate in channels that are already grass-lined unless erosion potential or sediment-laden flow is expected, as installation may damage vegetation.
- Require extensive maintenance following high velocity flows.
- Promotes sediment trapping which can be re-suspended during subsequent storms or removal of the check dam.
- Do not construct check dams with straw bales or silt fence.
- Water suitable for mosquito production may stand behind check dams, particularly if subjected to daily non-stormwater discharges.

Implementation

General

Check dams reduce the effective slope and create small pools in swales and ditches that drain 10 acres or less. Using check dams to reduce channel slope reduces the velocity of stormwater flows, thus reducing erosion of the swale or ditch and promoting sedimentation. Thus, check dams are dual-purpose and serve an important role as erosion controls as well as sediment controls. Note that use of 1-2 isolated check dams for sedimentation will likely result in little net removal of sediment because of the small detention time and probable scour during longer storms. Using a series of check dams will generally increase their effectiveness. A sediment trap (SE-3) may be placed immediately upstream of the check dam to increase sediment removal efficiency.

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Design and Layout

Check dams work by decreasing the effective slope in ditches and swales. An important consequence of the reduced slope is a reduction in capacity of the ditch or swale. This reduction in capacity should be considered when using this BMP, as reduced capacity can result in overtopping of the ditch or swale and resultant consequences. In some cases, such as a "permanent" ditch or swale being constructed early and used as a "temporary" conveyance for construction flows, the ditch or swale may have sufficient capacity such that the temporary reduction in capacity due to check dams is acceptable. When check dams reduce capacities beyond acceptable limits, either:

- Don't use check dams. Consider alternative BMPs, or.
- Increase the size of the ditch or swale to restore capacity.

Maximum slope and velocity reduction is achieved when the toe of the upstream dam is at the same elevation as the top of the downstream dam (see "Spacing Between Check Dams" detail at the end of this fact sheet). The center section of the dam should be lower than the edge sections (at least 6 inches), acting as a spillway, so that the check dam will direct flows to the center of

the ditch or swale (see "Typical Rock Check Dam" detail at the end of this fact sheet). Bypass or side-cutting can occur if a sufficient spillway is not provided in the center of the dam.

Check dams are usually constructed of rock, gravel bags, sandbags, and fiber rolls. A number of products can also be used as check dams (e.g. HDPE check dams, temporary silt dikes (SE-12)), and some of these products can be removed and reused. Check dams can also be constructed of logs or lumber and have the advantage of a longer lifespan when compared to gravel bags, sandbags, and fiber rolls. Check dams should not be constructed from straw bales or silt fences, since concentrated flows quickly wash out these materials.

Rock check dams are usually constructed of 8 to 12 in. rock. The rock is placed either by hand or mechanically, but never just dumped into the channel. The dam should completely span the ditch or swale to prevent washout. The rock used should be large enough to stay in place given the expected design flow through the channel. It is recommended that abutments be extended 18 in. into the channel bank. Rock can be graded such that smaller diameter rock (e.g. 2-4 in) is located on the upstream side of larger rock (holding the smaller rock in place); increasing residence time.

Log check dams are usually constructed of 4 to 6 in. diameter logs, installed vertically. The logs should be embedded into the soil at least 18 in. Logs can be bolted or wired to vertical support logs that have been driven or buried into the soil.

See fiber rolls, SE-5, for installation of fiber roll check dams.

Gravel bag and sand bag check dams are constructed by stacking bags across the ditch or swale, shaped as shown in the drawings at the end of this fact sheet (see "Gravel Bag Check Dam" detail at the end of this fact sheet).

Manufactured products, such as temporary silt dikes (SE-12), should be installed in accordance with the manufacturer's instructions. Installation typically requires anchoring or trenching of products, as well as regular maintenance to remove accumulated sediment and debris.

If grass is planted to stabilize the ditch or swale, the check dam should be removed when the grass has matured (unless the slope of the swales is greater than 4%).

The following guidance should be followed for the design and layout of check dams:

- Install the first check dam approximately 16 ft from the outfall device and at regular intervals based on slope gradient and soil type.
- Check dams should be placed at a distance and height to allow small pools to form between each check dam.
- For multiple check dam installation, backwater from a downstream check dam should reach the toes of the upstream check dam.
- A sediment trap provided immediately upstream of the check dam will help capture sediment. Due to the potential for this sediment to be resuspended in subsequent storms, the sediment trap should be cleaned following each storm event.

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- High flows (typically a 2-year storm or larger) should safely flow over the check dam without an increase in upstream flooding or damage to the check dam.
- Where grass is used to line ditches, check dams should be removed when grass has matured sufficiently to protect the ditch or swale.

Materials

- Rock used for check dams should typically be 8-12 in rock and be sufficiently sized to stay in place given expected design flows in the channel. Smaller diameter rock (e.g. 2 to 4 in) can be placed on the upstream side of larger rock to increase residence time.
- Gravel bags used for check dams should conform to the requirements of SE-6, Gravel Bag Berms.
- Sandbags used for check dams should conform to SE-8, Sandbag Barrier.
- Fiber rolls used for check dams should conform to SE-5, Fiber Rolls.
- Temporary silt dikes used for check dams should conform to SE-12, Temporary Silt Dikes.

Installation

- Rock should be placed individually by hand or by mechanical methods (no dumping of rock) to achieve complete ditch or swale coverage.
- Tightly abut bags and stack according to detail shown in the figure at the end of this section (pyramid approach). Gravel bags and sandbags should not be stacked any higher than 3 ft.
- Upper rows or gravel and sand bags shall overlap joints in lower rows.
- Fiber rolls should be trenched in, backfilled, and firmly staked in place.
- Install along a level contour.
- HDPE check dams, temporary silt dikes, and other manufactured products should be used and installed per manufacturer specifications.

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Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Replace missing rock, bags, rolls, etc. Replace bags or rolls that have degraded or have become damaged.
- If the check dam is used as a sediment capture device, sediment that accumulates behind the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.

- If the check dam is used as a grade control structure, sediment removal is not required as long as the system continues to control the grade.
- Inspect areas behind check dams for pools of standing water, especially if subjected to daily non-stormwater discharges.
- Remove accumulated sediment prior to permanent seeding or soil stabilization.
- Remove check dam and accumulated sediment when check dams are no longer needed.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Draft – Sedimentation and Erosion Control, and Inventory of Current Practices, USEPA, April 1990.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Metzger, M.E. 2004. Managing mosquitoes in stormwater treatment devices. University of California Division of Agriculture and Natural Resources, Publication 8125. On-line: http://anrcatalog.ucdavis.edu/pdf/8125.pdf

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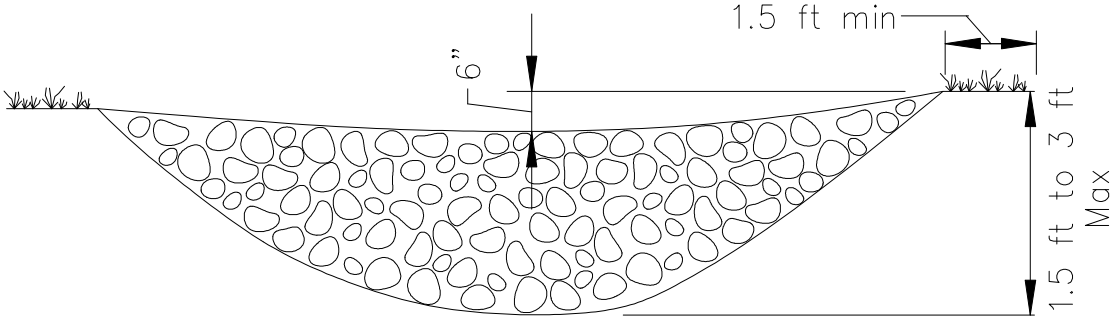
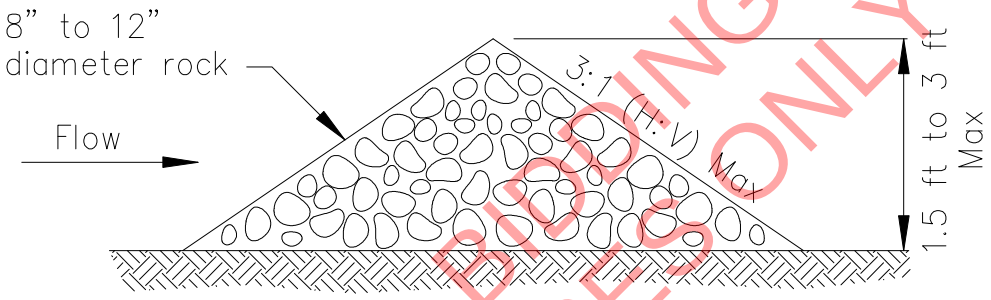


ELEVATION



TYPICAL ROCK CHECK DAM SECTION

ROCK CHECK DAM
NOT TO SCALE

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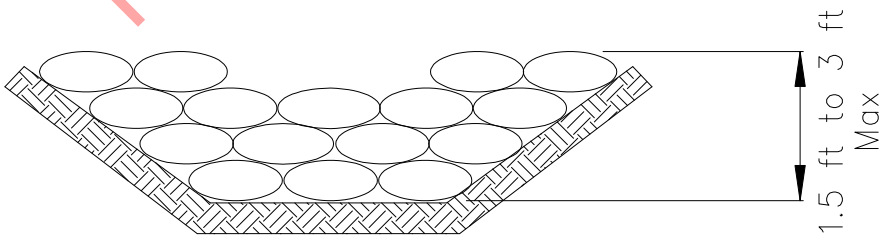
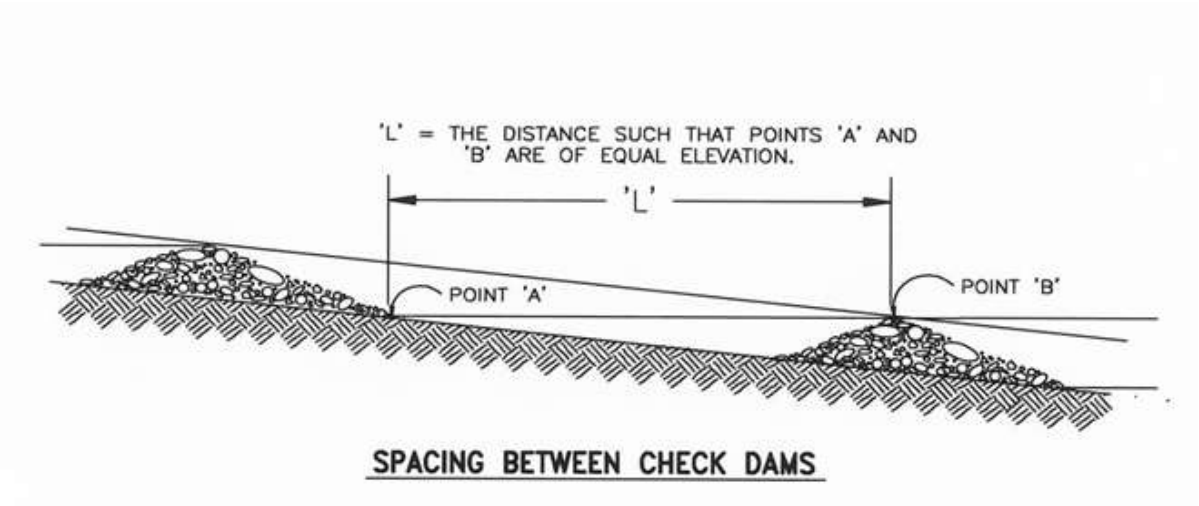


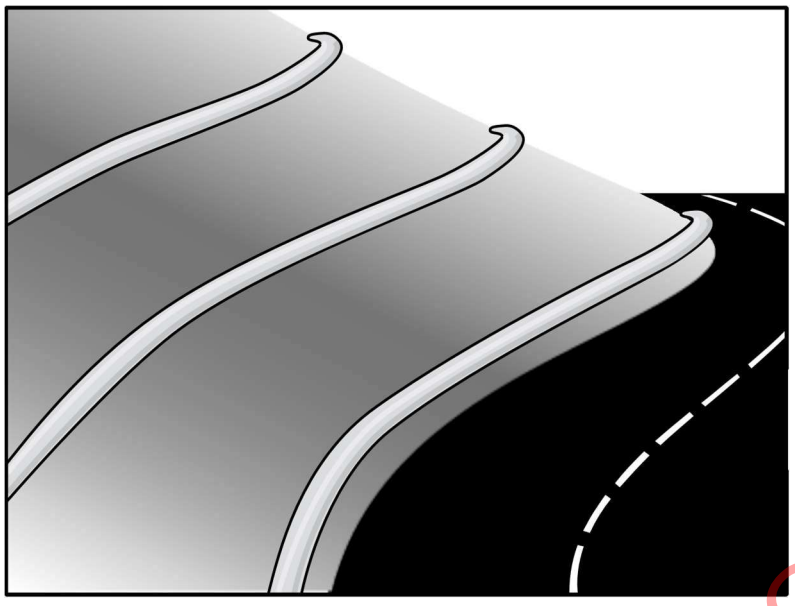
GRAVEL BAG CHECK DAM ELEVATION
NOT TO SCALE



SPACING BETWEEN CHECK DAMS

FOR BIDDING PURPOSES ONLY

Fiber Rolls SE-5



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- SE-1 Silt Fence
- SE-6 Gravel Bag Berm
- SE-8 Sandbag Barrier
- SE-12 Manufactured Linear Sediment Controls
- SE-13 Compost Socks and Berms
- SE-14 Biofilter Bags

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Description and Purpose

A fiber roll (also known as a wattle or log) consists of straw, coir, curled wood fiber, or other biodegradable materials bound into a tight tubular roll wrapped by netting. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight, when staking the rolls are not feasible (such as use as inlet protection).

When fiber rolls are placed at the top, toe, and on the face of slopes along the contours, fiber rolls intercept runoff, reduce flow velocity, release runoff as sheet flow, and provide sediment removal from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

Suitable Applications

Fiber rolls may be suitable:

- Along the top, toe, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- At the end of a downward slope where it transitions to a steeper slope.
- Along the perimeter of a project.
- As check dams in unlined ditches with minimal grade.
- Down-slope of exposed soil areas.

- At operational storm drains as a form of inlet protection.
- Around temporary stockpiles.

Limitations

- Fiber rolls are to be used in conjunction with erosion control, such as hydroseed, mulch, rolled erosion control products (RECPs), etc.
- Only biodegradable fiber rolls containing no plastic can remain on a site when applying for a Notice of Termination (NOT) due to plastic pollution and wildlife concerns. There may be further limitations on the use of plastic wrapped fiber rolls in wildlife sensitive areas. Fiber rolls containing plastic must be removed and disposed of prior to final stabilization.
- Do not install fiber rolls in high traffic areas where vehicles and equipment will displace or damage them.
- Do not use fiber rolls on paved surfaces where they cannot be staked and trenched in. Only gravel core rolls may be effective in this situation. See Gravel Bags (SE-6), Manufactured Linear Sediment Controls (SE-12), Compost Socks and Berms (SE-13), and Biofilter Bags (SE-14) for situations where staking or trenching is not possible.
- Do not use fiber rolls on slopes subject to creep, slumping, or landslides.
- Improper installation of a fiber roll such as not being trenched in, not staked appropriately, or not sufficiently overlapping at the ends, may cause undercutting and increased erosion.
- Fiber rolls installed by the Type 1 method are not effective unless trenched in and staked. If not properly staked and trenched in, fiber rolls will not work as intended and could be transported by high flows.
- Fiber rolls installed by the Type 2 method are not effective unless staked. If not properly staked in, fiber rolls will not work as intended and could be transported by high flows.
- Not intended for use in concentrated flows.
- Not intended to contain stormwater. See Sediment Basin (SE-2) or Sediment Trap (SE-3) for stormwater containment BMPs.
- Difficult to move once saturated.
- Difficult to repair when a small section of the fiber roll is damaged. Replacement of the entire fiber roll or installation of an additional fiber roll adjacent to the damage is often required.
- Fiber rolls are susceptible to damage from wildlife.
- Fiber rolls have a limited sediment capture zone.
- Fiber rolls typically function for 12-24 months, depending upon local conditions, roll material, and installation method. For example, the Type 2 installation method may last longer than the Type 1 installation method because the fiber roll is not penetrated.

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- Fiber rolls that come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll, are considered passive treatment technologies and are subject to additional requirements, see Passive Treatment (SE-15).

Implementation

Fiber Roll Materials

- Fiber rolls are to be prefabricated.
- Fiber rolls are made from weed-free rice straw, flax, curled wood fiber, or coir bound into a tight tubular roll by netting or wrap (see Limitations above regarding plastic netting).
- Typical fiber rolls vary in diameter from 6 in. to 20 in. Larger diameter rolls are available as well. The larger the roll diameter, the higher the sediment retention capacity.
- Typical fiber rolls lengths are 4, 10, 20 and 25 ft., although other lengths may be available.

Installation

- Locate fiber rolls on level contours spaced as follows:
  - Slope inclination between 20:1 and 4:1 -20 (H:V): Place fibers rolls at a maximum interval of 35 ft.
  - Slope inclination of 4:1 (H:V): Place fiber rolls at a maximum interval of 20 ft.
  - Slope inclination between 4:1 and 2:1 (H:V): Place fiber rolls at a maximum interval of 15 ft. (a closer spacing is more effective).
  - Slope inclination 2:1 (H:V) or greater: Place fiber rolls at a maximum interval of 10 ft. (a closer spacing is more effective).
- It is critical that fiber rolls are installed perpendicular to water flow and parallel to the slope contour.
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth is to be ¼ to 1/3 of the thickness of the roll, and the width is to be equal to the roll diameter, in order to provide area to backfill the trench.
- Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- For Type 1 installations:
  - Place in a trench that is from 2 to 4 inches deep.
  - Fasten with wood stakes every 4 feet along the length of the fiber roll.
  - Fasten the ends of the fiber roll by placing a stake 6 inches from the end of the roll.

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- Drive the stakes into the soil so the top of the stake is less than 2 inches above the top of the fiber roll.

- For Type 2 installations (Caltrans, 2024):
  - Trenching in the fiber rolls is optional.
  - J-hook the ends of the fiber roll up-slope to prevent runoff from going around the fiber roll.
  - Drive stakes along alternating sides of each fiber roll, spaced 2 ft. apart. Stakes are to alternate between upslope and downslope of the fiber roll.
  - Lace the rope tightly around the stakes and over the fiber roll. Knot the rope at each stake.
  - Tighten the fiber roll to the surface of the slope by driving the stakes further into the soil.
- If more than one fiber roll is placed in a row, the rolls should overlap, not abut at the ends. Stagger overlapping joints in adjacent rows by 5 to 10 feet.
- See typical fiber roll installation details at the end of this fact sheet.

Removal

- Fiber rolls can be left in place or be removed depending on the type of fiber roll and its application (temporary vs. permanent installation).
- For temporary installations, only remove fiber rolls when upgradient areas are stabilized per General Permit requirements, and/or pollutant sources are no longer present. Remove fiber rolls before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.
- For permanent installations for final stabilization, fiber rolls encased with plastic netting or containing any plastic material are to be removed from the site. If a fiber roll is to be left in place as part of a final stabilization design, the fiber roll must be non-plastic, made of plant-based materials (e.g., burlap-wrapped, coconut jute netting, and any other plant-based netting), and fully biodegradable.
- Fiber rolls can be an effective component of a final stabilization system, if all components of the fiber rolls are plant-based, fully biodegradable, and the fiber rolls are coupled with fully biodegradable effective erosion control measures (hydroseeding, RECPs, etc.) properly applied/installed per manufacturer's specifications and/or per the current CASQA BMP Fact Sheets. Removal of fiber rolls that are used as part of a final stabilization system can result in greater disturbance; therefore, during the BMP planning phase, only specify fiber rolls wrapped in non-plastic fully biodegradable materials for areas where fiber rolls will be used on final slopes.

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Inspection and Maintenance

- BMPs are to be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that BMPs be inspected weekly at a minimum and prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair/replace split, torn, unraveling, or slumping fiber rolls as needed.
- Replace fiber rolls when they are disintegrated, flattened, and no longer effective.
- If construction activities or access to a work area are impaired by a fiber roll, move the fiber roll to avoid its damage or disintegration. Reinstall the fiber roll once active work is complete.
- If a fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, periodically remove sediment that accumulates upgradient of the fiber roll to maintain BMP effectiveness. Remove sediment when sediment accumulation reaches one-third of the height of the fiber roll.
- If fiber rolls are used for erosion control, such as in a check dam, sediment removal may not be required as long as the system continues to control the grade. Sediment control BMPs will be implemented in conjunction with this type of application.
- Repair any undercutting, rills, and gullies promptly.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425-11.1, Section 4, Fiber Rolls SC-5, California Department of Transportation (Caltrans), March 2024.

Construction Stormwater Program website, State Water Resources Control Board, online at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.html

Order 2022-0057-DWQ, NPDES General Permit No. CAS000002: National Pollutant Discharge Elimination System (NDPES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit), California State Water Resources Control Board (State Water Board), September 2022.

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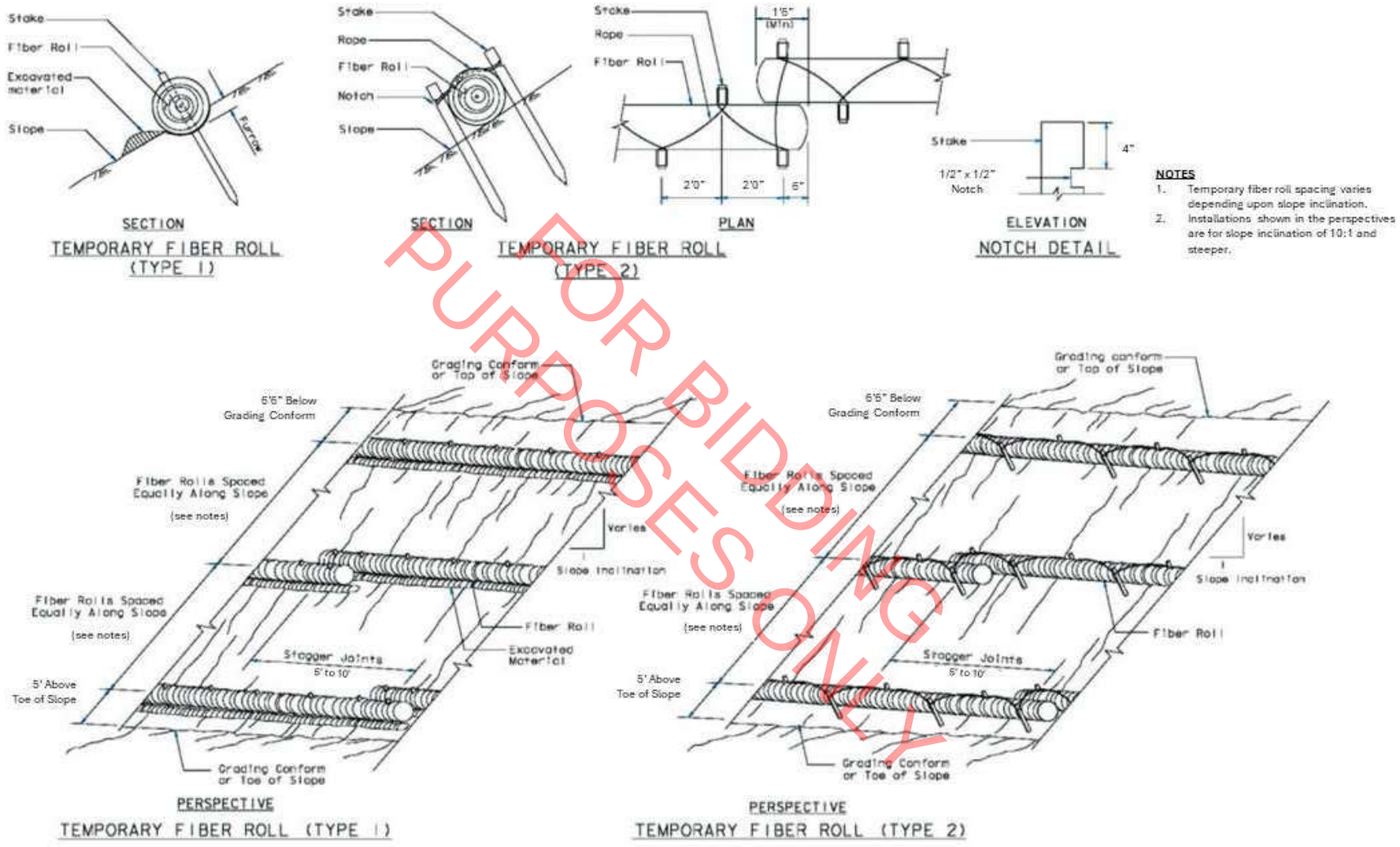
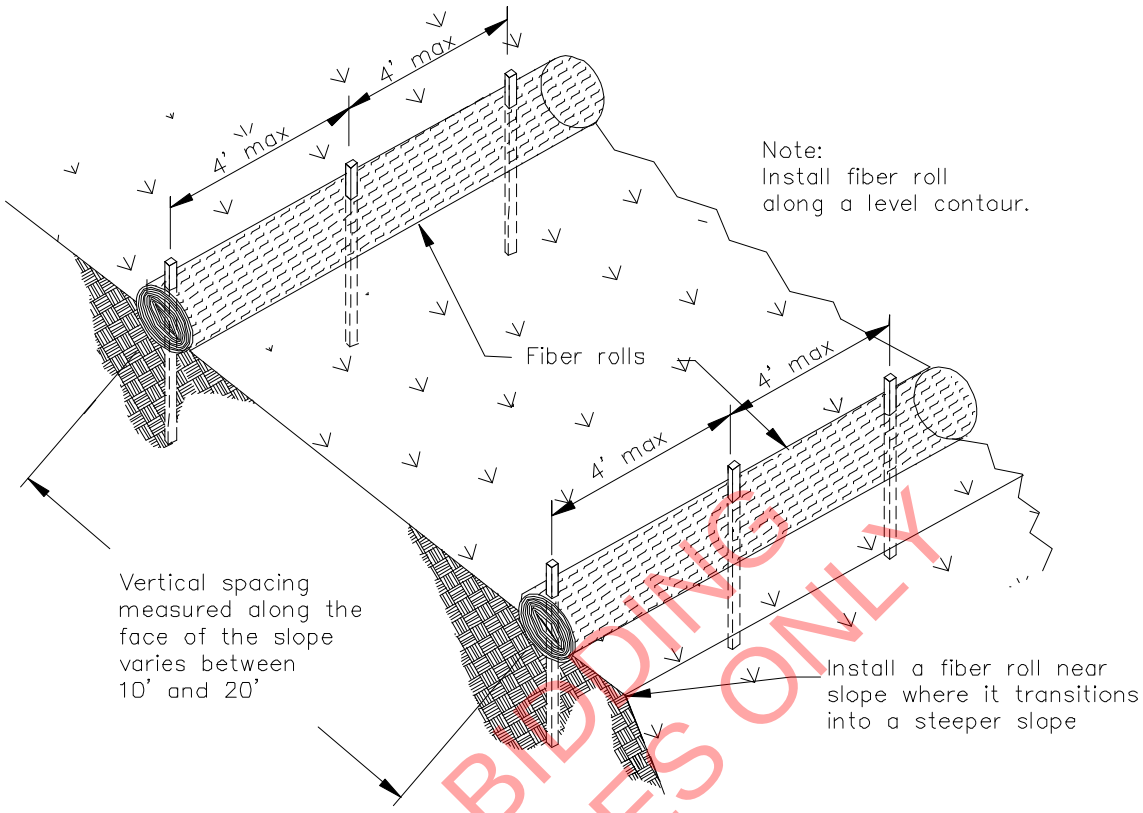


FOR BIDDING PURPOSES ONLY

Reference: Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425-11.1, Section 4, Fiber Rolls SC-5, California Department of Transportation (Caltrans), March 2024.



TYPICAL FIBER ROLL INSTALLATION
N.T.S.

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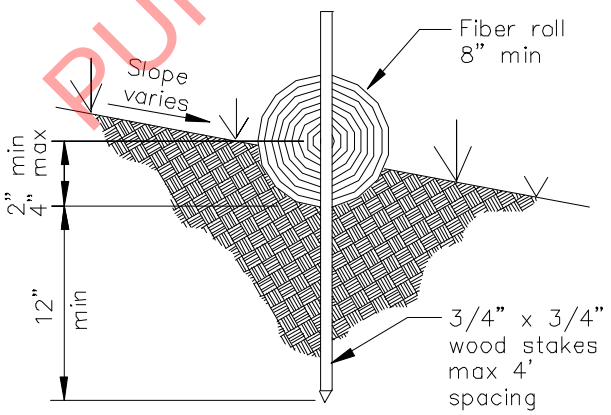
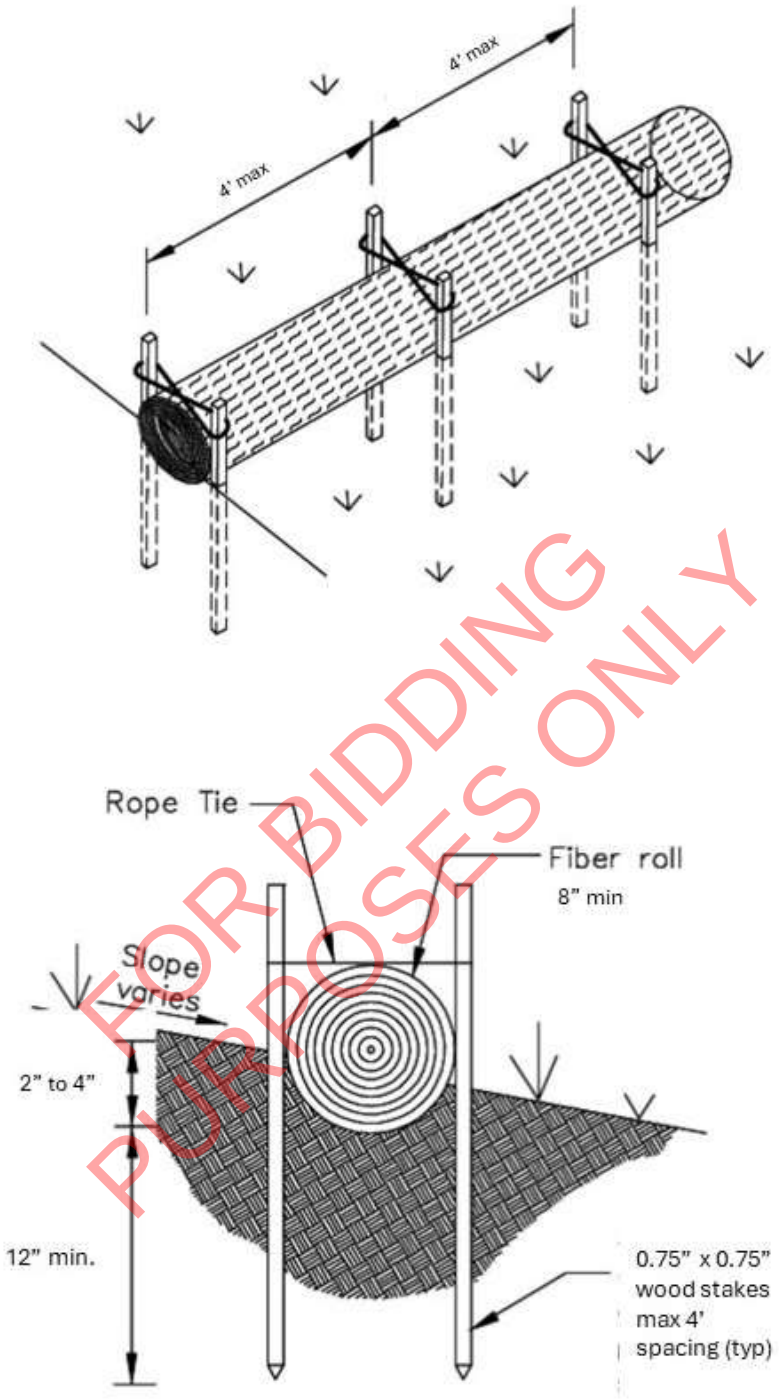


ENTRENCHMENT DETAIL
N.T.S.



OPTIONAL ENTRENCHMENT DETAIL

N.T.S.

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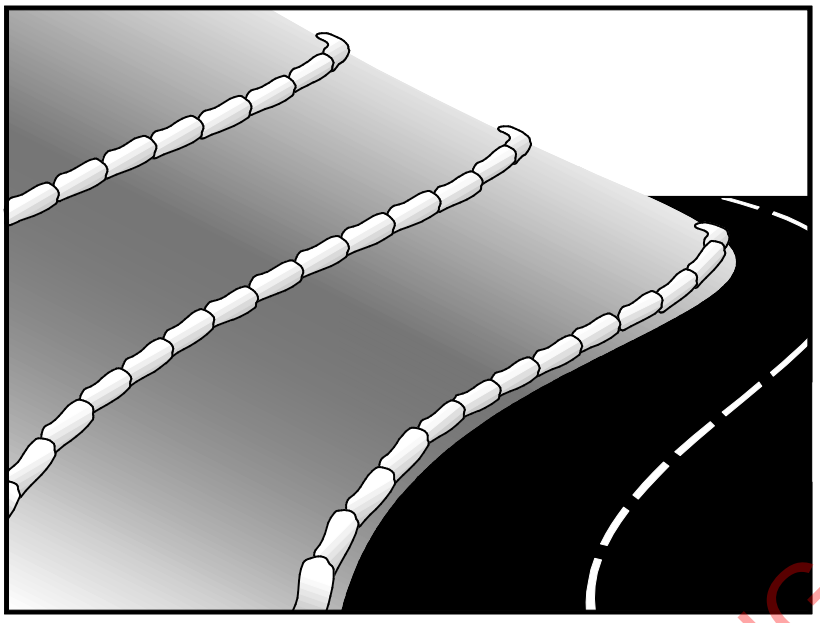
Reference: Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425-11.1, Section 4, Fiber Rolls SC-5, California Department of Transportation (Caltrans), March 2024.

Gravel Bag Berm SE-6



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

A gravel bag berm is a series of gravel-filled bags placed on a level contour to intercept sheet flows. Gravel bags pond sheet flow runoff, allowing sediment to settle out, and release runoff slowly as sheet flow, preventing erosion.

Suitable Applications

Gravel bag berms may be suitable:

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes
  - As sediment traps at culvert/pipe outlets
  - Below other small cleared areas
  - Along the perimeter of a site
  - Down slope of exposed soil areas
  - Around temporary stockpiles and spoil areas
  - Parallel to a roadway to keep sediment off paved areas
  - Along streams and channels
- As a linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence
SE-5 Fiber Roll
SE-8 Sandbag Barrier
SE-12 Temporary Silt Dike
SE-14 Biofilter Bags

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- At the top of slopes to divert runoff away from disturbed slopes.
- As chevrons (small check dams) across mildly sloped construction roads. For use check dam use in channels, see SE-4, Check Dams.

Limitations

- Gravel berms may be difficult to remove.
- Removal problems limit their usefulness in landscaped areas.
- Gravel bag berm may not be appropriate for drainage areas greater than 5 acres.
- Runoff will pond upstream of the berm, possibly causing flooding if sufficient space does not exist.
- Degraded gravel bags may rupture when removed, spilling contents.
- Installation can be labor intensive.
- Durability of gravel bags is somewhat limited, and bags may need to be replaced when installation is required for longer than 6 months.
- Easily damaged by construction equipment.
- When used to detain concentrated flows, maintenance requirements increase.

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Implementation

General

A gravel bag berm consists of a row of open graded gravel-filled bags placed on a level contour. When appropriately placed, a gravel bag berm intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding allows sediment to settle. The open graded gravel in the bags is porous, which allows the ponded runoff to flow slowly through the bags, releasing the runoff as sheet flows. Gravel bag berms also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets, which erode rills, and ultimately gullies, into disturbed, sloped soils. Gravel bag berms are similar to sand bag barriers but are more porous. Generally, gravel bag berms should be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.

Design and Layout

- Locate gravel bag berms on level contours.
- When used for slope interruption, the following slope/sheet flow length combinations apply:
  - Slope inclination of 4:1 (H:V) or flatter: Gravel bags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
  - Slope inclination between 4:1 and 2:1 (H:V): Gravel bags should be placed at a maximum interval of 15 ft. (a closer spacing is more effective), with the first row near the slope toe.

Slope inclination 2:1 (H:V) or greater: Gravel bags should be placed at a maximum interval of 10 ft. (a closer spacing is more effective), with the first row near the slope toe.

- Turn the ends of the gravel bag barriers up slope to prevent runoff from going around the berm.
- Allow sufficient space up slope from the gravel bag berm to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, gravel bag barriers should be set back from the slope toe to facilitate cleaning. Where specific site conditions do not allow for a set-back, the gravel bag barrier may be constructed on the toe of the slope. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers.
- Drainage area should not exceed 5 acres.
- In Non-Traffic Areas:
  - Height = 18 in. maximum
  - Top width = 24 in. minimum for three or more-layer construction
  - Top width = 12 in. minimum for one- or two-layer construction
  - Side slopes = 2:1 (H:V) or flatter
- In Construction Traffic Areas:
  - Height = 12 in. maximum
  - Top width = 24 in. minimum for three or more-layer construction.
  - Top width = 12 in. minimum for one- or two-layer construction.
  - Side slopes = 2:1 (H:V) or flatter.
- Butt ends of bags tightly.
- On multiple row, or multiple layer construction, overlap butt joints of adjacent row and row beneath.
- Use a pyramid approach when stacking bags.

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Materials

- ***Bag Material:*** Bags should be woven polypropylene, polyethylene or polyamide fabric or burlap, minimum unit weight of 4 ounces/yd^2, Mullen burst strength exceeding 300 lb/in^2 in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355.

- ***Bag Size:*** Each gravel-filled bag should have a length of 18 in., width of 12 in., thickness of 3 in., and mass of approximately 33 lbs. Bag dimensions are nominal and may vary based on locally available materials.

- ***Fill Material:*** Fill material should be 0.5 to 1 in. Crushed rock, clean and free from clay, organic matter, and other deleterious material, or other suitable open graded, non-cohesive, porous gravel.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Gravel bags exposed to sunlight will need to be replaced every two to three months due to degrading of the bags.

- Reshape or replace gravel bags as needed.

- Repair washouts or other damage as needed.

- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.

- Remove gravel bag berms when no longer needed and recycle gravel fill whenever possible and properly dispose of bag material. Remove sediment accumulation and clean, re-grade, and stabilize the area.

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References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Handbook of Steel Drainage and Highway Construction, American Iron and Steel Institute, 1983.

Stormwater Pollution Plan Handbook, First Edition, State of California, Department of Transportation Division of New Technology, Materials and Research, October 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Street Sweeping and Vacuuming SE-7



Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

Limitations

- Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).
- Sweeping may be less effective for fine particle soils (i.e., clay).

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused and perhaps save money.
- Inspect potential sediment tracking locations daily.

- Visible sediment tracking should be swept or vacuumed on a daily basis.
- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.
- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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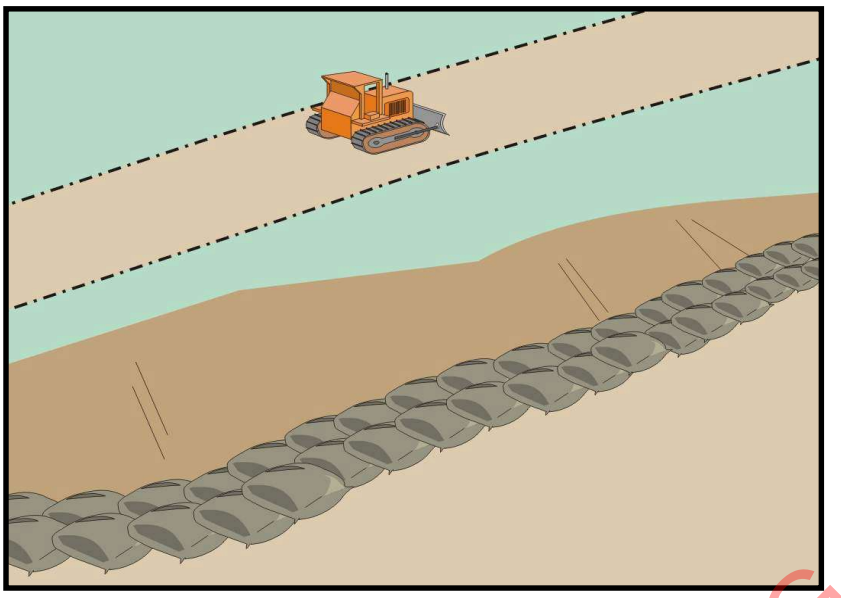
Sandbag Barrier SE-8



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

A sandbag barrier is a series of sand-filled bags placed on a level contour to intercept or to divert sheet flows. Sandbag barriers placed on a level contour pond sheet flow runoff, allowing sediment to settle out.

Suitable Applications

Sandbag barriers may be a suitable control measure for the applications described below. It is important to consider that sand bags are less porous than gravel bags and ponding or flooding can occur behind the barrier. Also, sand is easily transported by runoff if bags are damaged or ruptured. The SWPPP Preparer should select the location of a sandbag barrier with respect to the potential for flooding, damage, and the ability to maintain the BMP.

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes.
  - As sediment traps at culvert/pipe outlets.
  - Below other small cleared areas.
  - Along the perimeter of a site.
  - Down slope of exposed soil areas.
  - Around temporary stockpiles and spoil areas.
  - Parallel to a roadway to keep sediment off paved areas.
  - Along streams and channels.

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Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-12 Manufactured Linear Sediment Controls

SE-14 Biofilter Bags

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- As linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
  - At the top of slopes to divert runoff away from disturbed slopes.
  - As check dams across mildly sloped construction roads.

Limitations

- It is necessary to limit the drainage area upstream of the barrier to 5 acres.
- Sandbags are not intended to be used as filtration devices.
- Easily damaged by construction equipment.
- Degraded sandbags may rupture when removed, spilling sand.
- Installation can be labor intensive.
- Durability of sandbags is somewhat limited, and bags will need to be replaced when there are signs of damage or wear.
- Burlap should not be used for sandbags.

FOR BIDDING PURPOSES ONLY

Implementation

General

A sandbag barrier consists of a row of sand-filled bags placed on a level contour. When appropriately placed, a sandbag barrier intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding allows sediment to settle. Sand-filled bags have limited porosity, which is further limited as the fine sand tends to quickly plug with sediment, limiting or completely blocking the rate of flow through the barrier. If a porous barrier is desired, consider SE-1, Silt Fence, SE-5, Fiber Rolls, SE-6, Gravel Bag Berms or SE-14, Biofilter Bags. Sandbag barriers also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets which erode rills, and ultimately gullies, into disturbed, sloped soils. Sandbag barriers are similar to gravel bag berms, but less porous. Generally, sandbag barriers should be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.

Design and Layout

- Locate sandbag barriers on a level contour.
- When used for slope interruption, the following slope/sheet flow length combinations apply:
  - Slope inclination of 4:1 (H:V) or flatter: Sandbags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
  - Slope inclination between 4:1 and 2:1 (H:V): Sandbags should be placed at a maximum interval of 15 ft. (a closer spacing is more effective), with the first row near the slope toe.

  - Slope inclination 2:1 (H:V) or greater: Sandbags should be placed at a maximum interval of 10 ft. (a closer spacing is more effective), with the first row near the slope toe.

- Turn the ends of the sandbag barrier up slope to prevent runoff from going around the barrier.
- Allow sufficient space up slope from the barrier to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, sand bag barriers should be set back from the slope toe to facilitate cleaning. Where specific site conditions do not allow for a set-back, the sand bag barrier may be constructed on the toe of the slope. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers.
- Drainage area should not exceed 5 acres.
- Butt ends of bags tightly.
- Overlap butt joints of row beneath with each successive row.
- Use a pyramid approach when stacking bags.
- In non-traffic areas
  - Height = 18 in. maximum
  - Top width = 24 in. minimum for three or more-layer construction
  - Side slope = 2:1 (H:V) or flatter
- In construction traffic areas
  - Height = 12 in. maximum
  - Top width = 24 in. minimum for three or more-layer construction.
  - Side slopes = 2:1 (H:V) or flatter.
- See typical sandbag barrier installation details at the end of this fact sheet.

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Materials

- ***Sandbag Material:*** Sandbag should be woven polypropylene, polyethylene or polyamide fabric, minimum unit weight of 4 ounces/yd^2, Mullen burst strength exceeding 300 lb/in^2 in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355. Use of burlap is not an acceptable substitute, as sand can more easily mobilize out of burlap.
- ***Sandbag Size:*** Each sand-filled bag should have a length of 18 in., width of 12 in., thickness of 3 in., and mass of approximately 33 lbs. Bag dimensions are nominal and may vary based on locally available materials.

- ***Fill Material:*** All sandbag fill material should be non-cohesive, Class 3 (Caltrans Standard Specification, Section 25) or similar permeable material free from clay and deleterious material, such as recycled concrete or asphalt.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Sandbags exposed to sunlight will need to be replaced every two to three months due to degradation of the bags.
- Reshape or replace sandbags as needed.
- Repair washouts or other damage as needed.
- Sediment that accumulates behind the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Remove sandbags when no longer needed and recycle sand fill whenever possible and properly dispose of bag material. Remove sediment accumulation, and clean, re-grade, and stabilize the area.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Standard Specifications for Construction of Local Streets and Roads, California Department of Transportation (Caltrans), July 2002.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

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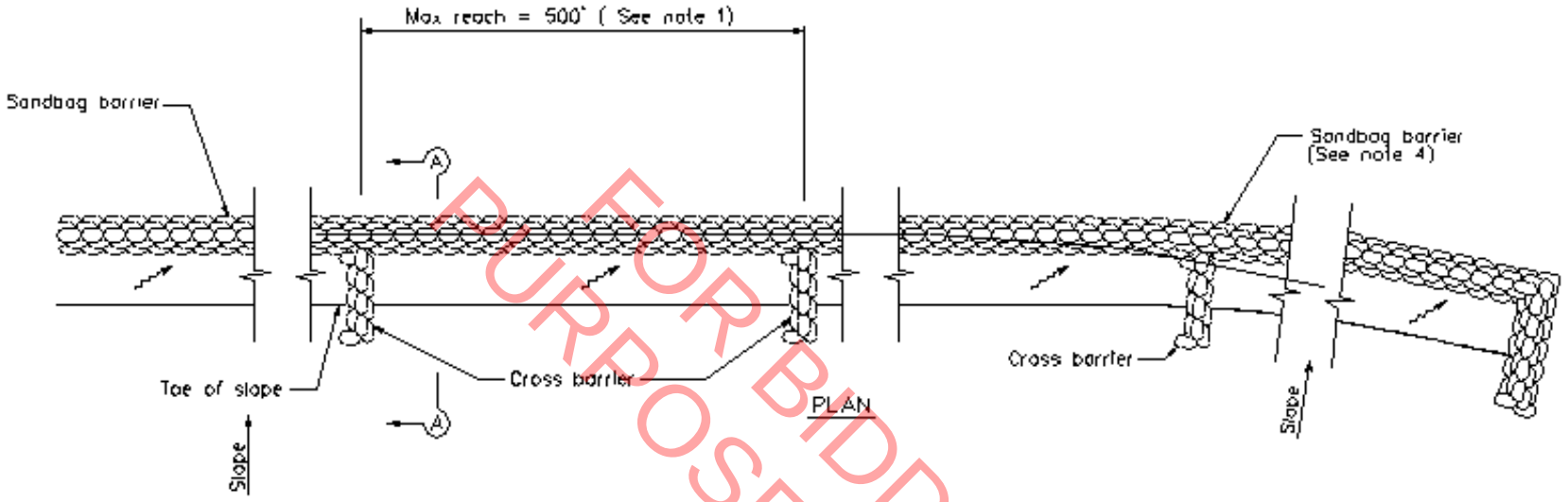
Sandbag Barrier SE-8



SANDBAG BARRIER

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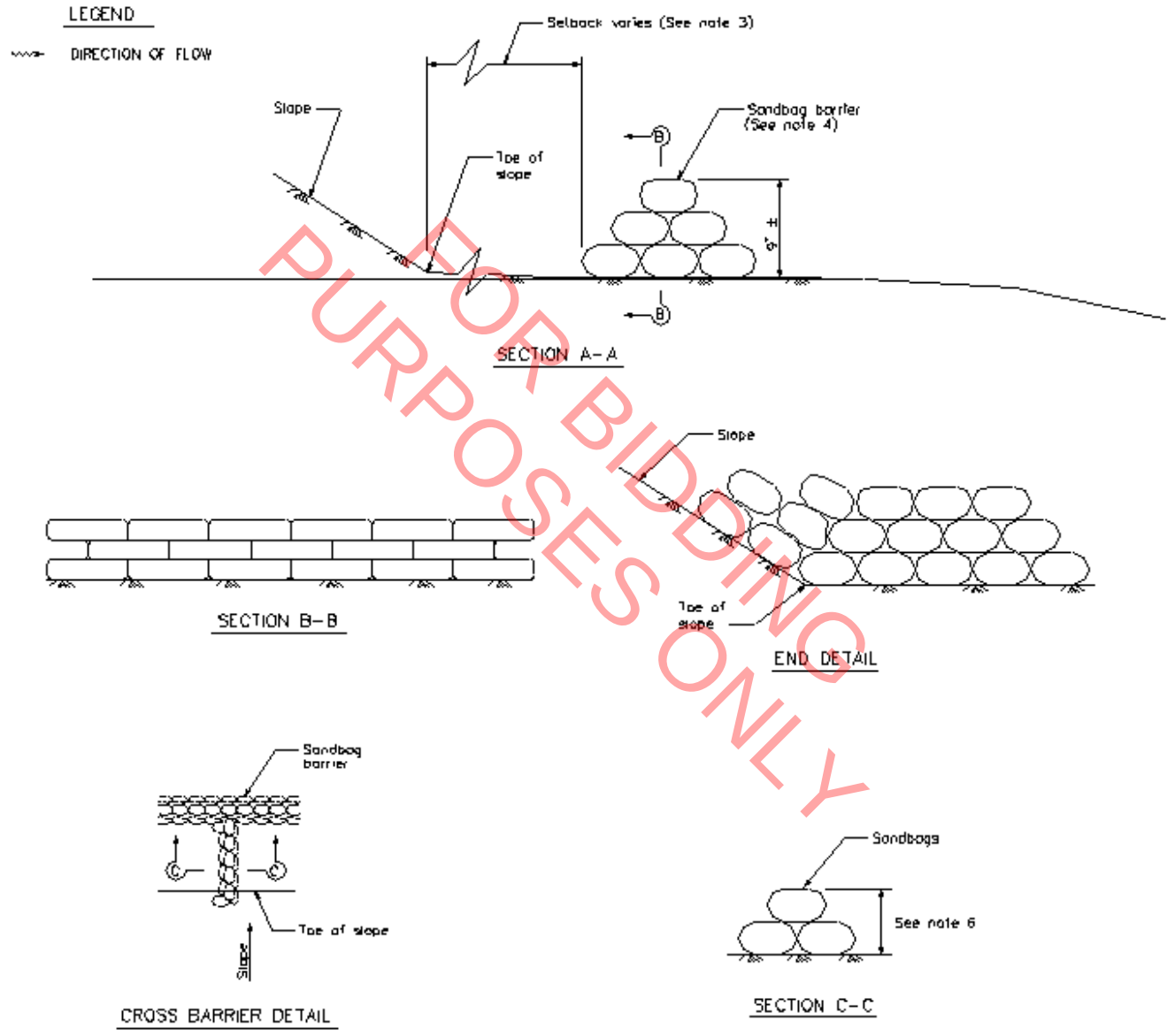
NOTES

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/2 the height of the linear barrier. In no case shall the reach length exceed 500'.
2. Place sandbags tightly
3. Dimension may vary to fit field condition.
4. Sandbag barrier shall be a minimum of 3 bags high.
5. The end of the barrier shall be turned up slope.
6. Cross barriers shall be a min of 1/2 and a max of 2/3 the height of the linear barrier.
7. Sandbag rows and layers shall be staggered to eliminate gaps.



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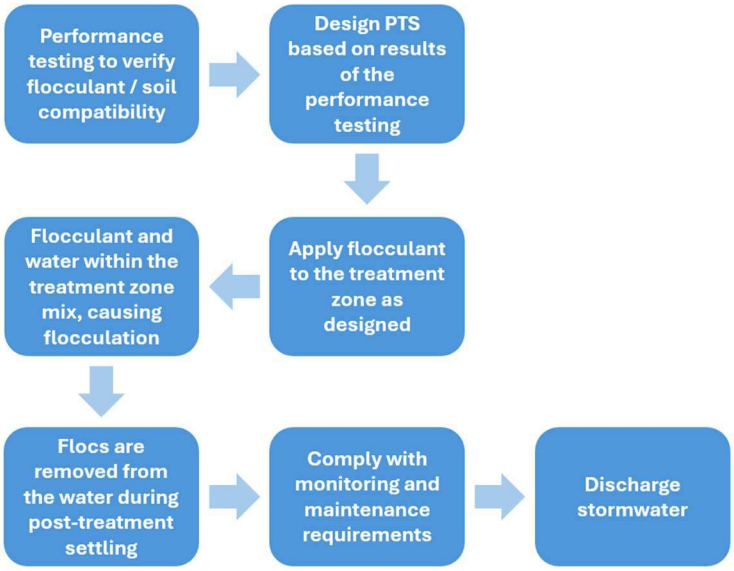
Passive Treatment SE-15



Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-11 Active Treatment Systems

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Description and Purpose

Passive treatment is defined in the 2022 General Permit as the application of natural or synthetic chemicals and products to reduce turbidity in discharges through coagulation and flocculation. Passive treatment does not rely on computerized, enclosed systems with pumps, filters, and real-time controls. Passive treatment may include pumps where they are necessary to move water around the construction site.

Flocculants used in a passive treatment system (PTS) are best introduced in onsite areas of high velocity such as channelized stormwater conveyances, Earth Dikes and Drainage Swales (EC-9), or pipes to promote mixing. Flow is then conveyed to a basin or other sediment control best management practice (BMP) (such as a sediment trap, basin with baffle-grid, or in-ground sand filter) that allow for settling and/or filtration of the flocculated sediment. Common PTS include check dams with flocculant (followed by a settling/filtration area) and sediment basins dosed with flocculant at the inlet (U.S. Environmental Protection Agency (EPA), 2012).

The 2022 General Permit states that "The types of flocculants and coagulants that can be included in passive treatment for this General Permit are non-ionic and anionic flocculants and coagulants." While there are a wide variety of flocculants and coagulants available for use, this fact sheet only addresses anionic polyacrylamide (PAM) flocculants. This material is a long chain polymer widely available in the erosion and sediment control market and has been used and studied extensively.

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This fact sheet specifically incorporates the 2022 General Permit, Attachment G requirements.[1] 2022 General Permit permittees choosing to implement passive treatment technologies on their site are subject to the requirements of Attachment G of the 2022 General Permit which include:

- Do not use chemical treatment as a standalone BMP; maximize the use of non-chemical BMPs for site erosion and sediment controls.
- Employ a trained person knowledgeable in the principles and practices of passive treatment to oversee the product application or installation.
- Store products at the site in leak-proof containers with secondary containment kept under a storm-resistant shelter. Follow the manufacturer's instructions for handling and storage.
- Use passive treatment in a manner that precludes the accidental discharge of passive treatment products during storage, application, and after being applied.
- Maintain a copy of the site-specific Passive Treatment Plan in the Stormwater Pollution Prevention Plan (SWPPP) onsite and updated in the Stormwater Multiple Application and Report Tracking System (SMARTS).

A Qualified SWPPP Developer (QSD) must prepare the Passive Treatment Plan addressing all the information listed in 2022 General Permit, Attachment G, Section D.2. The Passive Treatment Plan is to be electronically certified and submitted by the Legally Responsible Person (LRP) through SMARTS 14 days prior to passive treatment use. A copy must be available on-site during active construction.

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Suitable Applications

The primary purpose of a PTS is to enhance removal of sediment and reduce turbidity, particularly at sites where a system of traditional BMPs is not sufficient to meet applicable numeric targets, such as Numeric Action Levels (NALs).

PTS can provide significant reductions in turbidity and can be installed in a variety of situations. They are especially useful where traditional erosion and sediment control BMPs cannot adequately control turbidity in construction site runoff. PTS provide an alternative to Active Treatment Systems (see SE-11) where enhanced sediment and turbidity control is needed. Flocculants can be deployed in ditches, swales, diversions, slope drains, storm drains, and inlets where concentrated, turbulent flows provide the mixing needed to provide sufficient contact between the flocculant and sediment to create flocs (i.e., flocculant bound to suspended particles). A PTS requires appropriate sediment control BMPs to allow flocs to settle prior to off-site discharge.

Limitations

- A California licensed Professional Engineer must design the discharge location(s) from the area treated with passive treatment products (treatment zone) to dissipate energy from concentrated flows.
- The use of cationic chemicals for passive treatment is not authorized by the 2022 General Permit. Anionic chemicals are authorized for use in PTS, typically consisting of PAM.

[1] The 2009 CGP does not authorize the use of passive treatment.

- A PTS should not be designed to use channelized stormwater conveyances, earth dikes and drainage swales, or pipes associated with the municipal separate storm sewer system or any receiving water.
- Flocculants installed directly before water discharges into a sediment basin or trap may have inadequate mixing and the reaction may not allow for floc formation.
- Stormwater treated with passive treatment products must pass through a sediment control BMP (such as, a sediment basin or trap) or filter (such as, sand filter or geotextile bag) to settle or remove flocculants prior to discharge from the site.
- Effectiveness of passive treatment products depends on product type, installation method, flow duration, flow intensity, water temperature, water pH, site soil type, and intensity of precipitation events. Choose the passive treatment product based on the site-specific factors.
- When proper installation and application occurs, average percent reduction rates in turbidity can range from 86% when flocculants are added at the inlet of a sediment basin to 90%, 64%, and 76% when flocculants are applied to fiber check dams, rock check dams wrapped in fabric, and wetted rock check dams, respectively (McLaughlin, 2010).

Implementation

PTS should only be used as part of a comprehensive system of traditional erosion and sediment control BMPs, such as check dams, ground cover, silt fence, inlet protection, and sediment basins. If selected to enhance a site's BMP system, the following implementation guidance is provided.

Criteria for Passive Treatment Product Use

Passive treatment product(s) are to be used as follows:

- The distance or barrier between the treatment zone and the receiving water(s) shall comply with surface water buffer requirements, in Attachment D of the 2022 General Permit for traditional construction projects or Attachment E 2022 General Permit for linear underground / overhead projects (LUPs), to prevent a discharge of treated effluent to the receiving water.
- Applying passive treatment products directly into a receiving water is prohibited.
- Passive treatment application rates, dosing, and methods used in treatment zones shall be determined based on the manufacturer's guidance to provide adequate sediment control without having an excess amount of product in runoff.
- Passive treatment re-application rates, dosing, and methods used in treatment zones shall occur based on the manufacturer's recommended frequency and on-site conditions such as soil type, precipitation, and slope to avoid the discharge of excess product in runoff.
- Test treated stormwater and site-specific sediment to demonstrate that the selected formulation is an effective product for removing suspended sediment. Testing shall be conducted by a person trained in the use of the passive treatment product prior to being applied at the site.

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- Employ a trained person to calculate the appropriate standard passive treatment product quantity per unit flow rate value. This calculated value is to be included in the Passive Treatment Plan and be recalculated and resubmitted via SMARTS as site conditions change.
- Employ a trained person to ensure that the mixing and reaction time recommended by the manufacturer is followed during passive treatment application.
- Provide settling area for the passive treatment product-sediment laden stormwater that is sized to hold the sediment and allows the reasonable cleanout frequency specified in the Passive Treatment Plan.
- Implement a sedimentation basin BMP upon any evidence that previously settled sediment is being re-suspended.

Considerations for the Selection of Flocculants

Soil Specific Product Selection

Anionic PAM is available with a wide variety of properties. These variations allow for the selection of a PAM that will flocculate the many types of soils that occur in California. Selecting the correct product, a particular type of anionic PAM, to use with site specific soil is a critical step in implementing a PTS to promote flocculation. A jar test should be performed to select a flocculant that reacts with the soil being treated. Please note that other passive treatment products may have different passive treatment chemicals performance testing, dosing, mixing, and settling recommendations.

Performance Test Guidelines

The 2022 General Permit, Attachment G, Section C.2 requires passive treatment chemicals performance testing, dosing, mixing, and settling for use in sediment control BMPs. One type of performance testing is a jar test. A jar test is typically used to select PAM formulation. Although there is currently an ASTM protocol (ASTM D2035-19) for conducting jar tests, the protocol was not specifically developed for stormwater and has not been widely used at construction sites. A relatively simple effluent test is also sometimes used to assess treatment effectiveness and identify the need for additional mixing or dosing before discharge of treated water (Hetzel et al., 2023).

A jar test is a laboratory or field procedure in which the effectiveness of a given chemical is determined by simulating the flocculation process at different chemical doses for different formulations. The purpose of the procedure is to estimate the optimal dose required to maximize turbidity reduction. In a jar test, samples of water to be treated are placed in jars, and different amounts of chemicals are added to each jar. The samples are then stirred, and the settling of solids is observed. The dose of chemicals that provides the maximum flocculation and settling is the optimal or target dose.

Jar tests should be conducted by trained individuals and the test protocol and results are reported in the Passive Treatment Plan. Test results should indicate the most effective product for the specific soil or water. At a minimum, document the following for each jar test:

- Before and after images;
- Reaction time (mixing needed) for complete floc formation;

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- Pre- and post-treatment turbidity;
- Test date; and
- Name and contact of person conducting test.

Effluent Test Guidelines

The objective of the effluent test is to determine whether discharge water requires additional measures prior to discharge to ensure treatment is optimal (e.g., additional chemical, additional mixing, additional settling). The test is based on the observation that factors such as mixing intensity, mixing time, and dose have an effect on final turbidity removal.

In the effluent test, a sample of treated stormwater is collected in a flask, and its turbidity is measured. A subsample is taken and mixed for a short period of time, followed by a period of gentle mixing by swirling. If the turbidity of the subsample is significantly different from the original sample, mixing is assumed to have been inadequate or additional settling is required. If turbidity differences between the original sample and test sample are minor, an incremental amount of product relative to the original target dose (e.g., about 1 mg/L for PAM) is added to the sample to see if there is an improvement in turbidity removal. An improvement in turbidity removal compared to the control indicates potential underdosing. A decrease in turbidity removal compared to the control indicates potential overdosing.

Toxicity

Toxicity is the adverse response(s) of organisms to chemicals or physical agents ranging from mortality to physiological responses such as impaired reproduction or growth anomalies. Any chemical that is released into the environment has some level of potential toxicity. The important considerations for PTS, which treats stormwater prior to discharge off the project site, include how much is used and how much would be expected to be discharged. This is described below for PAM.

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Seven-day toxicity testing as per Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013 (EPA, 2002b) is useful for selecting flocculants that are least likely to cause harm in the environment. Many flocculant manufacturers have their products tested with *Ceriodaphnia dubia* (water fleas) over the course of seven days to quantify the effect the flocculant has on reproduction rates as well as survival of the organism. These data are used to assess the safety of the product and to determine appropriate maximum application rates. Request such information from the manufacturer/distributor for verification of product safety.

The seven-day toxicity test for a site-appropriate flocculant should generally indicate the maximum dosage rate is lower than the no observed effects concentration (NOEC). The applicable Regional Water Quality Control Board (RWQCB) may use site-specific information to require additional sampling and monitoring to confirm the toxicological requirements are being met and to ensure there are no adverse impacts to waters of the United States.

PAM is a class of chemicals composed of large molecules made up of many acrylamide units. When linked in long chains, some portion of the acrylamide units can be modified to result in net positive, neutral, or negative charge on the PAM molecule. Positively charged, or cationic, PAMs may not be used for passive treatment because they can be toxic to fish and other aquatic

organisms if they enter water bodies in sufficient concentrations. Negatively charged, or anionic, PAMs are less toxic to aquatic organisms and are widely used for erosion control in furrow irrigation in agriculture. PAMs are also used in a variety of erosion control products. Only food-grade PAM is used because it contains very low (<0.05%) amounts of free acrylamide, which can be toxic to workers at high doses or with long exposures. Anionic PAM usually reacts quickly with sediment and is removed from solution as the sediment settles. The sediment treated with PAM can be handled like any other sediment.

Materials

Flocculants are often manufactured in a solid form, but this material can be reconstituted into a variety of products. PAM comes in granular (powder), solid block (logs), and effervescent tablet forms. Solutions can be made up from the flake or granular forms as well as the effervescent tablets for certain types of PTS. The granular, log, and effervescent forms can be used in a variety of applications where concentrated flow and mixing occur.

When choosing a product, consider the pros and cons of each material type. Granular flocculants are quicker to dissolve but may require more monitoring and maintenance, since high dosages are easily visible if over-applied. Blocks of flocculant are slower to dissolve and last longer but may be more difficult to reach optimal dosing concentration. Blocks left installed between storm events require maintenance to prevent drying out and coating with sediment, which can prevent dissolution of the flocculant during future rain events.

Granular flocculants can be applied to fiber rolls and along channel walls as part of a PTS. The fibers provide a large surface area for the granules to adhere to and provide high exposure to turbid water as it passes over and through the flocculant-treated fiber roll. The resulting flocs also tend to stick to natural fiber materials, which can be placed near discharge points to provide additional floc removal capabilities.

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Design, Operation, and Dosing Rates

The design and operation of PTS at a construction site needs to account for site specific factors. Proper implementation throughout the project is essential for optimum cost-effective performance and safe application. Over-application of flocculant can decrease PTS performance, increase chemical costs, and increase the risk of exceeding effluent toxicity thresholds. Sites choosing to utilize a PTS must have a QSD prepare a Passive Treatment Plan to be included in the project SWPPP.

Required Passive Treatment Plan Elements:

- A list of other erosion and sediment control BMPs implemented in the drainage area and treatment zones. Passive treatment is not to be used as a standalone BMP.
- Manufacturer product details (e.g., function, physical form, product name, expiration date and any other identifiers), specifications, and current acute and chronic toxicological and ecological information.
- The design details and drawings for maintenance and removal procedures for the products applied on-site.
- Contact information (name, position, email, phone number) of the trained person who is implementing passive treatment for the permittee; Qualified SWPPP Practitioner (QSP); and

other site personnel who are trained to assist the permittee with the passive treatment implementation.

- Inspection and maintenance requirements for treatment zones.
- Monitoring, sampling, and reporting plan, including quality assurance/quality control (QA/QC).
- Health and safety procedures.
- Spill prevention and response procedures.
- Calculated and re-calculated quantities of passive treatment products used.
- Site-specific performance testing results and the associated dosage/application rate(s).
- Site Map showing:
  - Location(s) where the product(s) is used (treatment zone);
  - Treatment zone effluent discharge location(s);
  - Location(s) where product(s) will be stored;
  - Locations of product recovery BMP(s), including but not limited to, ponds, chemicals; and
  - Surface water buffer between the passive treatment zone and receiving waters.
- Treatment zone soil type(s).
- Proposed application date(s) or schedule.
- Application method(s).

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One of the key factors in the effectiveness of the flocculant is to ensure that it dissolves and thoroughly mixes with the runoff water. Introducing flocculants to the runoff at a point of high flow velocity helps to provide the turbulence and mixing needed to maximize the suspended sediment exposure to the large flocculant molecules. Example locations for these conditions on a construction site include:

- Storm drain pipes and junction boxes.
- Slope drains, particularly single-wall corrugated pipe.
- Check dams and liners, particularly natural fiber materials, in drainage and diversion ditches.

All these areas have fast moving water that should drain to a sediment basin or trap. Installing porous baffles made of coir or similar materials in the sediment basin or sediment basin or trap will maximize the capture of sediment.

Passive Treatment Application Documentation Requirements

- The trained person employed to implement the passive treatment will complete a checklist with the following information during each passive treatment product application:
  - Application date(s);
  - Application method(s);
  - Weather condition(s) during application;
  - Estimated flow rate of stormwater runoff;
  - Estimated volume of water being treated;
  - Application rate(s), dosing, and mixing, consistent with the Passive Treatment Plan; and
  - Any other site-specific conditions or observations relevant to the functioning of the product.
- Keep the passive treatment application checklists with the Passive Treatment Plan.

Toxicity Requirements

The use of cationic chemicals for passive treatment is not authorized. Anionic chemicals are authorized for use in PTS, typically consisting of PAM.

Passive treatment PAMs must:

- Be free of nonylphenol and nonylphenol ethoxylates, often used as surfactants in emulsion-based products.
  - Avoid emulsion-based products, which may contain surfactants and petroleum distillates that can be toxic to aquatic life.
- Be food grade (National Sanitary Foundation/American National Standards Institute) products or contain less than 0.05 percent residual monomer by volume.
- Have a charge density between 10 and 55 percent by weight.
- Have a high molecular weight.
- Be mixed and applied in accordance with Occupational Safety and Health Administration Safety Data Sheet requirements and the manufacturer's recommendations.

Include the current acute and chronic toxicological test data provided by the manufacturer in the Passive Treatment Plan.

- The methods for the acute toxicity testing are to be those outlined for a 96-hour acute test in "Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms, EPA-821-R-02-012" for *Pimephales promelas* (fathead minnow), (EPA, 2002a). Acute toxicity for *Oncorhynchus mykiss* (rainbow trout) may be used as a substitute for testing fathead minnows.

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- The methods for the chronic toxicity testing are to be those outlined for a seven-day chronic test in EPA-821-R-02-013 for *Ceriodaphnia dubia* (Daphnia), (EPA, 2002b).
- All toxicity tests are to meet quality assurance criteria and test acceptability criteria in the most recent versions of the EPA test method for Whole Effluent Toxicity (WET) testing as well as any toxicity provisions adopted by the State Water Resources Control Board (SWRCB).
- The toxicological information in the Passive Treatment Plans indicates the safety of the passive treatment product(s) based on expected release rates, toxicity reports, the anticipated concentration (calculated from product release rate) and intended use at the site.

The RWQCBs may use site-specific information to require additional sampling and monitoring to confirm the toxicological requirements are being met and to ensure there are no adverse impacts to waters of the United States.

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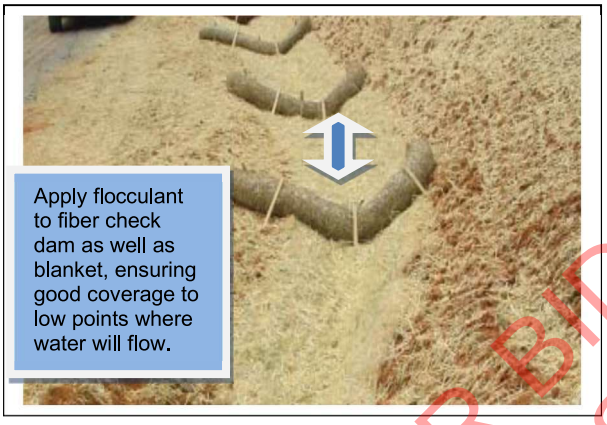
Implementation:

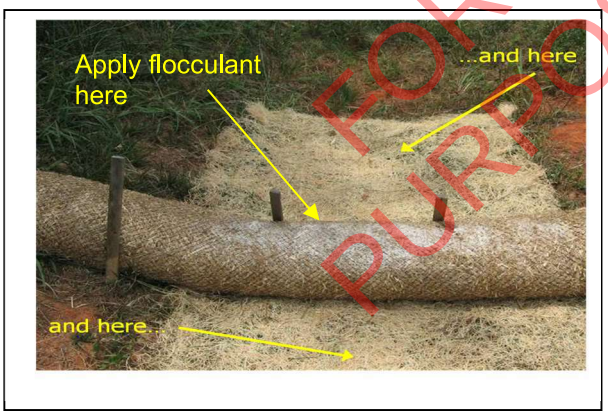
Granular PAM used with Check Dams

- As a general example, based on an application of 4 oz of PAM applied to each check dam (1 oz upslope on matting, 2 oz on check dam, and 1 oz downslope on matting), a 50 lb bag of PAM is anticipated to last approximately through 227 applications.
- Concentration in a flow through system will depend on total mass of product and the product lifespan (i.e., how much water will flow over it before it is fully dissolved), which can be variable. Lifespan of the product depends on flow duration, flow intensity, temperature, and pH.
- Reapply PAM after every rainfall event that is equal to or exceeds 0.50 inches.



Left: Example of fiber check dams installed in a conveyance ditch to slow the velocity of stormwater discharge to allow for settlement of heavier particles to occur.

Applying flocculants to the low points (weirs) on the fiber check dams and blanket allows for thorough mixing and contact time between the sediments and water, causing flocculation to occur.



Left: Example of flocculant applied to an area of concentrated flow where a majority of the stormwater will be flowing (upslope, on, and downslope of fiber check dams).

Proper installation of the BMPs is critical. Using landscape staples to securely fasten the fiber check dam to the ground and wooden stakes to support it during periods of high flow will enable all stormwater to flow over the low point and have maximum treatment.

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PAM Blocks

- Install PAM blocks per manufacturer recommendations based on anticipated flow rate. Application rates may vary based on passive treatment product, implementation per, manufacturer specification, residence time, and mixing. One manufacturer recommends approximately one block for each 60 gallons per minute of flow (Heltzel et al., 2023).



Left: Slope drains are an excellent place to apply all forms of flocculants, (block, granular, and tablets).

Place the flocculant inside the slope drain near the inlet. As the sediment laden water enters the pipe, treatment will occur leaving cleaner water to discharge at the outfall.

Note: Allowing for heavy sediment to settle before entering the pipe is ideal.



Left: Flocculants added to the inside of a sediment basin's perforated riser pipe.

Because the pipe is perforated, high velocities ideal for flocculation can be achieved. Note: Post settling must occur to allow flocculated material to stay on site.

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PAM Effervescent Tablets



Left: Flocculants (PAM Effervescent Tablets – 5 g/tablet) have been added to the inside portion of a fiber check dam. As the water builds up on the upstream side of the check dam, the contact time with PAM can be achieved. Treatment begins and continues as water is flowing through the fiber check dam.

Notes:

1. To be effective, tablets should be installed within the full width of the fiber check dam to ensure sufficient contact between flocculant and water.
2. Post settling will occur as the water moves down the conveyance.
3. Flocculant tablets are also available in mesh bags to apply a larger amount of tablets in a single application.

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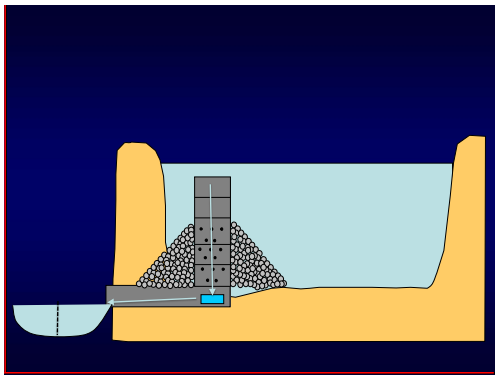
Proper design and installation of PTS should ensure that flocculants and flocs are not discharged from the construction site. Design the PTS so that the flocculated materials are captured on the site before discharging the treated stormwater. Stormwater treated with flocculants should be directed into a sediment retention structure such as a sediment basin or trap to allow for settlement of flocs prior to offsite discharge.

The success of PTS requires sufficient training of construction staff. Grade sites to the extent feasible to route all stormwater discharges from disturbed areas into the water conveyances with PTS installed.

Example Calculations

Note: The assumed values used in the example calculations below do not apply to all passive treatment products. The specifics of the project site and the passive treatment product needs to be considered by the QSD in coordination with the manufacturer specifications. For example, the anticipated peak flow rate, block weight, percent PAM, and flow rate handled by each block may all vary depending on site conditions and the product used.



You plan to use PAM blocks for turbidity reduction. You calculate peak flow (Q_{10}) at 5 cfs.

- How many blocks are needed?
- How much water can be treated?

Answer:
Assume each block weighs 8 lbs and is 50% PAM. Also, each block should only handle 75 gpm of flow.
5 cf/sec x 7.5 gal/cf = 38 gps x 60 sec = 2,280 gpm / 75 gpm = 30 logs needed
30 logs x 4 lbs PAM/log = 120 lbs PAM
120 lbs x 0.45 kg/lb = 54 kg x 1,000 g/kg = 54,000 g x 1,000 mg/g = 54,000,000 mg which can treat 54,000,000 L x 1gal/3.8L = 14,200,000 gal x 1cf/7.5 gal = 1,900,000 cf

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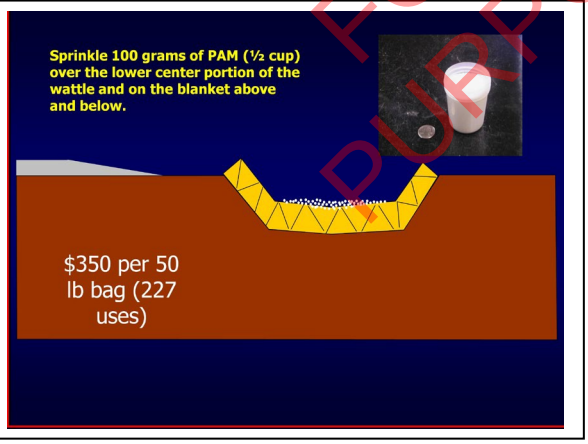

There are 2 acres draining into ditches totaling 300-ft on an average 5% slope.

- How many 12-in fiber check dams do you need?
- How much stormwater can be treated if you put 100 g on each fiber check dam? (Assume 1 mg/L dosing rate.)

Answer:
A 5% slope drops 5-ft for every 100-ft length so a 300-ft ditch would drop 15-ft therefore, 15 12-in diameter fiber rolls are needed.
15 fiber rolls x 100 g PAM = 1,500 g or 1,500,000 mg = 1,500,000 L can be treated
1,500,000 L x 1 gal/3.8L = 395,000 gal x 1 cf/7.5 gal = 53,000 cf
For 2 ac: 53,000 cf/87,000 sq ft = 0.6 acre foot or 7-in of runoff (assuming no infiltration)

Factors in PTS Success and Failure

Factors to maximize turbidity reductions using flocculants obtained from controlled research studies and at active construction sites are summarized below. A list of published studies on PTS in controlled and field conditions is provided at the end of this fact sheet.

- Reduce the sediment load in the runoff before it reaches the flocculant location. This avoids burying the flocculant under accumulated sediment.
- Create high flow across or onto the flocculant. This will help dissolve the flocculant and prevent suspended solids from sticking to it, inhibiting further flocculant release.
- Match site specific soil to the flocculant being used.
- Once PAM blocks are wetted, they should not be exposed to sun or otherwise exposed to conditions where they will dry out between storm events. Otherwise, their effectiveness may be impacted.
- Apply adequate amounts of the flocculant to ensure proper dosing. Reapply flocculant as needed to achieve settleable captured flocculant.
- Stabilize the treatment area to ensure minimal erosion. The area immediately around sediment basins and diversion ditches needs to be stabilized to prevent the contribution of untreated, turbid runoff into the basin.
- Design conveyances to direct turbid runoff to the treatment area. Bypass flows of untreated runoff are often the cause of turbidity spikes.
- Properly install the conveyance BMPs. Poor installation of BMPs, such as failing to staple fiber check dams down to prevent undercutting (see examples below), will result in poor PTS performance.
- Perform regular inspections to maintain PTS performance and effectiveness.

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Above: Examples of poorly installed conveyance BMPs.

Inspection and Maintenance

As with any BMP, maintenance is a critical part of making sure these systems are working properly. When implemented properly, the use of flocculants dramatically improves sediment trapping thus requiring frequent maintenance to remove accumulated sediment.

- Inspect PTS in accordance with the Passive Treatment Plan. Inspect BMPs weekly at minimum, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Ensure a QSP visually inspects the passive treatment zone surface condition within 72 hours before forecasted precipitation events and within 48 hours after qualifying precipitation events.
- Inspect sediment retention structures per the appropriate fact sheet, e.g., SE-2 Sediment Basin and SE-3 Sediment Trap.
  - Periodically remove sediment that accumulates in a sediment basin to maintain BMP effectiveness. Remove sediment when sediment accumulation reaches one-half the designated sediment storage volume.
  - Periodically remove sediment that accumulates in a sediment trap to maintain BMP effectiveness. Remove sediment when sediment accumulation reaches one-third the trap capacity.
- Properly manage sediment removed during maintenance. Evaluate the sediment for use or disposal and manage accordingly. Options include:
  - Incorporating sediment into earthwork on the site (only if there is no risk that sediment is contaminated).
  - Off-site export/disposal at an appropriate location (e.g., sediment characterization and disposal at an appropriate landfill).
- Visually inspect the treatment zone for effective floc formulation to evaluate whether re-application or removal of the chemical product is required. Ensure adequate mixing is occurring prior to adjusting dosing rates.
  - Recalculate and adjust appropriate dosing rates based on observed field conditions (e.g., rate of dissolution of product, stormwater runoff volumes, sediment type). Higher discharge turbidity is a potential indication of an overdose or underdose situation.
  - If treated water feels slimy or viscous, this indicates a potential overdose situation is likely occurring.
  - If higher than anticipated peak flows are observed, then a potential underdosing situation is likely occurring and reapplication of the product according to the Passive Treatment Plan and manufacturer's specifications may be required to reach desired performance goals.

FOR BIDDING PURPOSES ONLY

References and Additional Resources

Bhardwaj, A. J., R. A. McLaughlin, and D. L. Babcock. 2008. Energy dissipation and chemical treatment to improve stilling basin performance. Trans. Am. Soc. Ag. Eng. 51(5): 1645-1652

Bhardwaj, A. J., and R. A. McLaughlin. 2008. Simple polyacrylamide dosing systems for turbidity reduction in stilling basins. Trans. Am. Soc. Ag. Eng. 51(5): 1653-1662.

California State Water Resources Control Board (State Water Board), 2022. Order 2022-0057-DWQ, NPDES General Permit No. CAS000002: National Pollutant Discharge Elimination System (NDPES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit).

Heltzel, J., A. Motlagh, D. Patel, C. Leo, D. Salt, and B. Currier. 2023. Passive Chemical Treatment Monitoring Guidance and Study Plan Development. Office of Water Programs, California State University, Sacramento. https://www.owp.csus.edu/research/passive-dose/passive-chemical-treatment.pdf

McLaughlin, R. A., and M. M. McCaleb. 2010. Passive treatment to meet the EPA turbidity limit. In Proc. TMDL 2010 Watershed Management to Improve Water Quality Conf., CD-ROM. I. Chaubey and G. Yagow, eds. St. Joseph, Mich.: ASABE. ,14 November 2010 . ASAE Pub #711P0710cd.

McLaughlin, R. A., S. A. Hayes, D. L. Clinton, M. S. McCaleb, and G. D. Jennings. 2009. Water quality improvements using modified sediment control systems on construction sites. Trans. Am. Soc. Ag. Eng. 52(6): 1859-1867.

McLaughlin, R. A., S. E. King, and G. D. Jennings. 2009. Improving construction site runoff with fiber check dams and polyacrylamide. J. Soil and Water Cons. 64(2):144-154.

McLaughlin, R. A., and G. D. Jennings. 2007. Minimizing Water Quality Impacts from Road Construction Projects. NC Dept. Transp. Final Report # FHWA/NC/2006-21. https://apps.dot.state.nc.us/Projects/Research/ProjectInfo.aspx?ID=701

McLaughlin, R. A. and G. D. Jennings. 2006. Evaluating Systems to Reduce Road Improvement Impacts on Mountain Streams. NC Dept. Transp. Final Report # FHWA/NC/2006-44. https://apps.dot.state.nc.us/Projects/Research/ProjectInfo.aspx?ID=1203

McLaughlin, R. A. 2006. Polyacrylamide blocks for turbidity control on construction sites. Am. Soc. Ag. Biol. Eng. Meeting Presentation Paper Number: 062254.

McLaughlin, R. A. 2002. Measures to Reduce Erosion and Turbidity in Construction Site Runoff. NC Dept. Transp. Final Report # FHWA/NC/2002-023 https://apps.dot.state.nc.us/Projects/Research/ProjectInfo.aspx?ID=402

U.S. Environmental Protection Agency. 2002a. Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms, EPA-821-R-02-012. https://www.epa.gov/cwa-methods/acute-toxicity-wet-methods

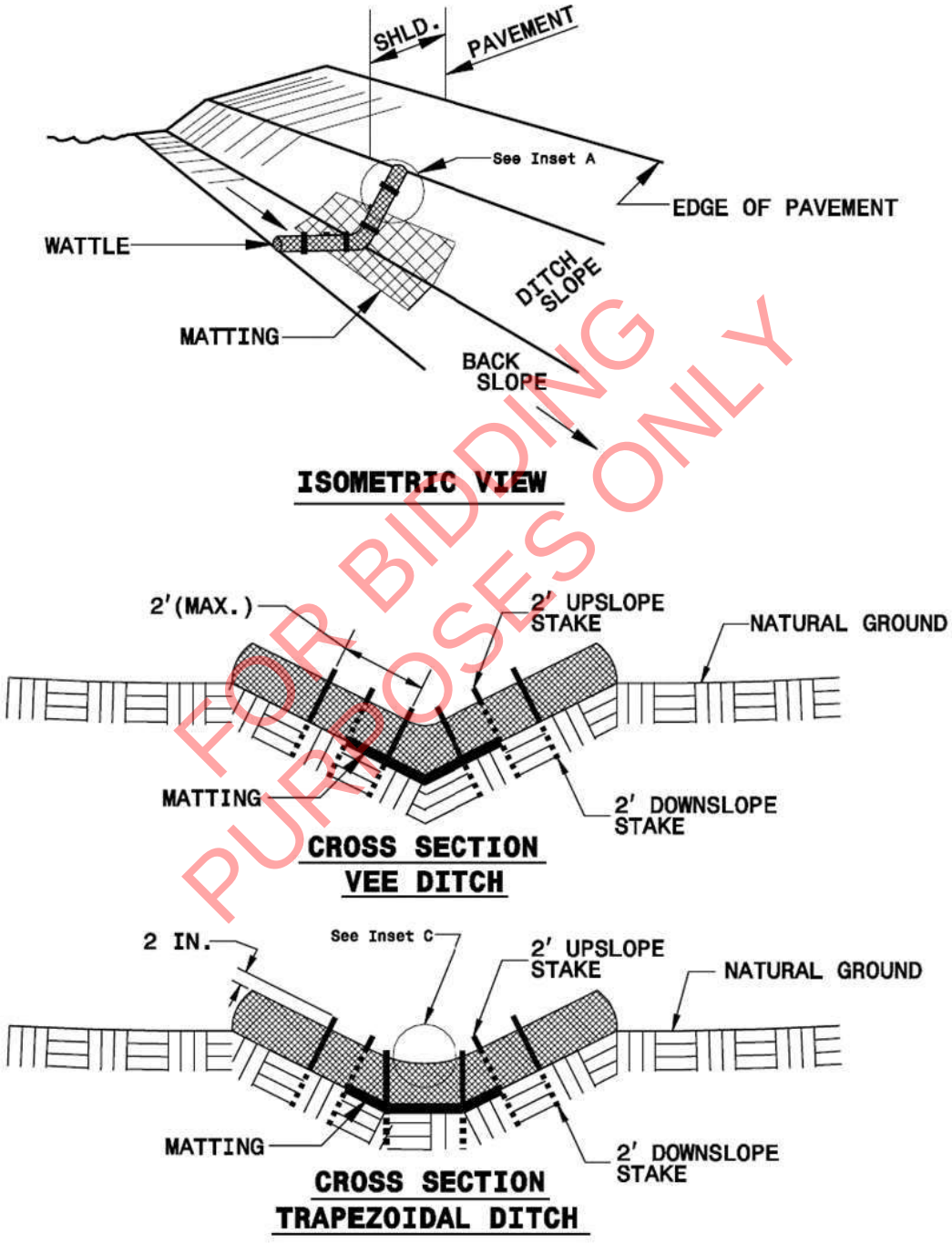
FOR BIDDING PURPOSES ONLY

U.S. Environmental Protection Agency. 2002b. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition, EPA-821-R-02-013. https://www.epa.gov/sites/default/files/2015-08/documents/short-term-chronic-freshwater-wet-manual_2002.pdf

U.S. Environmental Protection Agency. 2012. Federal Register / Vol. 77, No. 1 / Tuesday, January 3, 2012. http://www.gpo.gov/fdsys/pkg/FR-2012-01-03/html/2011-33661.htm

FOR BIDDING PURPOSES ONLY

FIBER ROLLS WITH POLYACRYLAMIDE (PAM) DETAIL



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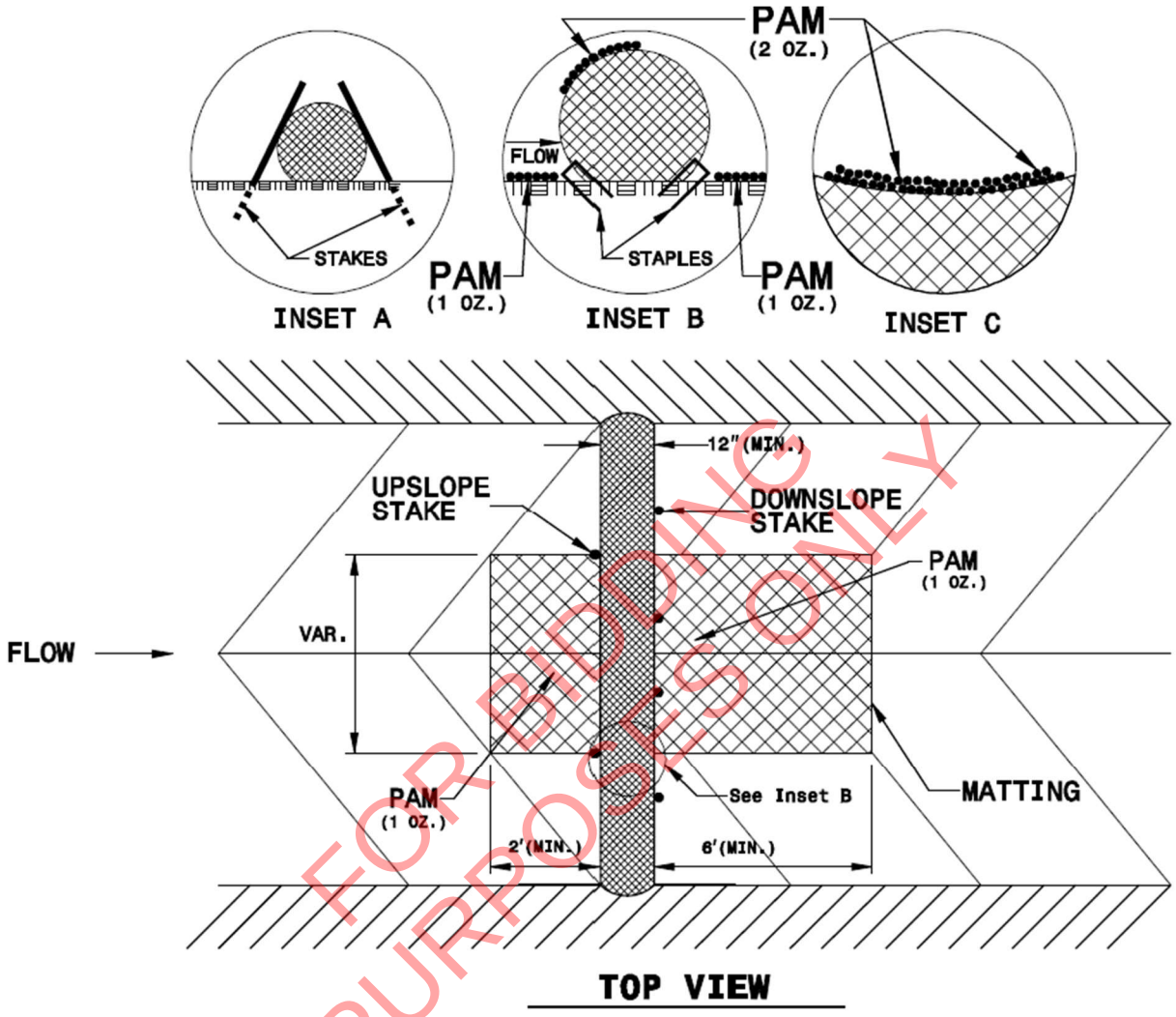
FIBER CHECK DAM WITH POLYMER DETAIL



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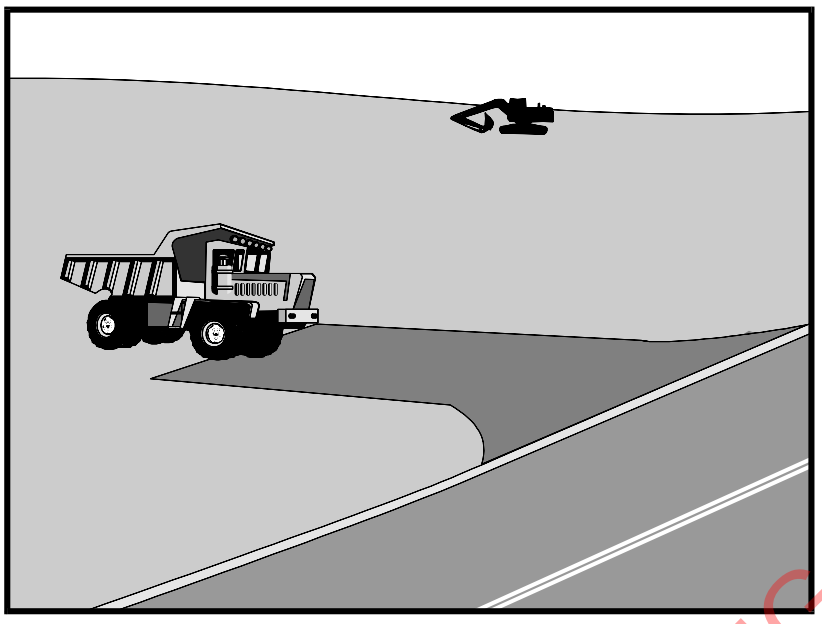
Detail courtesy of North Carolina Department of Transportation
https://connect.ncdot.gov/resources/roadside/SoilWaterDocuments/WattlewithPAMdetail.pdf

Stabilized Construction Entrance/Exit TC-1



Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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FOR BIDDING PURPOSES ONLY

Description and Purpose

A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

Suitable Applications

Use at construction sites:

- Where dirt or mud can be tracked onto public roads.
- Adjacent to water bodies.
- Where poor soils are encountered.
- Where dust is a problem during dry weather conditions.

Limitations

- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water runoff.

Stabilized Construction Entrance/Exit TC-1

Implementation

General

A stabilized construction entrance is a pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right of way, street, alley, sidewalk, or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights of way or streets. Reducing tracking of sediments and other pollutants onto paved roads helps prevent deposition of sediments into local storm drains and production of airborne dust.

Where traffic will be entering or leaving the construction site, a stabilized construction entrance should be used. NPDES permits require that appropriate measures be implemented to prevent tracking of sediments onto paved roadways, where a significant source of sediments is derived from mud and dirt carried out from unpaved roads and construction sites.

Stabilized construction entrances are moderately effective in removing sediment from equipment leaving a construction site. The entrance should be built on level ground. Advantages of the Stabilized Construction Entrance/Exit is that it does remove some sediment from equipment and serves to channel construction traffic in and out of the site at specified locations. Efficiency is greatly increased when a washing rack is included as part of a stabilized construction entrance/exit.

FOR BIDDING PURPOSES ONLY

Design and Layout

- Construct on level ground where possible.
- Select 3 to 6 in. diameter stones.
- Use minimum depth of stones of 12 in. or as recommended by soils engineer.
- Construct length of 50 ft or maximum site will allow, and 10 ft minimum width or to accommodate traffic.
- Rumble racks constructed of steel panels with ridges and installed in the stabilized entrance/exit will help remove additional sediment and to keep adjacent streets clean.
- Provide ample turning radii as part of the entrance.
- Limit the points of entrance/exit to the construction site.
- Limit speed of vehicles to control dust.
- Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Route runoff from stabilized entrances/exits through a sediment trapping device before discharge.
- Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.

- Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions. Do not use asphalt concrete (AC) grindings for stabilized construction access/roadway.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth, or place aggregate to a depth recommended by a geotechnical engineer. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.
- Designate combination or single purpose entrances and exits to the construction site.
- Require that all employees, subcontractors, and suppliers utilize the stabilized construction access.
- Implement SE-7, Street Sweeping and Vacuuming, as needed.
- All exit locations intended to be used for more than a two-week period should have stabilized construction entrance/exit BMPs.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMPs are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect local roads adjacent to the site daily. Sweep or vacuum to remove visible accumulated sediment.
- Remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment.
- Keep all temporary roadway ditches clear.
- Check for damage and repair as needed.
- Replace gravel material when surface voids are visible.
- Remove all sediment deposited on paved roadways within 24 hours.
- Remove gravel and filter fabric at completion of construction

FOR BIDDING PURPOSES ONLY

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, USEPA Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April 1992.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters, EPA 840-B-9-002, USEPA, Office of Water, Washington, DC, 1993.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

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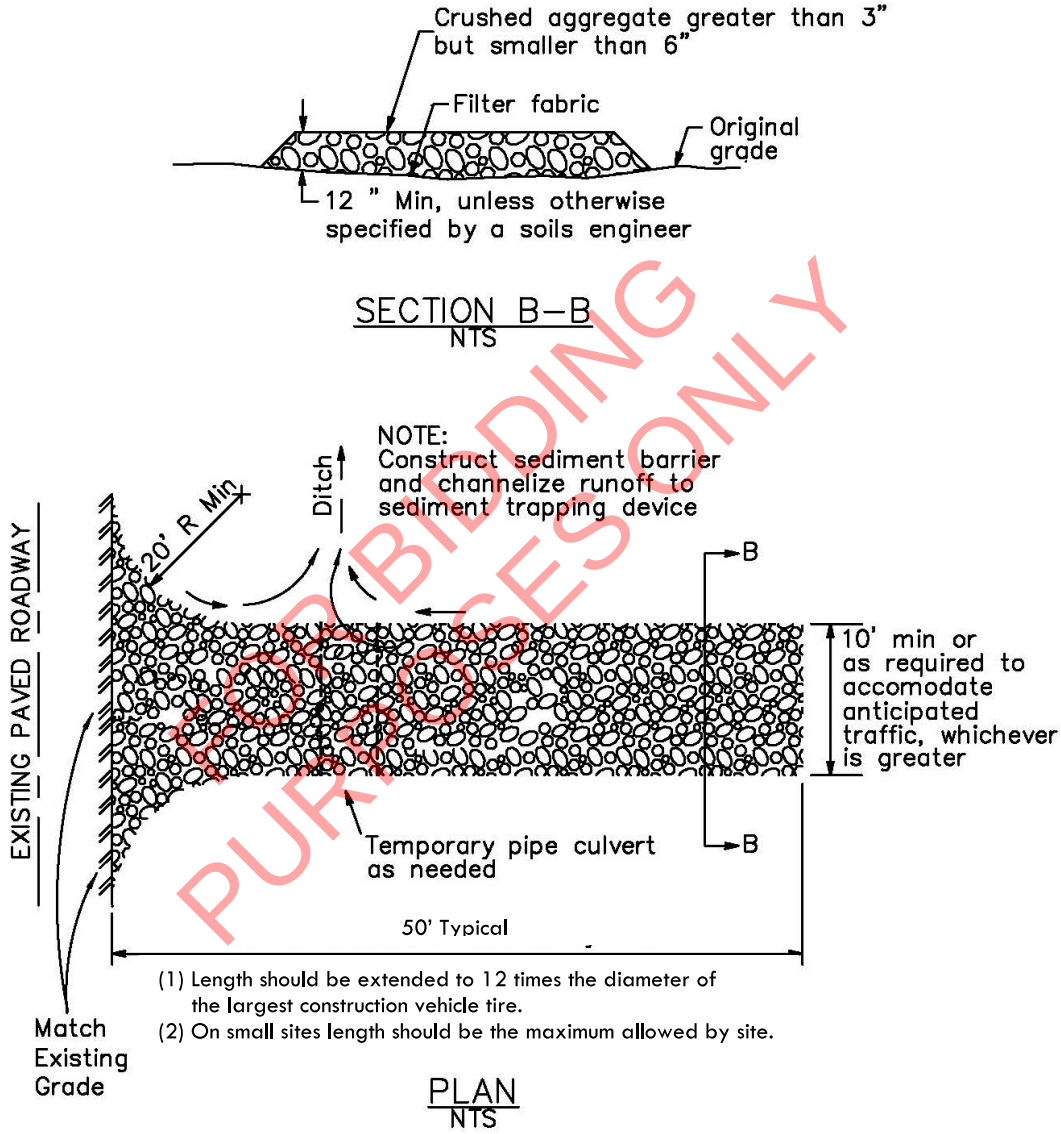
Stabilized Construction Entrance/Exit TC-1



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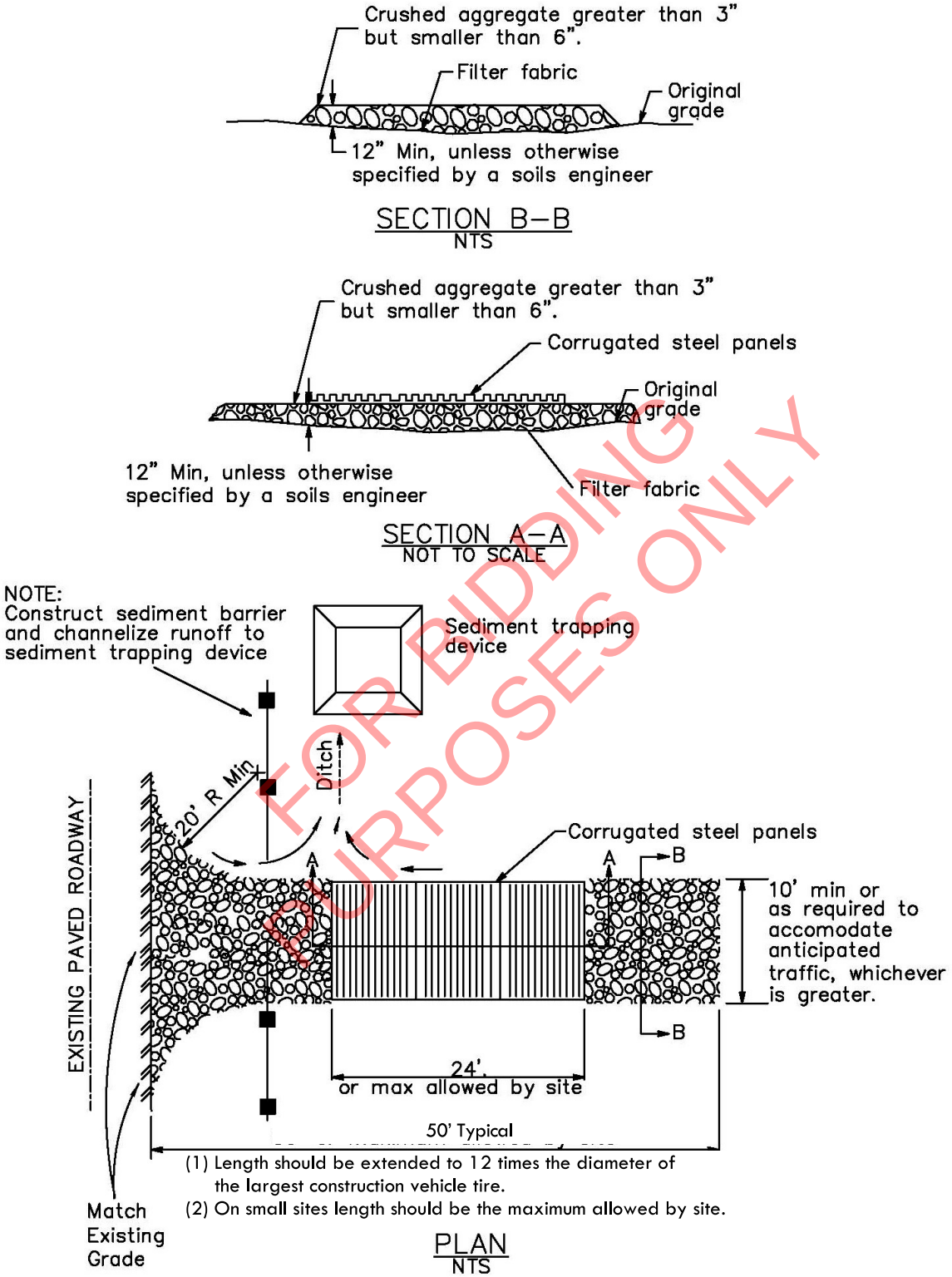
Stabilized Construction Entrance/Exit TC-1



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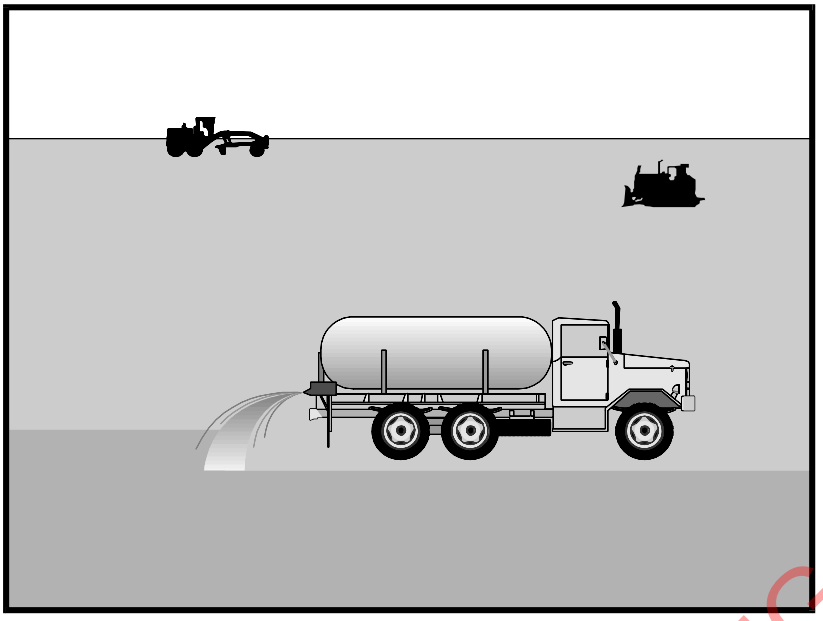
Wind Erosion Control WE-1



Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	☑
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

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Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

California's Mediterranean climate, with a short "wet" season and a typically long, hot "dry" season, allows the soils to thoroughly dry out. During the dry season, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking, and dust generated by construction equipment. Site conditions and climate can make dust control more of an erosion problem than water-based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- Soils and debris storage piles
- Batch drop from front-end loaders
- Areas with unstabilized soil
- Final grading/site stabilization

Limitations

- Watering prevents dust only for a short period (generally less than a few hours) and should be applied daily (or more often) to be effective.
- Over watering may cause erosion and track-out.
- Oil or oil-treated subgrade should not be used for dust control because the oil may migrate into drainageways and/or seep into the soil.
- Chemical dust suppression agents may have potential environmental impacts. Selected chemical dust control agents should be environmentally benign.
- Effectiveness of controls depends on soil, temperature, humidity, wind velocity and traffic.
- Chemical dust suppression agents should not be used within 100 feet of wetlands or water bodies.
- Chemically treated subgrades may make the soil water repellant, interfering with long-term infiltration and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.
- If the soil surface has minimal natural moisture, the affected area may need to be pre-wetted so that chemical dust control agents can uniformly penetrate the soil surface.

FOR BIDDING PURPOSES ONLY

Implementation

Dust Control Practices

Dust control BMPs generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. The following table presents dust control practices that can be applied to varying site conditions that could potentially cause dust. For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications. Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic. Preventive measures include

minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph or less, and controlling the number and activity of vehicles on a site at any given time.

Chemical dust suppressants include: mulch and fiber based dust palliatives (e.g. paper mulch with gypsum binder), salts and brines (e.g. calcium chloride, magnesium chloride), non-petroleum based organics (e.g. vegetable oil, lignosulfonate), petroleum based organics (e.g. asphalt emulsion, dust oils, petroleum resins), synthetic polymers (e.g. polyvinyl acetate, vinyl, acrylic), clay additives (e.g. bentonite, montmorillonite) and electrochemical products (e.g. enzymes, ionic products).

Site Condition	Dust Control Practices							
	Permanent Vegetation	Mulching	Wet Suppression (Watering)	Chemical Dust Suppression	Gravel or Asphalt	Temporary Gravel Construction Entrances/Equipment Wash Down	Synthetic Covers	Minimize Extent of Disturbed Area
Disturbed Areas not Subject to Traffic	X	X	X	X	X			X
Disturbed Areas Subject to Traffic			X	X	X	X		X
Material Stockpiles		X	X	X			X	X
Demolition			X			X	X	
Clearing/ Excavation			X	X				X
Truck Traffic on Unpaved Roads			X	X	X	X	X	
Tracking					X	X		

FOR BIDDING PURPOSES ONLY

Additional preventive measures include:

- Schedule construction activities to minimize exposed area (see EC-1, Scheduling).
- Quickly treat exposed soils using water, mulching, chemical dust suppressants, or stone/gravel layering.
- Identify and stabilize key access points prior to commencement of construction.
- Minimize the impact of dust by anticipating the direction of prevailing winds.
- Restrict construction traffic to stabilized roadways within the project site, as practicable.
- Water should be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment should be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit should be available at all times to apply water or dust palliative to the project.
- If reclaimed waste water is used, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality

Control Board (RWQCB) requirements. Non-potable water should not be conveyed in tanks or drain pipes that will be used to convey potable water and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes, and other conveyances should be marked, "NON-POTABLE WATER - DO NOT DRINK."

- Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Provide covers for haul trucks transporting materials that contribute to dust.
- Provide for rapid clean up of sediments deposited on paved roads. Furnish stabilized construction road entrances and wheel wash areas.
- Stabilize inactive areas of construction sites using temporary vegetation or chemical stabilization methods.

For chemical stabilization, there are many products available for chemically stabilizing gravel roadways and stockpiles. If chemical stabilization is used, the chemicals should not create any adverse effects on stormwater, plant life, or groundwater and should meet all applicable regulatory requirements.

FOR BIDDING PURPOSES ONLY

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check areas protected to ensure coverage.
- Most water-based dust control measures require frequent application, often daily or even multiple times per day. Obtain vendor or independent information on longevity of chemical dust suppressants.

References and Additional Resources

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

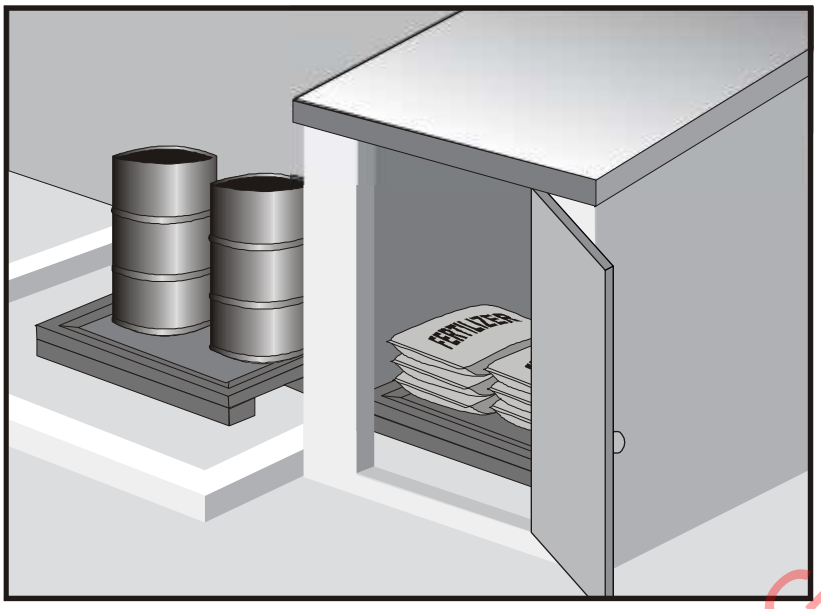
California Air Pollution Control Laws, California Air Resources Board, updated annually.

Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, California Air Resources Board, April 1991.

Material Delivery and Storage WM-1



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in watertight containers and/or a completely enclosed designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see WM-2, Material Use, or WM-4, Spill Prevention and Control. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

- Asphalt and concrete components
- Hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Concrete compounds
- Other materials that may be detrimental if released to the environment

Limitations

- Space limitation may preclude indoor storage.
- Storage sheds often must meet building and fire code requirements.

Implementation

The following steps should be taken to minimize risk:

- Chemicals must be stored in water tight containers with appropriate secondary containment or in a storage shed.
- When a material storage area is located on bare soil, the area should be lined and bermed.
- Use containment pallets or other practical and available solutions, such as storing materials within newly constructed buildings or garages, to meet material storage requirements.
- Stack erodible landscape material on pallets and cover when not in use.
- Contain all fertilizers and other landscape materials when not in use.
- Temporary storage areas should be located away from vehicular traffic.
- Material Safety Data Sheets (MSDS) should be available on-site for all materials stored that have the potential to effect water quality.
- Construction site areas should be designated for material delivery and storage.
- Material delivery and storage areas should be located away from waterways, if possible.
  - Avoid transport near drainage paths or waterways.
  - Surround with earth berms or other appropriate containment BMP. See EC-9, Earth Dikes and Drainage Swales.
  - Place in an area that will be paved.
- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes of your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. See the Flammable and Combustible Liquid Code, NFPA30.
- An up to date inventory of materials delivered and stored onsite should be kept.

FOR BIDDING PURPOSES ONLY

- Hazardous materials storage onsite should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- Keep ample spill cleanup supplies appropriate for the materials being stored. Ensure that cleanup supplies are in a conspicuous, labeled area.
- Employees and subcontractors should be trained on the proper material delivery and storage practices.
- Employees trained in emergency spill cleanup procedures must be present when dangerous materials or liquid chemicals are unloaded.
- If significant residual materials remain on the ground after construction is complete, properly remove and dispose of materials and any contaminated soil. See WM-7, Contaminated Soil Management. If the area is to be paved, pave as soon as materials are removed to stabilize the soil.

Material Storage Areas and Practices

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 should be stored in approved containers and drums and should not be overfilled. Containers and drums should be placed in temporary containment facilities for storage.
- A temporary containment facility should provide for a spill containment volume able to contain precipitation from a 25-year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest container within its boundary, whichever is greater.
- A temporary containment facility should be impervious to the materials stored therein for a minimum contact time of 72 hours.
- A temporary containment facility should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be collected and placed into drums. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. All collected liquids or non-hazardous liquids should be sent to an approved disposal site.
- Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Materials should be covered prior to, and during rain events.
- Materials should be stored in their original containers and the original product labels should be maintained in place in a legible condition. Damaged or otherwise illegible labels should be replaced immediately.

FOR BIDDING PURPOSES ONLY

- Bagged and boxed materials should be stored on pallets and should not be allowed to accumulate on the ground. To provide protection from wind and rain throughout the rainy season, bagged and boxed materials should be covered during non-working days and prior to and during rain events.
- Stockpiles should be protected in accordance with WM-3, Stockpile Management.
- Materials should be stored indoors within existing structures or completely enclosed storage sheds when available.
- Proper storage instructions should be posted at all times in an open and conspicuous location.
- An ample supply of appropriate spill clean up material should be kept near storage areas.
- Also see WM-6, Hazardous Waste Management, for storing of hazardous wastes.

Material Delivery Practices

- Keep an accurate, up-to-date inventory of material delivered and stored onsite.
- Arrange for employees trained in emergency spill cleanup procedures to be present when dangerous materials or liquid chemicals are unloaded.

Spill Cleanup

- Contain and clean up any spill immediately.
- Properly remove and dispose of any hazardous materials or contaminated soil if significant residual materials remain on the ground after construction is complete. See WM-7, Contaminated Soil Management.
- See WM-4, Spill Prevention and Control, for spills of chemicals and/or hazardous materials.
- If spills or leaks of materials occur that are not contained and could discharge to surface waters, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

FOR BIDDING PURPOSES ONLY

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep storage areas clean and well organized, including a current list of all materials onsite.
- Inspect labels on containers for legibility and accuracy.
- Repair or replace perimeter controls, containment structures, covers, and liners as needed to maintain proper function.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

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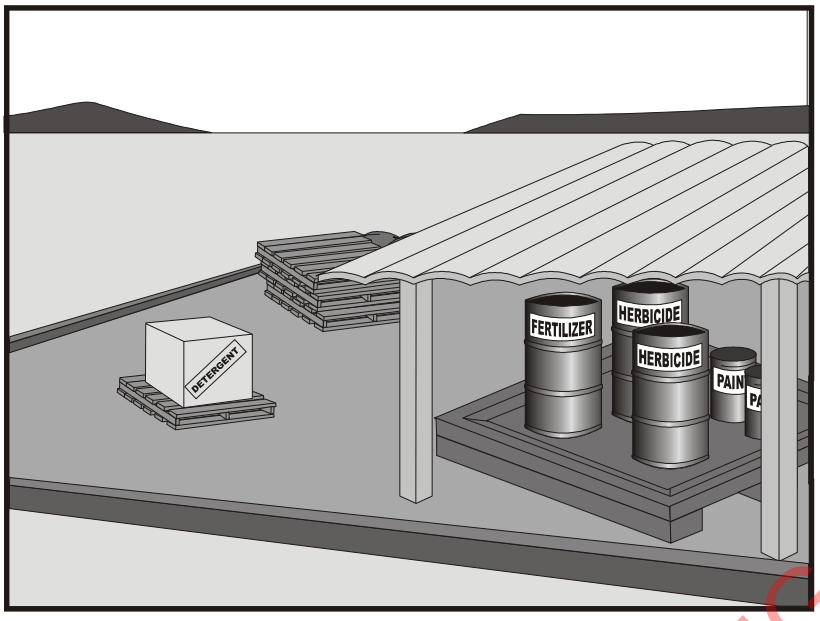
Material Use WM-2



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for use at all construction projects. These procedures apply when the following materials are used or prepared onsite:

- Pesticides and herbicides
- Fertilizers
- Detergents
- Petroleum products such as fuel, oil, and grease
- Asphalt and other concrete components
- Other hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Other materials that may be detrimental if released to the environment

Limitations

Safer alternative building and construction products may not be available or suitable in every instance.

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Implementation

The following steps should be taken to minimize risk:

- Minimize use of hazardous materials onsite.
- Follow manufacturer instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- Train personnel who use pesticides. The California Department of Pesticide Regulation and county agricultural commissioners license pesticide dealers, certify pesticide applicators, and conduct onsite inspections.
- The preferred method of termiticide application is soil injection near the existing or proposed structure foundation/slab; however, if not feasible, soil drench application of termiticides should follow EPA label guidelines and the following recommendations (most of which are applicable to most pesticide applications):
  - Do not treat soil that is water-saturated or frozen.
  - Application shall not commence within 24-hours of a predicted precipitation event with a 40% or greater probability. Weather tracking must be performed on a daily basis prior to termiticide application and during the period of termiticide application.
  - Do not allow treatment chemicals to runoff from the target area. Apply proper quantity to prevent excess runoff. Provide containment for and divert stormwater from application areas using berms or diversion ditches during application.
  - Dry season: Do not apply within 10 feet of storm drains. Do not apply within 25 feet of aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds).
  - Wet season: Do not apply within 50 feet of storm drains or aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds) unless a vegetative buffer is present (if so, refer to dry season requirements).
  - Do not make on-grade applications when sustained wind speeds are above 10 mph (at application site) at nozzle end height.
  - Cover treatment site prior to a rain event in order to prevent run-off of the pesticide into non-target areas. The treated area should be limited to a size that can be backfilled and/or covered by the end of the work shift. Backfilling or covering of the treated area shall be done by the end of the same work shift in which the application is made.
  - The applicator must either cover the soil him/herself or provide written notification of the above requirement to the contractor on site and to the person commissioning the application (if different than the contractor). If notice is provided to the contractor or the person commissioning the application, then they are responsible under the Federal Insecticide Fungicide, and Rodenticide Act (FIFRA) to ensure that: 1) if the concrete slab cannot be poured over the treated soil within 24 hours of application, the treated soil is

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covered with a waterproof covering (such as polyethylene sheeting), and 2) the treated soil is covered if precipitation is predicted to occur before the concrete slab is scheduled to be poured.

- Do not over-apply fertilizers, herbicides, and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Unless on steep slopes, till fertilizers into the soil rather than hydraulic application. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried offsite by runoff. Do not apply these chemicals before predicted rainfall.
- Train employees and subcontractors in proper material use.
- Supply Material Safety Data Sheets (MSDS) for all materials.
- Dispose of latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths, when thoroughly dry and are no longer hazardous, with other construction debris.
- Do not remove the original product label; it contains important safety and disposal information. Use the entire product before disposing of the container.
- Mix paint indoors or in a containment area. Never clean paintbrushes or rinse paint containers into a street, gutter, storm drain, or watercourse. Dispose of any paint thinners, residue, and sludge(s) that cannot be recycled, as hazardous waste.
- For water-based paint, clean brushes to the extent practicable, and rinse to a drain leading to a sanitary sewer where permitted or contain for proper disposal off site. For oil-based paints, clean brushes to the extent practicable, and filter and reuse thinners and solvents.
- Use recycled and less hazardous products when practical. Recycle residual paints, solvents, non-treated lumber, and other materials.
- Use materials only where and when needed to complete the construction activity. Use safer alternative materials as much as possible. Reduce or eliminate use of hazardous materials onsite when practical.
- Document the location, time, chemicals applied, and applicator's name and qualifications.
- Keep an ample supply of spill clean up material near use areas. Train employees in spill clean up procedures.
- Avoid exposing applied materials to rainfall and runoff unless sufficient time has been allowed for them to dry.
- Discontinue use of erodible landscape material within 2 days prior to a forecasted rain event and materials should be covered and/or bermed.
- Provide containment for material use areas such as masons' areas or paint mixing/preparation areas to prevent materials/pollutants from entering stormwater.

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Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Ensure employees and subcontractors throughout the job are using appropriate practices.

References and Additional Resources

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Comments on Risk Assessments Risk Reduction Options for Cypermethrin: Docket No. OPP–2005–0293; California Stormwater Quality Association (CASQA) letter to USEPA, 2006.Environmental Hazard and General Labeling for Pyrethroid Non-Agricultural Outdoor Products, EPA-HQ-OPP-2008-0331-0021; USEPA, 2008.

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

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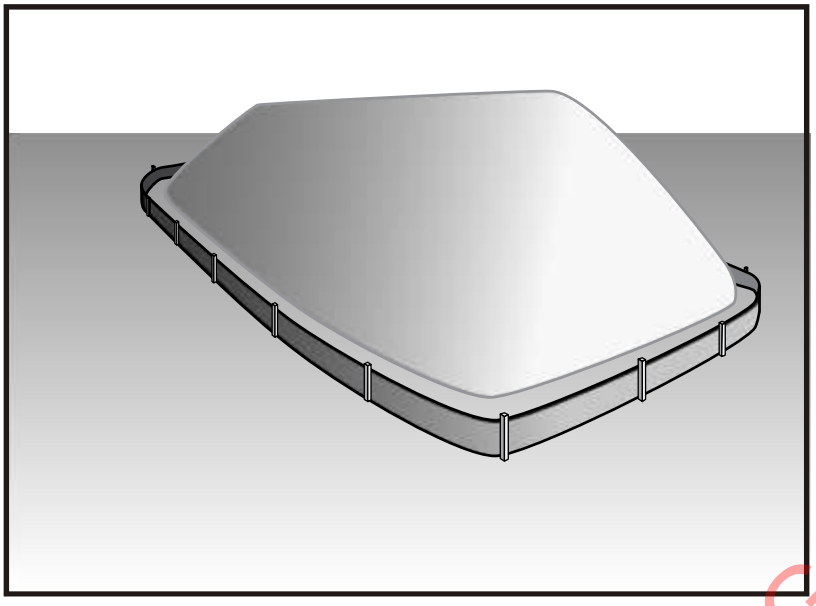
Stockpile Management WM-3



Treat Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as Portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of Plastic materials and photodegradable plastics should be avoided.

Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

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- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.
- After 14 days of inactivity, a stockpile is non-active and requires further protection described below. All stockpiles are required to be protected as non-active stockpiles immediately if they are not scheduled to be used within 14 days.
- Protect all stockpiles from stormwater run-on using temporary perimeter sediment barriers such as compost berms (SE-13), temporary silt dikes (SE-12), fiber rolls (SE-5), silt fences (SE-1), sandbags (SE-8), gravel bags (SE-6), or biofilter bags (SE-14). Refer to the individual fact sheet for each of these controls for installation information.
- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.
- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.
- Place bagged materials on pallets and under cover.
- Ensure that stockpile coverings are installed securely to protect from wind and rain.
- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.

Protection of Non-Active Stockpiles

A stockpile is considered non-active if it either is not used for 14 days or if it is scheduled not to be used for 14 days or more. Stockpiles need to be protected immediately if they are not scheduled to be used within 14 days. Non-active stockpiles of the identified materials should be protected as follows:

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Soil stockpiles

- Soil stockpiles should be covered or protected with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- Temporary vegetation should be considered for topsoil piles that will be stockpiled for extended periods.

Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate sub base

- Stockpiles should be covered and protected with a temporary perimeter sediment barrier at all times.

Stockpiles of "cold mix"

- Cold mix stockpiles should be placed on and covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Stockpiles of fly ash, stucco, hydrated lime

- Stockpiles of materials that may raise the pH of runoff (i.e., basic materials) should be covered with plastic and surrounded by a berm.

Stockpiles/Storage of treated wood

- Treated wood should be covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Protection of Active Stockpiles

A stockpile is active when it is being used or is scheduled to be used within 14 days of the previous use. Active stockpiles of the identified materials should be protected as follows:

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of "cold mix" and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.
- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff should be diverted around or away from the stockpile on the upstream perimeter.

Inspection and Maintenance

- Stockpiles must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- It may be necessary to inspect stockpiles covered with plastic sheeting more frequently during certain conditions (for example, high winds or extreme heat).
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the barrier height.

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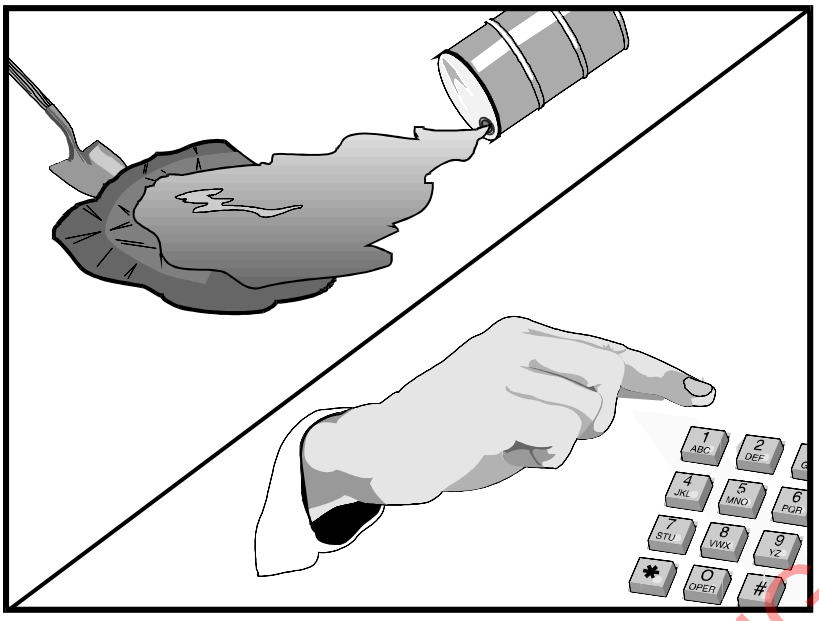
References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Spill Prevention and Control WM-4



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

- Fuels
- Lubricants
- Other petroleum distillates

Limitations

- In some cases, it may be necessary to use a private spill cleanup company.
- This BMP applies to spills caused by the contractor and subcontractors.
- Procedures and practices presented in this BMP are general. Contractor should identify appropriate practices for the specific materials used or stored onsite

Implementation

The following steps will help reduce the stormwater impacts of leaks and spills:

Education

- Be aware that different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- Have contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater runon during rainfall to the extent that it doesn't compromise clean up activities.
- Do not bury or wash spills with water.

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- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

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Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
  - Contain the spread of the spill.
  - Recover spilled materials.
  - Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

- Spills should be cleaned up immediately:
  - Contain spread of the spill.
  - Notify the project foreman immediately.
  - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
  - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
  - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
  - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
  - Notify the Governor's Office of Emergency Services Warning Center, (916) 845-8911.
  - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
  - Notification should first be made by telephone and followed up with a written report.
  - The services of a spill's contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
  - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.

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Reporting

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Regularly inspect onsite vehicles and equipment for leaks and repair immediately
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

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Vehicle and Equipment Fueling

- If fueling must occur onsite, use designate areas, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Discourage "topping off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.

- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

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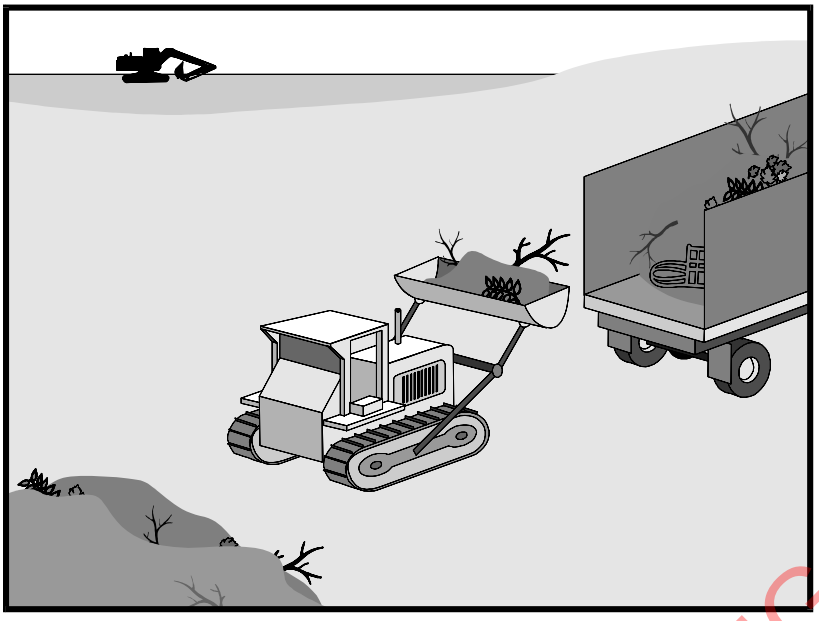
Solid Waste Management WM-5



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for construction sites where the following wastes are generated or stored:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction
- Packaging materials including wood, paper, and plastic
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces, and masonry products
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes
- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials

- Highway planting wastes, including vegetative material, plant containers, and packaging materials

Limitations

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

Implementation

The following steps will help keep a clean site and reduce stormwater pollution:

- Select designated waste collection areas onsite.
- Inform trash-hauling contractors that you will accept only watertight dumpsters for onsite use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Locate containers in a covered area or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
- Cover waste containers at the end of each work day and when it is raining.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during rainy and windy conditions.
- Remove this solid waste promptly since erosion and sediment control devices tend to collect litter.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- Arrange for regular waste collection before containers overflow.
- Clean up immediately if a container does spill.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.

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Education

- Have the contractor's superintendent or representative oversee and enforce proper solid waste management procedures and practices.
- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.

- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Require that employees and subcontractors follow solid waste handling and storage procedures.
- Prohibit littering by employees, subcontractors, and visitors.
- Minimize production of solid waste materials wherever possible.

Collection, Storage, and Disposal

- Littering on the project site should be prohibited.
- To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines should be a priority.
- Trash receptacles should be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Litter from work areas within the construction limits of the project site should be collected and placed in watertight dumpsters at least weekly, regardless of whether the litter was generated by the contractor, the public, or others. Collected litter and debris should not be placed in or next to drain inlets, stormwater drainage systems, or watercourses.
- Dumpsters of sufficient size and number should be provided to contain the solid waste generated by the project.
- Full dumpsters should be removed from the project site and the contents should be disposed of by the trash hauling contractor.
- Construction debris and waste should be removed from the site biweekly or more frequently as needed.
- Construction material visible to the public should be stored or stacked in an orderly manner.
- Stormwater runon should be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
- Solid waste storage areas should be located at least 50 ft from drainage facilities and watercourses and should not be located in areas prone to flooding or ponding.
- Except during fair weather, construction and highway planting waste not stored in watertight dumpsters should be securely covered from wind and rain by covering the waste with tarps or plastic.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.

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- For disposal of hazardous waste, see WM-6, Hazardous Waste Management. Have hazardous waste hauled to an appropriate disposal and/or recycling facility.
- Salvage or recycle useful vegetation debris, packaging and surplus building materials when practical. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Inspect construction waste area regularly.
- Arrange for regular waste collection.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

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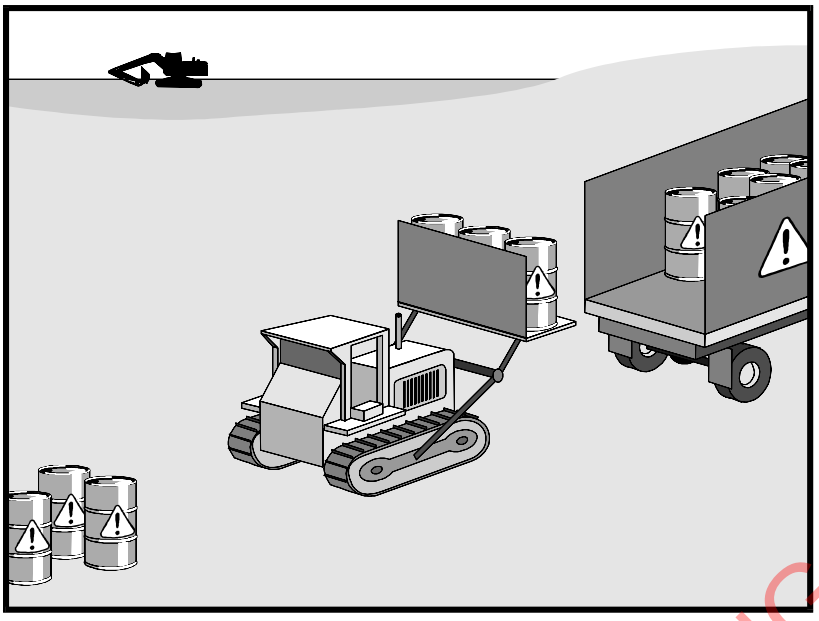
Hazardous Waste Management WM-6



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Hazardous waste management practices are implemented on construction projects that generate waste from the use of:

- Petroleum Products
- Asphalt Products
- Concrete Curing Compounds
- Pesticides
- Palliatives
- Acids
- Septic Wastes
- Paints
- Stains
- Solvents
- Wood Preservatives
- Roofing Tar
- Any materials deemed a hazardous waste in California, Title 22 Division 4.5, or listed in 40 CFR Parts 110, 117, 261, or 302

In addition, sites with existing structures may contain wastes, which must be disposed of in accordance with federal, state, and local regulations. These wastes include:

- Sandblasting grit mixed with lead-, cadmium-, or chromium-based paints
- Asbestos
- PCBs (particularly in older transformers)

Limitations

- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Nothing in this BMP relieves the contractor from responsibility for compliance with federal, state, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.
- This BMP does not cover aerially deposited lead (ADL) soils. For ADL soils refer to WM-7, Contaminated Soil Management.

Implementation

The following steps will help reduce stormwater pollution from hazardous wastes:

Material Use

- Wastes should be stored in sealed containers constructed of a suitable material and should be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172, 173, 178, and 179.
- All hazardous waste should be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.
- Waste containers should be stored in temporary containment facilities that should comply with the following requirements:
  - Temporary containment facility should provide for a spill containment volume equal to 1.5 times the volume of all containers able to contain precipitation from a 25-year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest tank within its boundary, whichever is greater.
  - Temporary containment facility should be impervious to the materials stored there for a minimum contact time of 72 hours.
  - Temporary containment facilities should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be placed into drums after each rainfall. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. Non-hazardous liquids should be sent to an approved disposal site.
  - Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.

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- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.

- Throughout the rainy season, temporary containment facilities should be covered during non-working days, and prior to rain events. Covered facilities may include use of plastic tarps for small facilities or constructed roofs with overhangs.

- Drums should not be overfilled, and wastes should not be mixed.

- Unless watertight, containers of dry waste should be stored on pallets.

- Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over application is expensive and environmentally harmful. Apply surface dressings in several smaller applications, as opposed to one large application. Allow time for infiltration and avoid excess material being carried offsite by runoff. Do not apply these chemicals just before it rains. People applying pesticides must be certified in accordance with federal and state regulations.

- Paint brushes and equipment for water and oil-based paints should be cleaned within a contained area and should not be allowed to contaminate site soils, watercourses, or drainage systems. Waste paints, thinners, solvents, residues, and sludges that cannot be recycled or reused should be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths should be disposed of as solid waste.

- Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. "Paint out" brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and reuse thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste.

- The following actions should be taken with respect to temporary contaminant:

  - Ensure that adequate hazardous waste storage volume is available.

  - Ensure that hazardous waste collection containers are conveniently located.

  - Designate hazardous waste storage areas onsite away from storm drains or watercourses and away from moving vehicles and equipment to prevent accidental spills.

  - Minimize production or generation of hazardous materials and hazardous waste on the job site.

  - Use containment berms in fueling and maintenance areas and where the potential for spills is high.

  - Segregate potentially hazardous waste from non-hazardous construction site debris.

  - Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.

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- Clearly label all hazardous waste containers with the waste being stored and the date of accumulation.
- Place hazardous waste containers in secondary containment.
- Do not allow potentially hazardous waste materials to accumulate on the ground.
- Do not mix wastes.
- Use all of the product before disposing of the container.
- Do not remove the original product label; it contains important safety and disposal information.

Waste Recycling Disposal

- Select designated hazardous waste collection areas onsite.
- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes, this can cause chemical reactions, making recycling impossible and complicating disposal.
- Recycle any useful materials such as used oil or water-based paint.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Arrange for regular waste collection before containers overflow.
- Make sure that hazardous waste (e.g., excess oil-based paint and sludge) is collected, removed, and disposed of only at authorized disposal areas.

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Disposal Procedures

- Waste should be disposed of by a licensed hazardous waste transporter at an authorized and licensed disposal facility or recycling facility utilizing properly completed Uniform Hazardous Waste Manifest forms.
- A Department of Health Services certified laboratory should sample waste to determine the appropriate disposal facility.
- Properly dispose of rainwater in secondary containment that may have mixed with hazardous waste.
- Attention is directed to "Hazardous Material", "Contaminated Material", and "Aerially Deposited Lead" of the contract documents regarding the handling and disposal of hazardous materials.

Education

- Educate employees and subcontractors on hazardous waste storage and disposal procedures.
- Educate employees and subcontractors on potential dangers to humans and the environment from hazardous wastes.
- Instruct employees and subcontractors on safety procedures for common construction site hazardous wastes.
- Instruct employees and subcontractors in identification of hazardous and solid waste.
- Hold regular meetings to discuss and reinforce hazardous waste management procedures (incorporate into regular safety meetings).
- The contractor's superintendent or representative should oversee and enforce proper hazardous waste management procedures and practices.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Warning signs should be placed in areas recently treated with chemicals.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- If a container does spill, clean up immediately.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Hazardous waste should be regularly collected.
- A foreman or construction supervisor should monitor onsite hazardous waste storage and disposal procedures.
- Waste storage areas should be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored.
- Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.
- Hazardous spills should be cleaned up and reported in conformance with the applicable Material Safety Data Sheet (MSDS) and the instructions posted at the project site.

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- The National Response Center, at (800) 424-8802, should be notified of spills of federal reportable quantities in conformance with the requirements in 40 CFR parts 110, 117, and 302. Also notify the Governors Office of Emergency Services Warning Center at (916) 845-8911.
- A copy of the hazardous waste manifests should be provided.

References and Additional Resources

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

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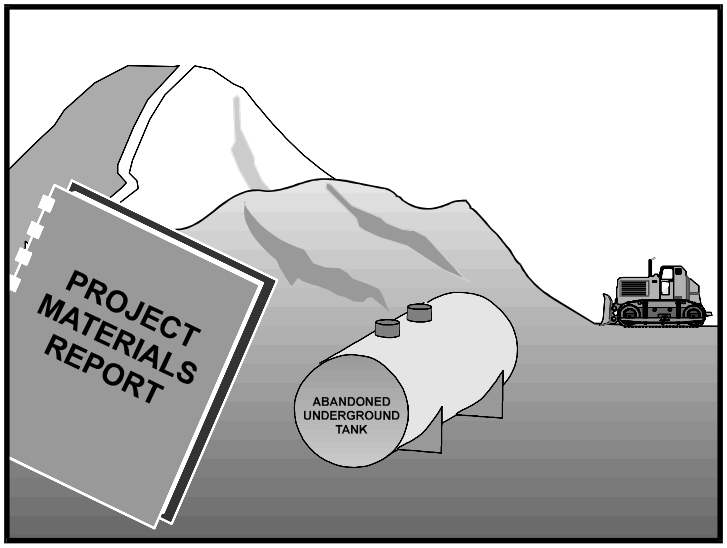
Contaminated Soil Management WM-7



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.

Suitable Applications

Contaminated soil management is implemented on construction projects in highly urbanized or industrial areas where soil contamination may have occurred due to spills, illicit discharges, aerial deposition, past use and leaks from underground storage tanks.

Limitations

Contaminated soils that cannot be treated onsite must be disposed of offsite by a licensed hazardous waste hauler. The presence of contaminated soil may indicate contaminated water as well. See NS-2, Dewatering Operations, for more information.

The procedures and practices presented in this BMP are general. The contractor should identify appropriate practices and procedures for the specific contaminants known to exist or discovered onsite.

Implementation

Most owners and developers conduct pre-construction environmental assessments as a matter of routine. Contaminated soils are often identified during project planning and development with known locations identified in the plans, specifications and in the SWPPP. The contractor should review applicable reports and investigate appropriate call-outs in the

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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plans, specifications, and SWPPP. Recent court rulings holding contractors liable for cleanup costs when they unknowingly move contaminated soil highlight the need for contractors to confirm a site assessment is completed before earth moving begins.

The following steps will help reduce stormwater pollution from contaminated soil:

- Conduct thorough, pre-construction inspections of the site and review documents related to the site. If inspection or reviews indicated presence of contaminated soils, develop a plan before starting work.
- Look for contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
- Prevent leaks and spills. Contaminated soil can be expensive to treat and dispose of properly. However, addressing the problem before construction is much less expensive than after the structures are in place.
- The contractor may further identify contaminated soils by investigating:
  - Past site uses and activities
  - Detected or undetected spills and leaks
  - Acid or alkaline solutions from exposed soil or rock formations high in acid or alkaline forming elements
  - Contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
  - Suspected soils should be tested at a certified laboratory.

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Education

- Have employees and subcontractors complete a safety training program which meets 29 CFR 1910.120 and 8 CCR 5192 covering the potential hazards as identified, prior to performing any excavation work at the locations containing material classified as hazardous.
- Educate employees and subcontractors in identification of contaminated soil and on contaminated soil handling and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).

Handling Procedures for Material with Aerially Deposited Lead (ADL)

- Materials from areas designated as containing (ADL) may, if allowed by the contract special provisions, be excavated, transported, and used in the construction of embankments and/or backfill.
- Excavation, transportation, and placement operations should result in no visible dust.
- Caution should be exercised to prevent spillage of lead containing material during transport.

- Quality should be monitored during excavation of soils contaminated with lead.

Handling Procedures for Contaminated Soils

- Minimize onsite storage. Contaminated soil should be disposed of properly in accordance with all applicable regulations. All hazardous waste storage will comply with the requirements in Title 22, CCR, Sections 66265.250 to 66265.260.
- Test suspected soils at an approved certified laboratory.
- Work with the local regulatory agencies to develop options for treatment or disposal if the soil is contaminated.
- Avoid temporary stockpiling of contaminated soils or hazardous material.
- Take the following precautions if temporary stockpiling is necessary:
  - Cover the stockpile with plastic sheeting or tarps.
  - Install a berm around the stockpile to prevent runoff from leaving the area.
  - Do not stockpile in or near storm drains or watercourses.
- Remove contaminated material and hazardous material on exteriors of transport vehicles and place either into the current transport vehicle or into the excavation prior to the vehicle leaving the exclusion zone.
- Monitor the air quality continuously during excavation operations at all locations containing hazardous material.
- Procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work, including registration for transporting vehicles carrying the contaminated material and the hazardous material.
- Collect water from decontamination procedures and treat or dispose of it at an appropriate disposal site.
- Collect non-reusable protective equipment, once used by any personnel, and dispose of at an appropriate disposal site.
- Install temporary security fence to surround and secure the exclusion zone. Remove fencing when no longer needed.
- Excavate, transport, and dispose of contaminated material and hazardous material in accordance with the rules and regulations of the following agencies (the specifications of these agencies supersede the procedures outlined in this BMP):
  - United States Department of Transportation (USDOT)
  - United States Environmental Protection Agency (USEPA)
  - California Environmental Protection Agency (CAL-EPA)

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- California Division of Occupation Safety and Health Administration (CAL-OSHA)
- Local regulatory agencies

Procedures for Underground Storage Tank Removals

- Prior to commencing tank removal operations, obtain the required underground storage tank removal permits and approval from the federal, state, and local agencies that have jurisdiction over such work.
- To determine if it contains hazardous substances, arrange to have tested, any liquid or sludge found in the underground tank prior to its removal.
- Following the tank removal, take soil samples beneath the excavated tank and perform analysis as required by the local agency representative(s).
- The underground storage tank, any liquid or sludge found within the tank, and all contaminated substances and hazardous substances removed during the tank removal and transported to disposal facilities permitted to accept such waste.

Water Control

- All necessary precautions and preventive measures should be taken to prevent the flow of water, including ground water, from mixing with hazardous substances or underground storage tank excavations. Such preventative measures may consist of, but are not limited to, berms, cofferdams, grout curtains, freeze walls, and seal course concrete or any combination thereof.
- If water does enter an excavation and becomes contaminated, such water, when necessary to proceed with the work, should be discharged to clean, closed top, watertight transportable holding tanks, treated, and disposed of in accordance with federal, state, and local laws.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for contractor's Water Pollution Control Manager, foreman, and/or construction supervisor to monitor onsite contaminated soil storage and disposal procedures.
- Monitor air quality continuously during excavation operations at all locations containing hazardous material.
- Coordinate contaminated soils and hazardous substances/waste management with the appropriate federal, state, and local agencies.
- Implement WM-4, Spill Prevention and Control, to prevent leaks and spills as much as possible.

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References and Additional Resources

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

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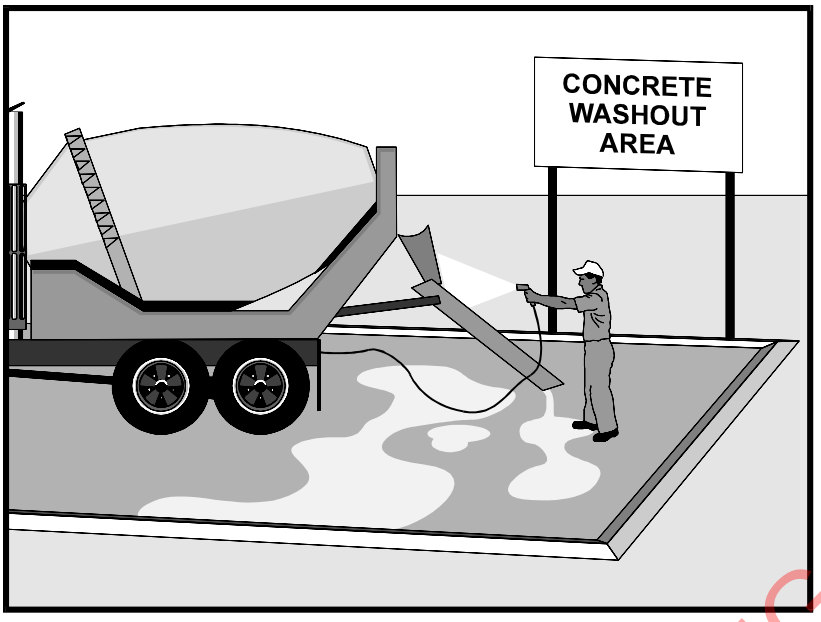
Concrete Waste Management WM-8



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

Prevent the discharge of pollutants to stormwater from concrete waste by conducting washout onsite or offsite in a designated area, and by employee and subcontractor training.

The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows and raising pH to levels outside the accepted range.

Suitable Applications

Concrete waste management procedures and practices are implemented on construction projects where:

- Concrete is used as a construction material or where concrete dust and debris result from demolition activities.
- Slurries containing Portland cement concrete (PCC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.
- Concrete trucks and other concrete-coated equipment are washed onsite.

- Mortar-mixing stations exist.
- Stucco mixing and spraying.
- See also NS-8, Vehicle and Equipment Cleaning.

Limitations

- Offsite washout of concrete wastes may not always be possible.
- Multiple washouts may be needed to assure adequate capacity and to allow for evaporation.

Implementation

The following steps will help reduce stormwater pollution from concrete wastes:

- Incorporate requirements for concrete waste management into material supplier and subcontractor agreements.
- Store dry and wet materials under cover, away from drainage areas. Refer to WM-1, Material Delivery and Storage for more information.
- Avoid mixing excess amounts of concrete.
- Perform washout of concrete trucks in designated areas only, where washout will not reach stormwater.
- Do not wash out concrete trucks into storm drains, open ditches, streets, streams or onto the ground. Trucks should always be washed out into designated facilities.
- Do not allow excess concrete to be dumped onsite, except in designated areas.
- For onsite washout:
  - On larger sites, it is recommended to locate washout areas at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste.
  - Washout wastes into the temporary washout where the concrete can set, be broken up, and then disposed properly.
  - Washouts shall be implemented in a manner that prevents leaching to underlying soils. Washout containers must be water tight and washouts on or in the ground must be lined with a suitable impervious liner, typically a plastic type material.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile or dispose in the trash.
- See typical concrete washout installation details at the end of this fact sheet.

Education

- Educate employees, subcontractors, and suppliers on the concrete waste management techniques described herein.

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- Arrange for contractor's superintendent or representative to oversee and enforce concrete waste management procedures.
- Discuss the concrete management techniques described in this BMP (such as handling of concrete waste and washout) with the ready-mix concrete supplier before any deliveries are made.

Concrete Demolition Wastes

- Stockpile concrete demolition waste in accordance with BMP WM-3, Stockpile Management.
- Dispose of or recycle hardened concrete waste in accordance with applicable federal, state or local regulations.

Concrete Slurry Wastes

- PCC and AC waste should not be allowed to enter storm drains or watercourses.
- PCC and AC waste should be collected and disposed of or placed in a temporary concrete washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below).
- A foreman or construction supervisor should monitor onsite concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented.
- Saw-cut concrete slurry should not be allowed to enter storm drains or watercourses. Residue from grinding operations should be picked up by means of a vacuum attachment to the grinding machine or by sweeping. Saw cutting residue should not be allowed to flow across the pavement and should not be left on the surface of the pavement. See also NS-3, Paving and Grinding Operations; and WM-10, Liquid Waste Management.
- Concrete slurry residue should be disposed in a temporary washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below) and allowed to dry. Dispose of dry slurry residue in accordance with WM-5, Solid Waste Management.

Onsite Temporary Concrete Washout Facility, Transit Truck Washout Procedures

- Temporary concrete washout facilities should be located a minimum of 50 ft from storm drain inlets, open drainage facilities, and watercourses. Each facility should be located away from construction traffic or access areas to prevent disturbance or tracking.
- A sign should be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.
- Temporary concrete washout facilities should be constructed above grade or below grade at the option of the contractor. Temporary concrete washout facilities should be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.

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- Temporary washout facilities should have a temporary pit or bermed areas of sufficient volume to completely contain all liquid and waste concrete materials generated during washout procedures.
- Temporary washout facilities should be lined to prevent discharge to the underlying ground or surrounding area.
- Washout of concrete trucks should be performed in designated areas only.
- Only concrete from mixer truck chutes should be washed into concrete wash out.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed of or recycled offsite.
- Once concrete wastes are washed into the designated area and allowed to harden, the concrete should be broken up, removed, and disposed of per WM-5, Solid Waste Management. Dispose of or recycle hardened concrete on a regular basis.
- Temporary Concrete Washout Facility (Type Above Grade)
  - Temporary concrete washout facility (type above grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft; however, smaller sites or jobs may only need a smaller washout facility. With any washout, always maintain a sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations.
  - Materials used to construct the washout area should conform to the provisions detailed in their respective BMPs (e.g., SE-8 Sandbag Barrier).
  - Plastic lining material should be a minimum of 10 mil in polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.
  - Alternatively, portable removable containers can be used as above grade concrete washouts. Also called a "roll-off"; this concrete washout facility should be properly sealed to prevent leakage and should be removed from the site and replaced when the container reaches 75% capacity.
- Temporary Concrete Washout Facility (Type Below Grade)
  - Temporary concrete washout facilities (type below grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft. The quantity and volume should be sufficient to contain all liquid and concrete waste generated by washout operations.
  - Lath and flagging should be commercial type.
  - Plastic lining material should be a minimum of 10 mil polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.

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- The base of a washout facility should be free of rock or debris that may damage a plastic liner.

Removal of Temporary Concrete Washout Facilities

- When temporary concrete washout facilities are no longer required for the work, the hardened concrete should be removed and properly disposed or recycled in accordance with federal, state or local regulations. Materials used to construct temporary concrete washout facilities should be removed from the site of the work and properly disposed or recycled in accordance with federal, state or local regulations.

- Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities should be backfilled and repaired.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Temporary concrete washout facilities should be maintained to provide adequate holding capacity with a minimum freeboard of 4 in. for above grade facilities and 12 in. for below grade facilities. Maintaining temporary concrete washout facilities should include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials should be removed and properly disposed or recycled in accordance with federal, state or local regulations.

- Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.

- Inspect washout facilities for damage (e.g. torn liner, evidence of leaks, signage, etc.). Repair all identified damage.

FOR BIDDING PURPOSES ONLY

References and Additional Resources

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Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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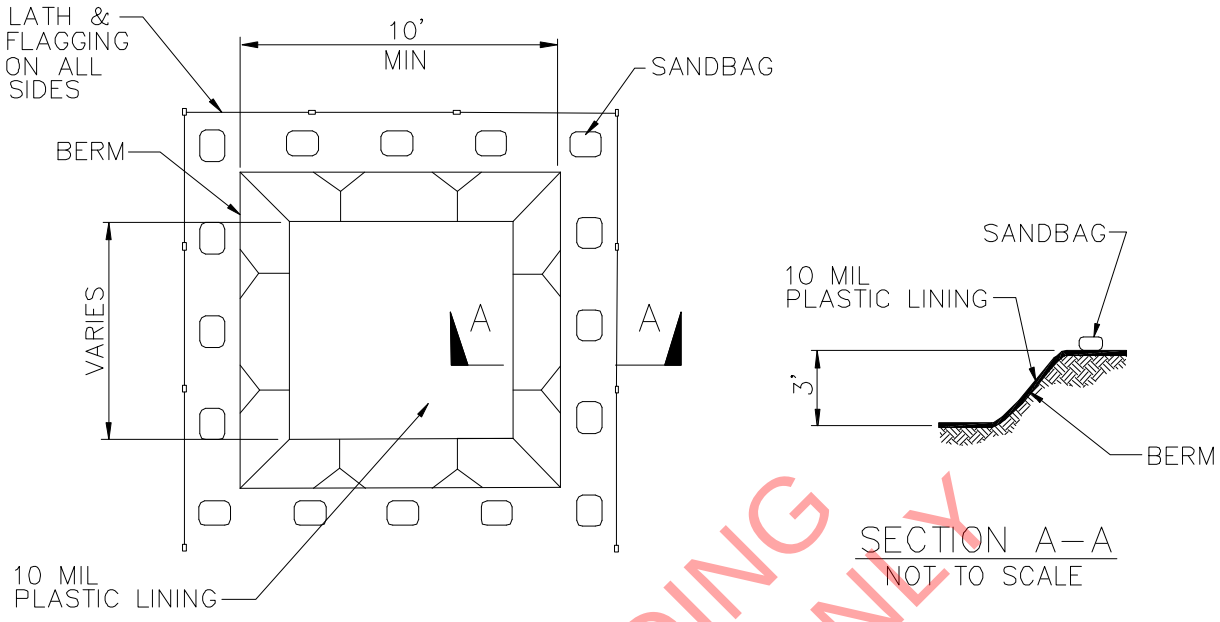
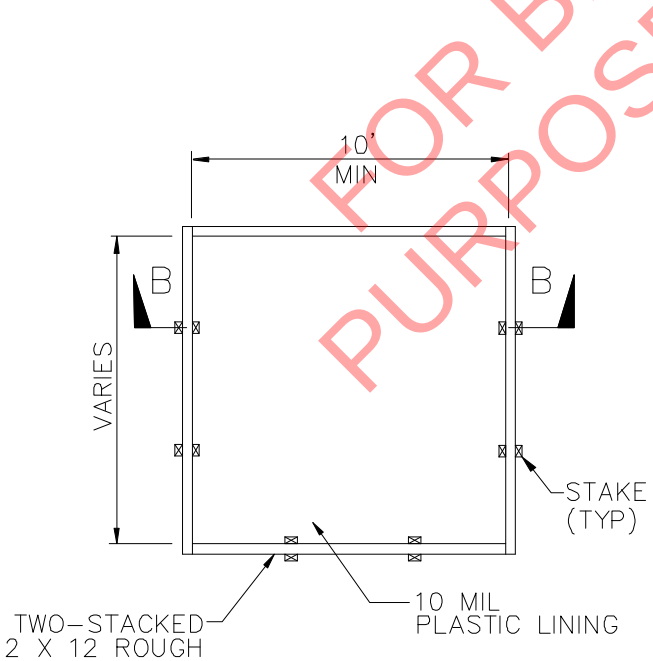


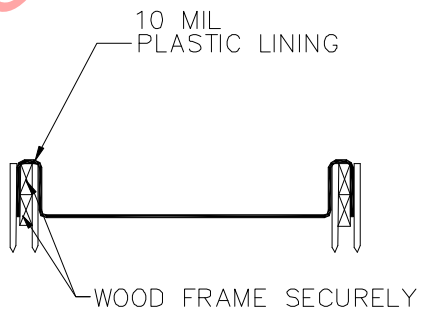
PLAN
NOT TO SCALE
TYPE "BELOW GRADE"

SECTION A–A
NOT TO SCALE

FOR BIDDING PURPOSES ONLY



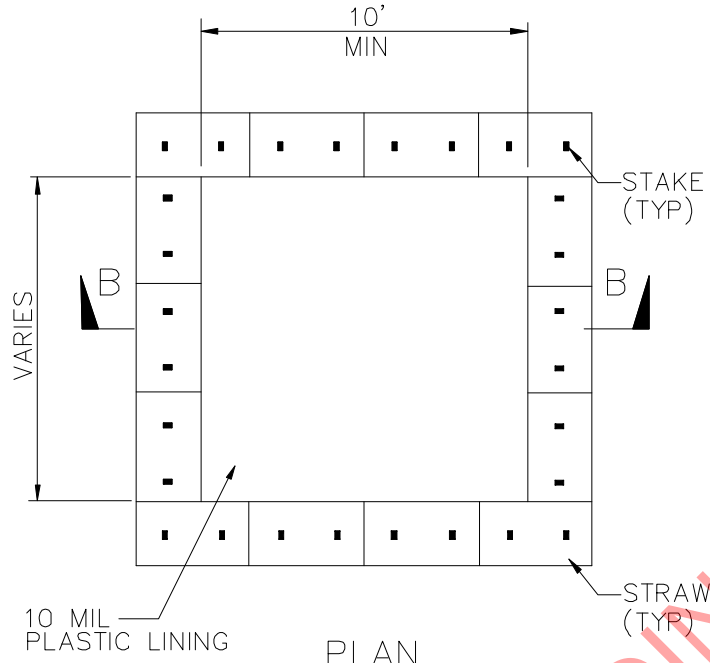
PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"



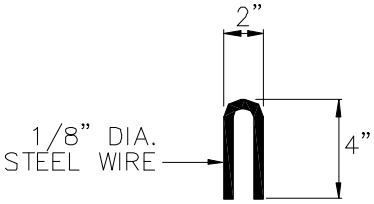
SECTION B–B
NOT TO SCALE

NOTES

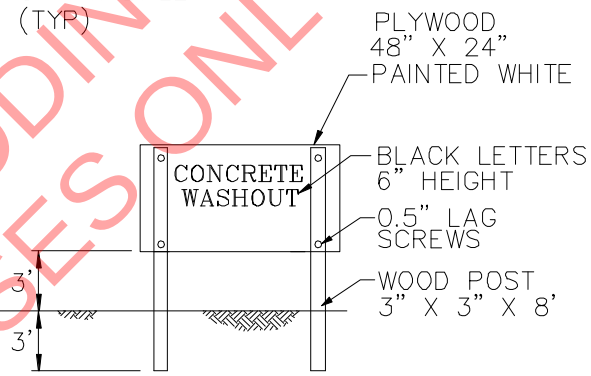
1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.



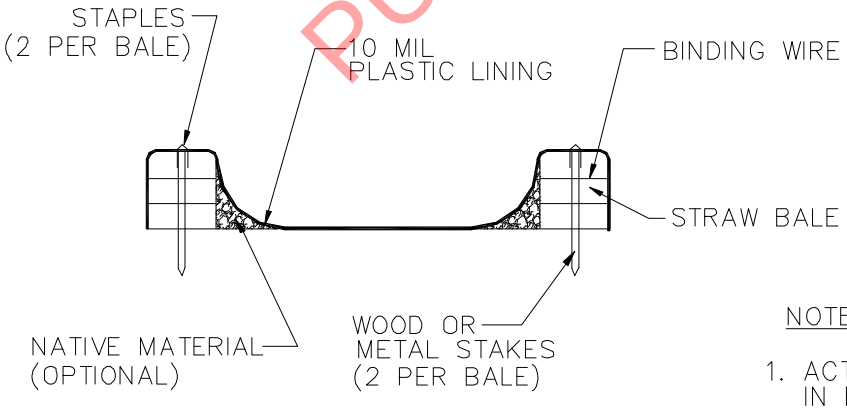
PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"
WITH STRAW BALES



STAPLE DETAIL



CONCRETE WASHOUT
SIGN DETAIL
(OR EQUIVALENT)



SECTION B–B
NOT TO SCALE

NOTES

1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

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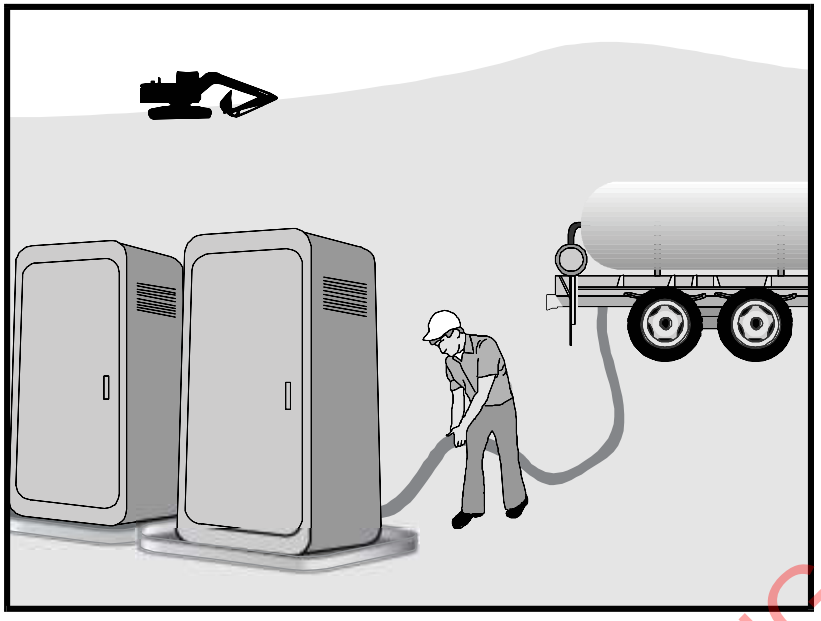
Sanitary/Septic Waste Management WM-9



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Description and Purpose

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

Suitable Applications

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

Limitations

None identified.

Implementation

Sanitary or septic wastes should be treated or disposed of in accordance with state and local requirements. In many cases, one contract with a local facility supplier will be all that it takes to make sure sanitary wastes are properly disposed.

Storage and Disposal Procedures

- Temporary sanitary facilities should be located away from drainage facilities, watercourses, and from traffic circulation. If site conditions allow, place portable facilities a minimum of 50 feet from drainage conveyances and traffic areas. When subjected to high winds or risk of high winds, temporary sanitary facilities should be secured to prevent overturning.

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	☑
Oil and Grease	
Organics	☑

Potential Alternatives

None

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- Temporary sanitary facilities must be equipped with containment to prevent discharge of pollutants to the stormwater drainage system of the receiving water.
- Consider safety as well as environmental implications before placing temporary sanitary facilities.
- Wastewater should not be discharged or buried within the project site.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, should comply with the local health agency, city, county, and sewer district requirements.
- Only reputable, licensed sanitary and septic waste haulers should be used.
- Sanitary facilities should be located in a convenient location.
- Temporary septic systems should treat wastes to appropriate levels before discharging.
- If using an onsite disposal system (OSDS), such as a septic system, local health agency requirements must be followed.
- Temporary sanitary facilities that discharge to the sanitary sewer system should be properly connected to avoid illicit discharges.
- Sanitary and septic facilities should be maintained in good working order by a licensed service.
- Regular waste collection by a licensed hauler should be arranged before facilities overflow.
- If a spill does occur from a temporary sanitary facility, follow federal, state and local regulations for containment and clean-up.

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Education

- Educate employees, subcontractors, and suppliers on sanitary and septic waste storage and disposal procedures.
- Educate employees, subcontractors, and suppliers of potential dangers to humans and the environment from sanitary and septic wastes.
- Instruct employees, subcontractors, and suppliers in identification of sanitary and septic waste.
- Hold regular meetings to discuss and reinforce the use of sanitary facilities (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected

weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Arrange for regular waste collection.
- If high winds are expected, portable sanitary facilities must be secured with spikes or weighed down to prevent over turning.
- If spills or leaks from sanitary or septic facilities occur that are not contained and discharge from the site, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

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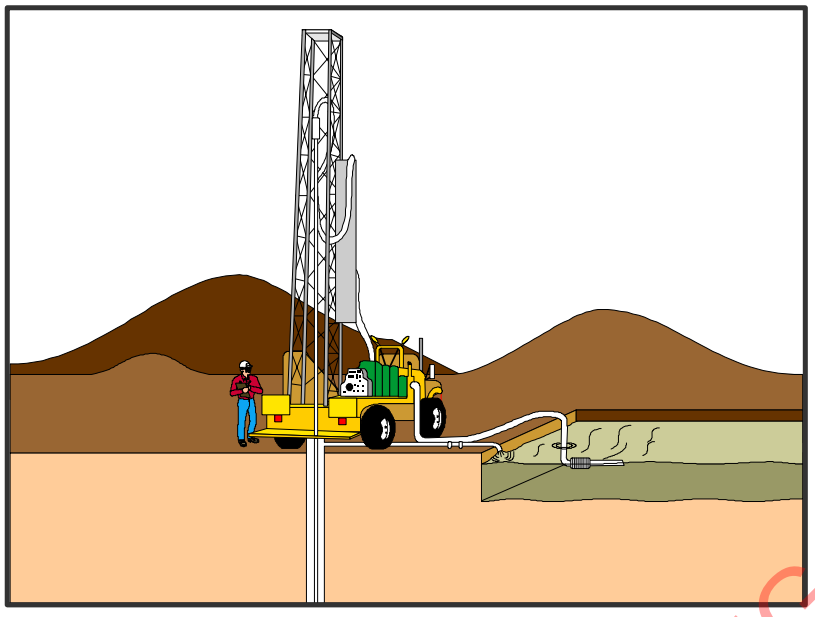
Liquid Waste Management WM-10



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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Description and Purpose

Liquid waste management includes procedures and practices to prevent discharge of pollutants to the storm drain system or to watercourses as a result of the creation, collection, and disposal of non-hazardous liquid wastes.

Suitable Applications

Liquid waste management is applicable to construction projects that generate any of the following non-hazardous by-products, residuals, or wastes:

- Drilling slurries and drilling fluids
- Grease-free and oil-free wastewater and rinse water
- Dredgings
- Other non-stormwater liquid discharges not permitted by separate permits

Limitations

- Disposal of some liquid wastes may be subject to specific laws and regulations or to requirements of other permits secured for the construction project (e.g., NPDES permits, Army Corps permits, Coastal Commission permits, etc.).

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- Liquid waste management does not apply to dewatering operations (NS-2 Dewatering Operations), solid waste management (WM-5, Solid Waste Management), hazardous wastes (WM-6, Hazardous Waste Management), or concrete slurry residue (WM-8, Concrete Waste Management).

- Typical permitted non-stormwater discharges can include: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; irrigation water; springs; water from crawl space pumps; footing drains; lawn watering; flows from riparian habitats and wetlands; and discharges or flows from emergency fire fighting activities.

Implementation

General Practices

- Instruct employees and subcontractors how to safely differentiate between non-hazardous liquid waste and potential or known hazardous liquid waste.

- Instruct employees, subcontractors, and suppliers that it is unacceptable for any liquid waste to enter any storm drainage device, waterway, or receiving water.

- Educate employees and subcontractors on liquid waste generating activities and liquid waste storage and disposal procedures.

- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).

- Verify which non-stormwater discharges are permitted by the statewide NPDES permit; different regions might have different requirements not outlined in this permit.

- Apply NS-8, Vehicle and Equipment Cleaning for managing wash water and rinse water from vehicle and equipment cleaning operations.

Containing Liquid Wastes

- Drilling residue and drilling fluids should not be allowed to enter storm drains and watercourses and should be disposed of.

- If an appropriate location is available, drilling residue and drilling fluids that are exempt under Title 23, CCR § 2511(g) may be dried by infiltration and evaporation in a containment facility constructed in conformance with the provisions concerning the Temporary Concrete Washout Facilities detailed in WM-8, Concrete Waste Management.

- Liquid wastes generated as part of an operational procedure, such as water-laden dredged material and drilling mud, should be contained and not allowed to flow into drainage channels or receiving waters prior to treatment.

- Liquid wastes should be contained in a controlled area such as a holding pit, sediment basin, roll-off bin, or portable tank.

- Containment devices must be structurally sound and leak free.

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- Containment devices must be of sufficient quantity or volume to completely contain the liquid wastes generated.
- Precautions should be taken to avoid spills or accidental releases of contained liquid wastes. Apply the education measures and spill response procedures outlined in WM-4, Spill Prevention and Control.
- Containment areas or devices should not be located where accidental release of the contained liquid can threaten health or safety or discharge to water bodies, channels, or storm drains.

Capturing Liquid Wastes

- Capture all liquid wastes that have the potential to affect the storm drainage system (such as wash water and rinse water from cleaning walls or pavement), before they run off a surface.
- Do not allow liquid wastes to flow or discharge uncontrolled. Use temporary dikes or berms to intercept flows and direct them to a containment area or device for capture.
- Use a sediment trap (SE-3, Sediment Trap) for capturing and treating sediment laden liquid waste or capture in a containment device and allow sediment to settle.

Disposing of Liquid Wastes

- A typical method to handle liquid waste is to dewater the contained liquid waste, using procedures such as described in NS-2, Dewatering Operations, and SE-2, Sediment Basin, and dispose of resulting solids per WM-5, Solid Waste Management.
- Methods of disposal for some liquid wastes may be prescribed in Water Quality Reports, NPDES permits, Environmental Impact Reports, 401 or 404 permits, and local agency discharge permits, etc. Review the SWPPP to see if disposal methods are identified.
- Liquid wastes, such as from dredged material, may require testing and certification whether it is hazardous or not before a disposal method can be determined.
- For disposal of hazardous waste, see WM-6, Hazardous Waste Management.
- If necessary, further treat liquid wastes prior to disposal. Treatment may include, though is not limited to, sedimentation, filtration, and chemical neutralization.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.

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- Remove deposited solids in containment areas and capturing devices as needed and at the completion of the task. Dispose of any solids as described in WM-5, Solid Waste Management.
- Inspect containment areas and capturing devices and repair as needed.

References and Additional Resources

Construction Site Best Management Practices (BMPs) Manual, CTSW-RT-24-425.11.1, California Department of Transportation (Caltrans), March 2024.

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Appendix H: BMP Inspection Form

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BMP INSPECTION REPORT

Date and Time of Observation:			Date Report Written:	
Inspection Type	☐ Weekly *Complete Parts I,II,III and VII*	☐ Pre-Storm *Complete Parts I,II,III,IV and VII*	☐ During Rain Event *Complete Parts I, II, III, V, and VII*	☐ Post-Storm *Complete Parts I,II,III,VI and VII*

Part I. General Information

Site Information

Construction Site Name: Basins and Stormwater Capture Project

Construction activities:	Approximate DSA:
Photos Taken: ☐ Yes ☐ No	Photo Reference IDs:

Weather

Estimate storm beginning (date and time): n/a	Estimate storm duration (days): n/a
Estimate time since last storm (days): n/a	Rain gauge reading (in): n/a

Is a "Qualifying Precipitation Event" predicted or did one occur (i.e., any weather pattern with a 50% chance of 0.5" or more within a 24-hr period when 0.5" has been forecast and continues on subsequent 24-hour periods when 0.25" of precipitation or more is forecast)? If yes, summarize forecast: (Y/N)
n/a

Exemption Documentation (explanation required if inspection could not be conducted). Visual inspections are not required outside of business hours or during dangerous weather conditions such as flooding or electrical storms.

Inspector Information

Inspector Name:	Inspector Title:
Signature:	Date:

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Part II. BMP Observations. Describe deficiencies in Part III.			
Minimum BMPs for Risk Level 1 Sites	Site Observation (yes, no, N/A)	Action Required (yes/no)	Action Implemented (Date)
Good Housekeeping for Construction Materials			
Inventory of products (excluding materials designed to be outdoors)			
Stockpiled construction materials not actively in use are covered and bermed			
All chemicals are stored in watertight containers with appropriate secondary containment, or in a completely enclosed storage shed			
Construction materials are minimally exposed to precipitation			
BMPs preventing the off-site tracking of materials are implemented and properly effective			
Good Housekeeping for Waste Management			
Wash/rinse water and materials are prevented from being disposed into the storm drain system			
Portable toilets are contained to prevent discharges of waste			
Sanitation facilities are clean and with no apparent for leaks and spills			
Equipment is in place to cover waste disposal containers at the end of business day and during rain events			
Discharges from waste disposal containers are prevented from discharging to the storm drain system / receiving water			
Stockpiled waste material is securely protected from wind and rain if not actively in use			
Procedures are in place for addressing hazardous and non-hazardous spills			
Appropriate spill response personnel are assigned and trained			
Equipment and materials for cleanup of spills is available onsite			
Washout areas (e.g., concrete) are contained appropriately to prevent discharge or infiltration into the underlying soil			
Good Housekeeping for Vehicle Storage and Maintenance			
Measures are in place to prevent oil, grease, or fuel from leaking into the ground, storm drains, or surface waters			
All equipment or vehicles are fueled, maintained, and stored in a designated area with appropriate BMPs			
Vehicle and equipment leaks are cleaned immediately and disposed of properly			

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Part II. BMP Observations Continued. Describe deficiencies in Part III.			
Minimum BMPs for Risk Level 1 Sites	Site Observation (yes, no, N/A)	Action Required (yes/no)	Action Implemented (Date)
Good Housekeeping for Landscape Materials			
Stockpiled landscape materials such as mulches and topsoil are contained and covered when not actively in use			
Erodible landscape material has not been applied 2 days before a forecasted rain event or during an event			
Erodible landscape materials are applied at quantities and rates in accordance with manufacturer recommendations			
Bagged erodible landscape materials are stored on pallets and covered			
Good Housekeeping for Air Deposition of Site Materials			
Good housekeeping measures are implemented onsite to control the air deposition of site materials and from site operations			
Non-Stormwater Management			
Non-Stormwater discharges are properly controlled			
Vehicles are washed in a manner to prevent non-stormwater discharges to surface waters or drainage systems			
Streets are cleaned in a manner to prevent unauthorized non-stormwater discharges to surface waters or drainage systems.			
Erosion Controls			
Wind erosion controls are effectively implemented			
Effective soil cover is provided for disturbed areas inactive (i.e., not scheduled to be disturbed for 14 days) as well as finished slopes, open space, utility backfill, and completed lots			
The use of plastic materials is limited in cases when a more sustainable, environmentally friendly alternative exists.			
Sediment Controls			
Perimeter controls are established and effective at controlling erosion and sediment discharges from the site			
Entrances and exits are stabilized to control erosion and sediment discharges from the site			
Sediment basins are properly maintained			
Inspect immediate access roads prior to forecasted precipitation			
Run-On and Run-Off Controls			
Run-on to the site is effectively managed and directed away from all disturbed areas.			
Other			
Are the project SWPPP and BMP plan up to date, available on-site and being properly implemented?			

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Is the posting of the project's unique WDID number, waiver identification number, and site and project contact information publicly accessible?			

Notes:

Photos:

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Part III.a Descriptions of BMP Deficiencies		
Deficiency	**Repairs Implemented: Note – Repairs must begin within 72 hours of identification and, complete repairs as soon as possible.**	
	Start Date	**Action**
1.		
2.		
3.		

Part III.b Corrected BMP Deficiencies		
Deficiency	**Repairs Implemented since last inspection report: Note – Repairs must begin within 72 hours of identification and, complete repairs as soon as possible.**	
	Completion Date	**Action Taken/Repair Made**
1.		
2.		
3.		

Part VII. Additional Corrective Actions Required. Identify additional corrective actions not included with BMP Deficiencies (Part III) above. Note if SWPPP change is required.	
Required Actions	**Implementation Date**

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Part IV. Additional Pre-Storm Observations. Note the presence or absence of floating and suspended materials, sheen, discoloration, turbidity, odors, and source(s) of pollutants(s).	(Yes, No, N/A)
Do stormwater storage and containment areas have adequate freeboard? If no, complete Part III.	
Are drainage areas free of spills, leaks, or uncontrolled pollutant sources? If no, complete Part VII and describe below.	
Notes:	
Are stormwater storage and containment areas free of leaks? If no, complete Parts III and/or VII and describe below.	
Notes:	
Additional Notes/Comments:	

Part V. Additional During QPE Observations. If BMPs cannot be inspected during inclement weather, list the results of visual inspections at all relevant outfalls, discharge points, and downstream locations. Note odors or visible sheen on the surface of discharges. Complete Part VII (Corrective Actions) as needed. (Outfall, Discharge Point, or Other Downstream Location)	
Location	Description
Location	Description
Location	Description

Part VI. Additional Post-QPE Observations. Visually observe (inspect) stormwater discharges at all discharge locations within 96 hours after each qualifying precipitation event, and observe (inspect) the discharge of stored or contained stormwater that is derived from and discharged subsequent to a qualifying precipitation event producing precipitation of ½ inch or more at the time of discharge. Complete Part VII (Corrective Actions) as needed. Discharge Location, Storage or Containment Area	Visual Observation

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Risk Level 1, 2, 3 ***Visual Inspection Field Log Sheet***					
Date and Time of Inspection:				Report Date:	
Inspection Type:	☐ Weekly	☐ Pre-Qualifying Precipitation Event (QPE)	☐ During QPE	☐ Post QPE	☐ Dewatering Discharge
Site Information					
Construction Site Name: Basins and Stormwater Capture Project					
Construction stage and completed activities:				Approximate DSA:	
Weather and Observations					
Date Rain Predicted to Occur:			Predicted % chance of precipitation (PoP): Predicted quantity of precipitation (QPF):		
Time since last storm: (date, amount)		Storm beginning: (date, time)	Ongoing storm duration: (days)	Rain gauge reading: (ongoing storm total)	
Observations: If yes identify location					
Odors	Yes ☐	No ☐			
Floating material	Yes ☐	No ☐			
Suspended Material	Yes ☐	No ☐			
Sheen	Yes ☐	No ☐			
Discolorations	Yes ☐	No ☐			
Turbidity	Yes ☐	No ☐			
Site Inspections					
Outfalls or BMPs Evaluated			**Deficiencies Noted**		
(add additional sheets or attached detailed BMP Inspection Checklists)					
Photos Taken:	Yes ☐ No ☐		Photo Reference IDs:		
Corrective Actions Identified (note if SWPPP/REAP change is needed)					
Inspector Information					
Inspector Name:				Inspector Title:	
Signature:				Date:	

FOR BIDDING PURPOSES ONLY

Appendix I: Certifications and Training Forms

FOR BIDDING PURPOSES ONLY

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

Qualified SWPPP Developer (QSD)

AND

Qualified SWPPP Practitioner (QSP)

Gretchen Heisdorf

March 5, 2025 - April 19, 2027

Certificate #485

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CASQA

CALIFORNIA STORMWATER QUALITY ASSOCIATION®

California Stormwater Quality Association and
California Construction General Permit Training Team

APEX TUTORING

CERTIFICATE

OF COMPLETION

THIS CERTIFIES THAT

Gretchen Heisdorf

SUCCESSFULLY COMPLETED THE 8-HOUR CALTRANS MANDATORY WATER POLLUTION CONTROL MANAGER (WPCM) TRAINING COURSE ON APRIL 24, 2021. THIS COURSE AWARDS 8 PDUs.

FOR BIDDING PURPOSES ONLY

David Korfas

DAVE KORFAS
CPESC, CGP TOR, QSD, QISP

Apex Tutoring
ACHIEVE YOUR HIGHEST POTENTIAL

Deanna Arrigo

DEANNA ARRIGO
PE, QSD, CMIT

To verify the authenticity of this certificate, please email your.apex.tutor@gmail.com.

CERTIFICATE OF TRAINING

COMPLETION OF THE STATE WATER BOARD

CBPELSG LICENSEE QSD/QSP SELF-CERTIFICATION TRAINING FOR THE

2009 AND 2022 CONSTRUCTION STORMWATER GENERAL PERMITS

FOR BIDDING PURPOSES ONLY

G10352

QSD/P Certificate #

Yvan Mendoza

Name

Signature

12/12/2024

Date

CALIFORNIA Water Boards

CGP TRAINING TEAM

APEX TUTORING

CERTIFICATE

OF COMPLETION

THIS CERTIFIES THAT

Yvan Mendoza

SUCCESSFULLY COMPLETED THE 8-HOUR CALTRANS MANDATORY WATER POLLUTION CONTROL MANAGER (WPCM) TRAINING COURSE ON APRIL 24, 2021. THIS COURSE AWARDS 8 PDUs.

FOR BIDDING PURPOSES ONLY

David Korfas

DAVE KORFAS
CPESC, CGP TOR, QSD, QISP

Apex Tutoring
ACHIEVE YOUR HIGHEST POTENTIAL

Deanna Arrigo

DEANNA ARRIGO
PE, QSD, CMIT

To verify the authenticity of this certificate, please email your.apex.tutor@gmail.com.

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP PRACTITIONER (QSP)

FOR BIDDING PURPOSES ONLY

Gregory Feaver

Sep 05, 2024 - Nov 01, 2026

Certificate # 28267

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

California Stormwater Quality Association and
California Construction General Permit Training Team

Certificate of Training

This Certificate acknowledges attendance by

Greg Feaver

8-Hour Water Pollution Control Manager Training Course per 13-1.01D(4)(b)

FOR BIDDING PURPOSES ONLY

MS Hatch CONSULTING

John Gleason, PE, QSD, ToR, CPESC
John.Gleason@mshatch.com
(949) 981-3867

10/14/2022
Date

Contractor Personnel Training Log

Stormwater Management Training Log and Documentation

Project Name: _____

WDID No. _____

Stormwater Management Topic: (check as appropriate)

☐ Good Housekeeping BMPs ☐ Erosion Control BMPs

☐ Sediment Control BMPs ☐ Tracking Control

☐ Non-Stormwater Management BMPs ☐ Waste Management & Pollution Control BMPs

☐ BMP Implementation Activities ☐ Advanced BMPs

☐ Identification of QSPs and QSP Delegates

Training Objective: _____
Date: _____
Instructor: _____
Training Length (hours): _____

Attendee Roster (Attach additional forms if necessary)

Name	Company	Phone

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QSP Delegate Training Log

Stormwater Management Training Log and Documentation

Project Name: _____

WDID No.: _____

QSP Delegate Name: _____

Delegated Responsibilities:

☐ Stormwater Visual Inspections
☐ Sampling
☐ BMP Inspections
☐ BMP Maintenance and Repair

Foundational Training

Topic	Date Completed	QSP Trainer
☐ Roles and Responsibilities		
☐ Forecast Information		
☐ Documentation and Reporting Procedures		

Site-Specific Training

Topic	Date Completed	QSP Trainer
☐ Visual Inspections		
☐ Sample Collection Procedures		
☐ Sample Reporting Procedures		
☐ BMP Implementation		

As needed, attach proof of external training (e.g., course completion certificates, credentials for the QSP Delegate).

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Appendix J: Responsible Parties

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Identification of QSP and QSP Delegates

Project Name: Basins and Stormwater Capture Project

WDID No.: _____

The following are QSPs and QSP Delegates associated with this project

Name of Personnel[1]	QSP Number, or state "Delegate"	Company	Date Assigned to Project
Gretchen Heisdorf	QSD/P 00485	Provost & Pritchard Consulting Group	8/1/2025
Greg Feaver	QSP 28267	Provost & Pritchard Consulting Group	8/1/2025
Yvan Mendoza	QSD/P PG 10352	Provost & Pritchard Consulting Group	8/1/2025

(1) If additional QSPs or QSP Delegates are required on the job site add additional lines

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Appendix K: Contractors and Subcontractors

The Contractor assigned to this project is:

Company Name	Contact Name (Site Responsibility)	Address (Street, City, State, Zip)	Phone Number & Email

Subcontractor:

Company Name	Contact Name (Site Responsibility)	Address (Street, City, State, Zip)	Phone Number & Email

Additional Contacts:

Company Name	Contact Name (Site Responsibility)	Address (Street, City, State, Zip)	Phone Number & Email
Provost & Pritchard Consulting Group	Eric Abrahamsen (Project Engineer)	455 W Fir Ave. Clovis, CA 93611	(559) 449-2700 eabrahamsen@ppeng.com

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Appendix L: Calculations

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Appendix M: Weather Reports

The discharger must obtain the precipitation forecast information from the National Weather Service Forecast Office (http://forecast.weather.gov). A printed copy with the date and time of printing should be retained in this Appendix or be kept electronically .

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Appendix N: Monitoring Records

Place completed BMP Inspection Forms, photographic documentation, Effluent Sampling, Receiving Water, and Dewatering Field Logs, Monitoring Exceptions, NAL Exceedance Reports, and Receiving Water Monitoring Trigger Exceptions in this appendix or be kept electronically.

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Appendix O: Example Storm Event Monitoring Forms

FOR BIDDING PURPOSES ONLY

Rain Gauge Log Sheet				
Construction Site Name:				
WDID #:				
Date (mm/dd/yy)	Time (24-hr)	Initials	Rainfall Depth (Inches)	Notes:

FOR BIDDING PURPOSES ONLY

Risk Level 1 ***Visual Inspection Field Log Sheet***					
Date and Time of Inspection:				Report Date:	
Inspection Type:	☐ Weekly	☐ Pre-Qualifying Precipitation Event (QPE)	☐ During QPE	☐ Post QPE	☐ Dewatering Discharge
Site Information					
Construction Site Name:					
Construction stage and completed activities:				Approximate DSA:	
Weather and Observations					
Date Rain Predicted to Occur:			Predicted % chance of precipitation (PoP): Predicted quantity of precipitation (QPF):		
Time since last storm: (date, amount)		Storm beginning: (date, time)	Ongoing storm duration: (days)	Rain gauge reading: (ongoing storm total)	
Observations: If yes identify location					
Odors	Yes ☐ No ☐				
Floating material	Yes ☐ No ☐				
Suspended Material	Yes ☐ No ☐				
Sheen	Yes ☐ No ☐				
Discolorations	Yes ☐ No ☐				
Turbidity	Yes ☐ No ☐				
Site Inspections					
Outfalls or BMPs Evaluated			**Deficiencies Noted**		
(add additional sheets or attached detailed BMP Inspection Checklists)					
Photos Taken:	Yes ☐ No ☐		Photo Reference IDs:		
Corrective Actions Identified (note if SWPPP/REAP change is needed)					
Inspector Information					
Inspector Name:				Inspector Title:	
Signature:				Date:	

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Risk Level 1 ***Effluent Sampling Field Log Sheets***			
Construction Site Name:		Date:	Time Start:
Sampler:			
Sampling Event Type:	☐ Stormwater	☐ Dewatering Discharge	☐ Non-visible pollutant

Field Meter Calibration	
pH Meter ID No./Desc.: Calibration Date/Time:	Turbidity Meter ID No./Desc.: Calibration Date/Time:

Field pH and Turbidity Measurements			
Discharge Location Description	pH	Turbidity	Time

Grab Samples Collected		
Discharge Location Description	Sample Type	Time

Additional Sampling Notes:
Time End:

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BSK ASSOCIATES®
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687 North Laverne Avenue, **Fresno**, CA 93727
9332 Tech Center Drive, Ste 100, **Sacramento**, CA 95826
350 E. Commercial Road, Ste 110, **San Bernardino**, CA 92408
4820 Rosedale Lane, **Bakersfield**, CA 93314

(800) 877-8310

Turnaround Time Request
☐ Standard - 10 business days
☐ Rush (Surcharge will apply)
Date needed:

ANALYTICAL CHAIN OF CUSTODY

Observed Temp (°C): **Corrected Temp (°C):** **Thermometer ID:** ***Required Fields**

Company/Client Name*:	**Report Attention*:**	**Invoice To*:**	**Phone*:**
	Additional cc's:	PO#:	**E-mail*:**

Address*: **City*:** **State*:** **Zip*:**

Project:	Project #:	Phase #	Task #:

Reporting Options:	Regulatory Copies	Regulatory Compliance
☐ Trace/MDL (J-Flag) ☐ EDD Type: _____	Copy to:	☐ CLIP System Number*: _____
Sampler Name (Printed/Signature)*:		☐ Geotracker #: _____

Matrix Types: SW=Surface Water BW=Bottled Water GW=Ground Water WW=Waste Water STW=Storm Water DW=Drinking Water SO=Solid

#	Sample Description*	Sampled* Date	Sampled* Time	Matrix*	Comments / Station Code / WTRAX

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Relinquished by: (Signature and Printed Name)	Company	Date	Time	Received by: (Signature and Printed Name)	Company
Relinquished by: (Signature and Printed Name)	Company	Date	Time	Received by: (Signature and Printed Name)	Company
Received at Lab by: (Signature and Printed Name)		Date	Time	Payment Received at Delivery: CC: last 4 #: Auth #: Check #: Date: Amount: PIA#: Init.	

Shipping Method: GLS UPS WALK-IN FED EX Courier:_____ BSK Lab: BAL FAL RAL SAL

Received on Ice: Yes No **Custody Seal:** Shipping Container Y / N Samples Y / N

Notes / Comments

Payment for services rendered as noted herein are due in full within 30 days from the date invoiced. If not so paid, account balances are deemed delinquent. Delinquent balances are subject to monthly service charges and interest specified in BSK's current Standard Terms and Conditions for Laboratory Services. The person signing for the Client/Company acknowledges that they are either the Client or an authorized agent to the Client, that the Client agrees to be responsible for payment for the services on this Chain of Custody, and agrees to BSK's terms and conditions for laboratory services unless contractually bound otherwise. Visit www.bskassociates.com for our current terms and conditions.

Appendix P: Field Meter Instructions

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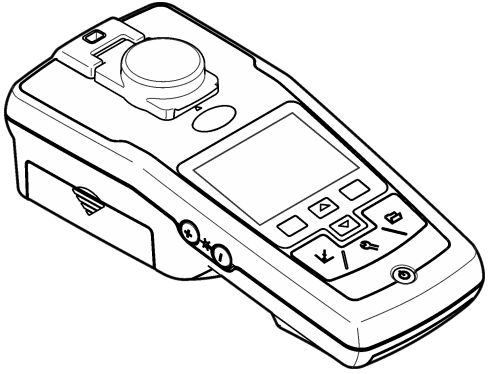
DOC022.53.80041

2100Q and 2100Q*is*

08/2021, Edition 6

User Manual

FOR BIDDING PURPOSES ONLY



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PURPOSES ONLY

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Section 1 Specifications

Specifications are subject to change without notice.

Specification	Details
Measurement method	Ratio turbidimetric determination using a primary nephelometric light scatter signal (90°) to the transmitted light scatter signal.
Regulatory	**2100Q:** Meets EPA Method 180.1
Lamp source	**2100Q:** Tungsten filament lamp **2100Q*is*:** Light-emitting diode (LED)
Range	0–1000 NTU (FNU)
Accuracy	±2% of reading plus stray light from 0–1000 NTU (FNU)
Repeatability	±1% of reading or 0.01 NTU (FNU), whichever is greater
Resolution	0.01 NTU on lowest range
Stray light	≤ 0.02 NTU (FNU)
Signal averaging	Selectable on or off
Detector	Silicon Photodiode
Overvoltage category	II
Altitude	2000 m (6562 ft) maximum
Reading modes	Normal (Push to Read), Signal Averaging or Rapidly Settling Turbidity

Specification	Details
Calibration options	Single step RapidCal for Low-Level Regulatory Reporting from 0–40 NTU (FNU) Full range calibration from 0–1000 NTU (FNU) Calibration to degrees of turbidity
Calibration logger	Records the last 25 successful calibrations
Verification logger	Logs the last 250 successful verifications
Data logger	500 records
Power requirement	Battery powered: 6 VDC maximum (4 NiMH 1.2 V AA batteries or 4 alkaline 1.5 V AA batteries) External power supply: 100–240 VAC ± 10%; output 5 W (9 VDC, 600 mA maximum)
Operating conditions	Temperature: 0 to 50 °C (32 to 122 °F) Relative Humidity: 0–90% at 30 °C, 0–80% at 40 °C, 0–70% at 50 °C, noncondensing
Storage conditions	–40 to 60 °C (–40 to 140 °F), instrument only
Interface	Optional USB
Sample required	15 mL (0.5 oz.)
Sample cells	Round cells 60 x 25 mm (2.36 x 1 in.) borosilicate glass with screw caps
Dimensions	22.9 x 10.7 x 7.7 cm (9.0 x 4.2 x 3.0 in.)
Weight	530 g (1.17 lb) without batteries 620 g (1.37 lb) with four AA alkaline batteries

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Specification	Details
Meter enclosure rating	IP67 (closed lid, battery and module compartment excluded)
Protection class	2100Q/is: Class III Power supply: Class II
Pollution degree	2
Environmental conditions	Indoor and outdoor use
Certification	CE certified
Warranty	1 year (EU: 2 years)

Section 2 General information

In no event will the manufacturer be liable for direct, indirect, special, incidental or consequential damages resulting from any defect or omission in this manual. The manufacturer reserves the right to make changes in this manual and the products it describes at any time, without notice or obligation. Revised editions are found on the manufacturer's website.

2.1 Safety information

The manufacturer is not responsible for any damages due to misapplication or misuse of this product including, without limitation, direct, incidental and consequential damages, and disclaims such damages to the full extent permitted under applicable law. The user is soley responsible to identify critical application risks and install appropriate mechanisms to protect processes during a possible equipment malfunction.

Please read this entire manual before unpacking, setting up or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment.

Make sure that the protection provided by this equipment is not impaired. Do not use or install this equipment in any manner other than that specified in this manual.

2.2 Use of hazard information

⚠ DANGER

Indicates a potentially or imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a potentially hazardous situation that may result in minor or moderate injury.

NOTICE

Indicates a situation which, if not avoided, may cause damage to the instrument. Information that requires special emphasis.

2.3 Precautionary labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol on the instrument is referenced in the manual with a precautionary statement.

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	This is the safety alert symbol. Obey all safety messages that follow this symbol to avoid potential injury. If on the instrument, refer to the instruction manual for operation or safety information.
	This symbol indicates that a risk of electrical shock and/or electrocution exists.
	Electrical equipment marked with this symbol may not be disposed of in European domestic or public disposal systems. Return old or end-of-life equipment to the manufacturer for disposal at no charge to the user.

2.4 Compliance and certification

⚠ CAUTION

This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

Canadian Radio Interference-Causing Equipment Regulation, ICES-003, Class A:

Supporting test records reside with the manufacturer.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de classe A répond à toutes les exigences de la réglementation canadienne sur les équipements provoquant des interférences.

FCC Part 15, Class "A" Limits

Supporting test records reside with the manufacturer. The device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

1. The equipment may not cause harmful interference.
2. The equipment must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their expense. The following techniques can be used to reduce interference problems:

1. Disconnect the equipment from its power source to verify that it is or is not the source of the interference.
2. If the equipment is connected to the same outlet as the device experiencing interference, connect the equipment to a different outlet.
3. Move the equipment away from the device receiving the interference.
4. Reposition the receiving antenna for the device receiving the interference.
5. Try combinations of the above.

2.5 Product overview

The 2100Q and 2100Q*is* portable turbidimeters measure turbidity from 0 to 1000 NTU (FNU). Primarily for field use, the portable meter operates on four AA batteries. Data can be stored and transferred to a printer, computer or USB storage device.

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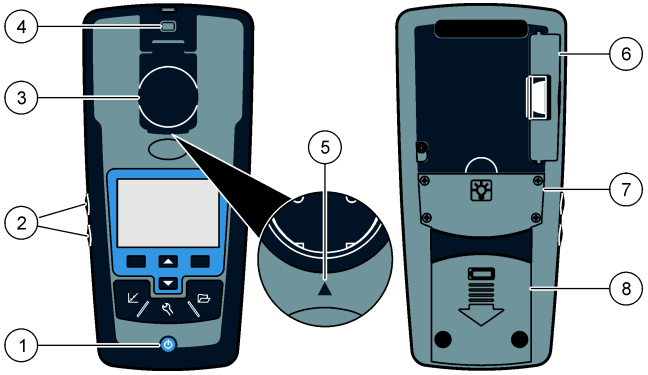
Figure 1 Product overview

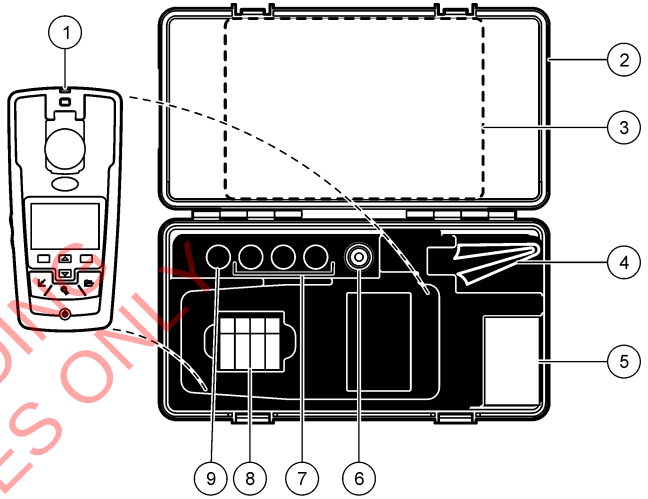


1	Power on or off	**5**	Alignment arrow
2	Backlight keys (+ and -)	**6**	Module
3	Sample cell holder with lid	**7**	Lamp compartment
4	Attachment for lanyard	**8**	Battery compartment

2.6 Product components

Refer to Figure 2 to make sure that all components have been received. If any of these items are missing or damaged, contact the manufacturer or a sales representative immediately.

Figure 2 2100Q and 2100Q*is* components



1	2100Q or 2100Q*is* turbidimeter	**6**	Silicone oil
2	Carrying case	**7**	20, 100 and 800 NTU StablCal calibration standards
3	User manual and Quick reference guide	**8**	AA alkaline batteries (pk/4)
4	Oiling cloth	**9**	StablCal 10 NTU verification standard
5	1" sample cell (10 mL) with cap (pk/6)		

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Section 3 Installation

⚠ CAUTION

Multiple hazards. Only qualified personnel must conduct the tasks described in this section of the document.

3.1 Install the battery

⚠ WARNING

Explosion hazard. An expired battery can cause hydrogen gas buildup inside the instrument. Replace the battery before it expires. Do not store the instrument for long periods with a battery installed.

⚠ WARNING

Potential fire hazard. Use only alkaline or nickel metal hydride batteries (NiMH) in the meter. Other battery types or incorrect installation can cause a fire. Never mix battery types in the meter.

NOTICE

The battery compartment is not waterproof. If the battery compartment becomes wet, remove and dry the batteries and dry the interior of the compartment. Check the battery contacts for corrosion and clean them if necessary.

NOTICE

When using nickel metal hydride (NiMH) batteries, the battery icon will not indicate a full charge after freshly charged batteries have been inserted (NiMH batteries are 1.2 V versus 1.5 V for alkaline batteries). Even though the icon does not indicate complete charge, 2300 mAH NiMH batteries will achieve 90% of instrument operation lifetime (before recharge) versus new alkaline batteries.

NOTICE

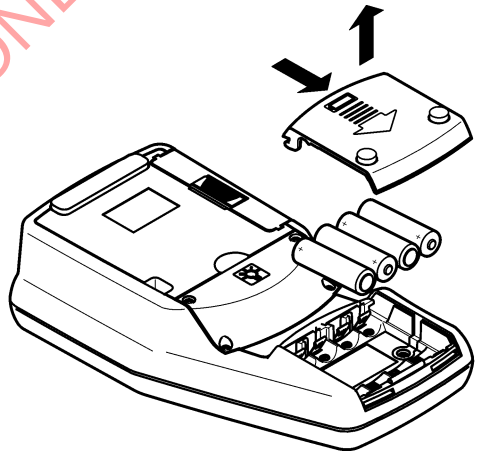
To avoid potential damage to the meter from battery leakage, remove the meter batteries prior to extended periods of non-use.

The meter can be powered with AA alkaline or rechargeable NiMH batteries. To conserve battery life, the meter will power off after 10 minutes of inactivity, the backlight powers off after 30 seconds. This time can be changed in the Power Management menu.
Note: *Rechargeable batteries will only be recharged with the USB/power module. Refer to the module documentation for further information.*

For battery installation refer to Figure 3.

1. Remove the battery cover.
2. Install 4 AA alkaline or 4 AA nickel metal hydride (NiMH) batteries. Make sure that the batteries are installed in the correct orientation.
3. Replace the battery cover.

Figure 3 Battery installation



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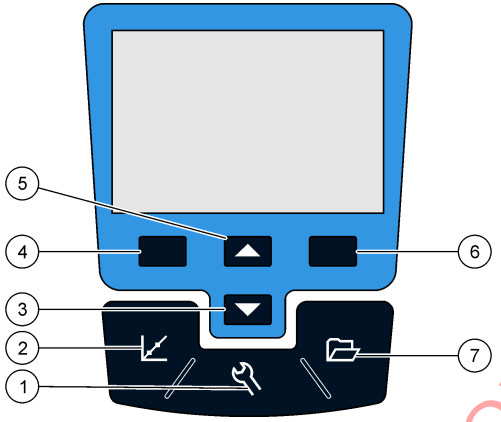
Section 4 User interface and navigation

4.1 User interface

Figure 4 Keypad description



1 **SETTINGS** key: select menu options for setting up the meter	5 **UP** key: scroll through menus, enter numbers and letters
2 **CALIBRATION** key: shows calibration screen, start calibration, select cal options	6 **RIGHT** key (contextual): read turbidity sample, selects or confirms options, opens/jumps to sub-menus
3 **DOWN** key: scroll through menus, enter numbers and letters	7 **DATA MANAGEMENT** key: view, delete or transfer stored data
4 **LEFT** key (contextual): access for calibration verification, cancels or exits the current menu screen to the previous menu screen	

4.2 Display description

The measurement screen shows the turbidity, unit, calibration status, date and time, operator ID (if setup) and sample ID (if setup). Refer to Figure 5.

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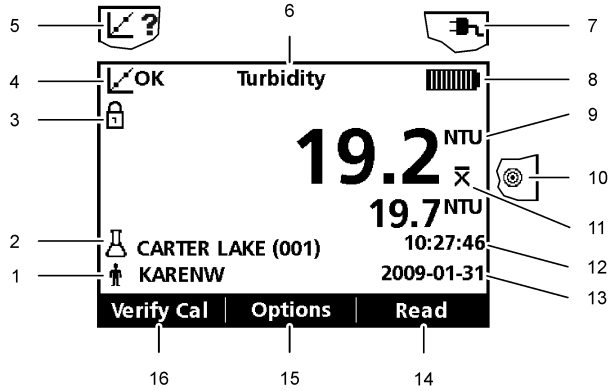
Figure 5 Single screen display



1	Operator identification	**9**	NTU (Nephelometric Turbidity Unit) or FNU (Formazin Turbidity Unit)
2	Sample identification	**10**	Reading mode: Rapidly Settling Turbidity (Target icon)
3	Stability or display lock indicator	**11**	Reading mode: Signal Average (X-bar icon)
4	Calibration status indicator (Calibration OK=pass)	**12**	Time
5	Calibration status indicator (Calibration ?=fail)	**13**	Date
6	Parameter title	**14**	Read (contextual: OK, Select)
7	AC power icon	**15**	Options (contextual)
8	Battery icon	**16**	Verification calibration

4.3 Navigation

The meter contains a Settings menu, Reading Options menu, Calibration Options menu and Calibration Verification Options menu to change various options. Use the **UP** and **DOWN** keys to highlight different options. Push the **RIGHT** key to select an option. There are two ways to change options:

1. Select an option from a list: Use the **UP** and **DOWN** keys to select an option. If check boxes are shown, more than one option can be selected. Push the **LEFT** key under Select.

   Note: *To deselect check boxes, push the* ***LEFT*** *key under Deselect.*
2. Enter an option value using the arrow keys:
   Push the **UP** and **DOWN** keys to enter or change a value.
3. Push the **RIGHT** key to advance to the next space.
4. Push the **RIGHT** key under **OK** to accept the value.

Section 5 Startup

5.1 Turn the meter on and off

Push the **ON/OFF** key to turn on or turn off the meter. If the meter does not turn on, make sure that the batteries, or the module, are properly installed or that the AC power supply is properly connected to an electrical outlet.

Note: *The Auto-Shutoff option can also be used to turn off the meter. Refer to* Power management *on page 14.*

5.2 Change the language

There are three options to set the language:

- The display language is selected when the meter is powered on for the first time.
- The display language is selected when the power key is pushed and held.
- The language can be changed from the Settings menu.

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1. Select a language from the list. Confirm with **OK**.
2. Push **Done** when the update is complete.

5.3 Change the date and time

The date and time can be changed from the Date & Time menu.

1. Push the **SETTINGS** key and select Date & Time.
2. Update the time and date information:

Option	Description
Format	Select one of the formats for the date and time: yyyy-mm-dd 24h yyyy-mm-dd 12h dd-mm-yyyy 24h dd-mm-yyyy 12h mm/dd/yyyy 24h mm/dd/yyyy 12h
Date	Enter the current date
Time	Enter the current time

The current date and time will be shown on the display.

After the date and time setup, the meter is ready to take a reading.

Section 6 Standard operation

6.1 Use a sample ID

The sample ID tag is used to associate readings with a particular sample location. If assigned, stored data will include this ID.

1. Select **Sample ID** in the Settings menu.
2. Select, create or delete a sample ID:

Option	Description
Current ID	Select an ID from a list. The current ID will be associated with sample data until a different ID is selected.
Create a New Sample ID	Enter a name for a new sample ID.
Delete Sample ID	Delete an existing sample ID.

6.2 Use an operator ID

The operator ID tag associates readings with an individual operator. All stored data will include this ID.

1. Select **Operator ID** in the Settings menu.
2. Select, create or delete an operator ID:

Option	Description
Current ID	Select an ID from a list. The current ID will be associated with sample data until a different ID is selected.
Create a New Operator ID	Enter a name for a new operator ID (maximum 10 names can be entered).
Delete Operator ID	Delete an existing operator ID.

6.3 Calibrate the turbidimeter with StablCal Standards

Note: *For best accuracy use the same sample cell or four matched sample cells for all readings during calibration. Insert the sample cell in the instrument cell*

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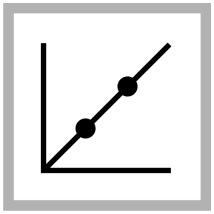
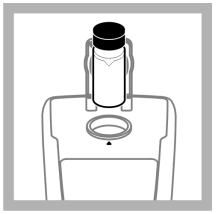
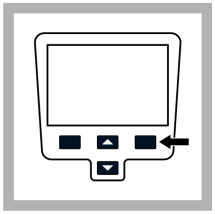
compartment so the diamond or orientation mark aligns with the raised orientation mark in front of the cell compartment.



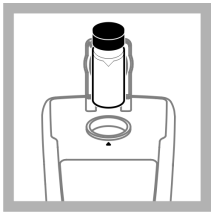
1. Push the **CALIBRATION** key to enter the Calibration mode. Follow the instructions on the display.
Note: *Gently invert each standard before inserting the standard.*



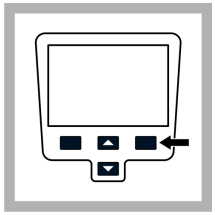
2. Insert the 20 NTU StablCal Standard and close the lid.
Note: *The standard to be inserted is bordered.*



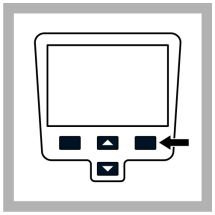
3. Push **Read**. The display shows Stabilizing and then shows the result.



4. Repeat Step 2 and 3 with the 100 NTU and 800 NTU StablCal Standard.
Note: *Push **Done** to complete a 2 point calibration.*



5. Push **Done** to review the calibration details.



6. Push **Store** to save the results. After a calibration is complete, the meter automatically goes into the Verify Cal mode. Refer to Calibration verification (Verify Cal) on page 19.

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6.4 Turbidity measurement

⚠WARNING

Potential explosion and fire hazard. This turbidimeter is designed for water based samples. Do not measure solvent or combustible based samples.

Readings can be taken with the Normal reading mode, Signal Average mode or in the Rapidly Settling Turbidity mode. Refer to Reading modes on page 20 for more information. For accurate turbidity readings use clean sample cells and remove air bubbles (degassing).

6.4.1 Measurement notes

Proper measurement techniques are important in minimizing the effects of instrument variation, stray light and air bubbles. Use the following measurement notes for proper measurements.

Instrument

- Make sure that the meter is placed on a level, stationary surface during the measurement.
  Note: *Do not hold the meter in the hand during measurement.*
- Always close the sample compartment lid during measurement, calibration and storage.
- Remove sample cell and batteries from the instrument if the instrument is stored for an extended time period (more than a month).
- Keep the sample compartment lid closed to prevent the entry of dust and dirt.

Sample cells

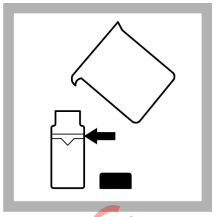
- Always cap the sample cell to prevent spillage of the sample into the instrument.
- Always use clean sample cells in good condition. Dirty, scratched or damaged cells can cause inaccurate readings.
- Make sure that cold samples do not “fog” the sample cell.
- Store sample cells filled with distilled or deionized water and cap tightly.

Measurement

- Measure samples immediately to prevent temperature changes and settling. Before a measurement is taken, always make sure that the sample is homogeneous throughout.
- Avoid sample dilution when possible.
- Avoid operation in direct sunlight.

6.4.2 Turbidity measurement procedure

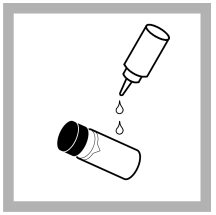
Note: *Before a measurement is taken, always make sure that the sample is homogeneous throughout.*



1. Collect a representative sample in a clean container. Fill a sample cell to the line (about 15 mL). Take care to handle the sample cell by the top. Cap the cell.



2. Wipe the cell with a soft, lint-free cloth to remove water spots and fingerprints.



3. Apply a thin film of silicone oil. Wipe with a soft cloth to obtain an even film over the entire surface (Apply silicone oil to a sample cell on page 20).

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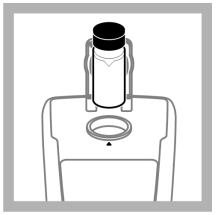
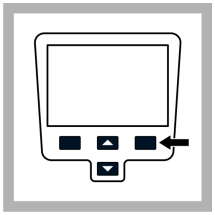
4. Push the **Power** key to turn the meter on. Place the instrument on a flat, sturdy surface.

Note: *Do not hold the instrument while making measurements.*



5. Gently invert and then insert the sample cell in the instrument cell compartment so the diamond or orientation mark aligns with the raised orientation mark in front of the cell compartment. Close the lid.



6. Push **Read**. The display shows Stabilizing then the turbidity in NTU (FNU). The result is shown and stored automatically. Additional information is available on the manufacturer's website.

Section 7 Data management

7.1 About stored data

The following types of data are stored in the data log:

- Reading Log: stores automatically each time a sample reading is taken (500 records).
- Calibration Log: stores only when **Store** is selected at the end of a calibration (25 records).
- Verify Cal Log: stores only after **Done** is selected at the end of a verification calibration (250 records).

When the data log becomes full, the oldest data point is deleted when more data is added to the log.

7.2 View data log

The data log contains Reading Log, Calibration Log and Verify Cal log. All logs can be sorted by date.

1. Push the **DATA MANAGEMENT** key.
2. Select View Data Log to view the stored data.
3. Push **Select** to view additional information.

Option	Description
Reading Log	Reading Log—shows the date, time and reading mode and associated calibration data.
Calibration Log	Calibration Log—shows the date and time of calibration data and additional information about the calibration.
Verify Cal Log	Verify Cal Log—shows the calibration verification date and time and additional information about the verification.
All Logs by Date	The most recent data and additional information is shown. The icons show whether the data is from a reading, calibration or calibration verification and identifies the reading mode, if applicable.

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7.3 Delete data log

There are two possibilities to delete stored readings in the Data Management menu:

1. Push the **DATA MANAGEMENT** key and select Delete Data Log.

Option	Description
Delete Last Reading	Only the last reading stored can be deleted until a new reading is taken and stored.
Delete All Logs	The entire Reading Log can be deleted at once.

7.4 Send stored data

Data can be stored and transferred to a printer, computer or USB storage device. The data will be formatted as an XML file. Install the USB/power module to the meter and to AC power. Refer to the module documentation for more information.

Section 8 Advanced operation

8.1 Display contrast

1. Push the **SETTINGS** key and select Display Contrast.
2. Use the **UP** and **DOWN** key to adjust the contrast of the display and push OK.

8.2 Power management

Use power management to change the backlight option and the battery saving auto-shutoff option.
Note: *Power management is not active when the meter is connected to AC power.*

1. Push the **SETTINGS** key and select Power Management.
2. Select which display option to change.

Option	Description
Backlight	The display is illuminated. To maximize battery life, select a time period after which the backlight will automatically power off if no key is pushed: 10 s, 20 s, 30 s,1 min, 2 min, 5 min ***Note:*** *The Backlight keys (Figure 1 on page 6) will turn the backlight on and off.*
Auto-Shutoff	To maximize battery life, set a time period after which the meter will automatically power off if no key is pushed: 1 min, 2 min, 5 min, 10 min, 30 min, 1 h

8.3 Set the sound options

The meter can make an audible sound when a key is pushed, when a reading is complete or when the calibration reminder is due.

1. Push **SETTINGS** and select Sounds.
2. Select which events will produce an audible sound. Multiple items can be selected.

Option	Description
Key Press	The meter will make an audible sound whenever a key is pushed.
Reading complete	The meter will make an audible sound whenever a reading is completed.
Reminders	The meter will make an audible sound when a calibration is due.

8.4 Security options

The Security Options menu is used to protect the meter setup.

The Setup Date and Time, Delete Data Log, Restoring Factory Defaults and Restore Factory Cal screens are not accessible without a password.

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Store the password in a safe and accessible place. If the specified password is forgotten and Security Options is turned on, the operator is locked out of the restricted menus. Contact technical support if the password is lost.

8.4.1 Turn security options on

The security options and the set password options are used together to prevent access to restricted menus.

1. Push the **SETTINGS** key and select Security Options.
2. Select Edit Password and use the **UP** and **DOWN** keys to set a password.
3. Select Security On to enable the password setting. The requirement for the password entry is controlled by setting Security Options on or off.
   Note: *Set the Security to Off to disable the password setting.*
4. Push the **ON/OFF** key to turn off and on the meter to activate the password settings.

8.5 View meter information

The instrument information menu shows specific information such as the meter name, model number, software version, serial number and available Operator and Sample IDs. 10 Operator IDs and 100 Sample IDs are available.

1. Push the **SETTINGS** key and select Meter Information.

8.6 Calibration

The portable turbidimeter is calibrated with Formazin Primary Standards at the factory. The meter should be calibrated upon receipt for best results. The manufacturer recommends calibration with a primary standard such as StablCal Stabilized Standards or with formazin standards every three months.
Note: *Set* ***Cal Reminder Repeat*** *in the Calibration Options menu for periodical calibration. Verify the calibration once a week.*

8.6.1 Calibration options

The calibration options contain Calibration History, Calibration Curves, Cal Reminder Repeat and Restore Factory Calibration.

1. Push the **CALIBRATION** key and then the **UP**and **DOWN** key.

Option	Description
Calibration History	The calibration history shows a list of the times when the meter was calibrated. Select a date and time to view a summary of the calibration data.
Cal.Curve	Select one of the calibration curves for calibration: StablCal RapidCal (0–40 NTU) StablCal (0–1000 NTU) Formazin RapidCal (0–40 NTU) Formazin (0–1000 NTU) Degrees (0–100 mg/L) SDVB (0–1000 NTU) Custom (0–1000 NTU)
Cal Reminder Repeat	The meter will make an audible sound when calibration is due. Select one of the following options for time interval and push OK: Off, 1 d, 7 d, 30 d, 60 d, 90 d
Restore Factory Calibration	All user calibrations will be deleted. The original factory calibration is restored.

8.6.2 Calibration standard overview

Refer to Table 1 for the calibration standard overview.

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Table 1 Calibration overview

Type of calibration	Required standards			
StablCal RapidCal (0–40 NTU)	–	20 NTU	–	–
StablCal (0–1000 NTU)	–	20 NTU	100 NTU	800 NTU
Formazin RapidCal (0–40 NTU)	Typically deionized or distilled water[1]	20 NTU	–	–
Formazin (0–1000 NTU)	Typically deionized or distilled water[1]	20 NTU	100 NTU	800 NTU
Degrees (0–100 mg/L)	Typically deionized or distilled water[1]	20 NTU	100 NTU	–
SDVB (0–1000 NTU)	Typically deionized or distilled water[1]	20 NTU	100 NTU	800 NTU
Custom (0–1000 NTU)	Typically deionized or distilled water[1]	Select values		

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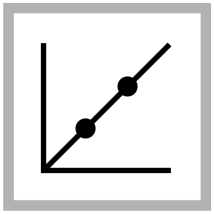
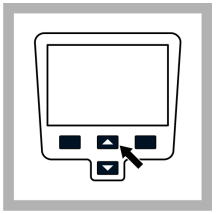
[1] The water must have a turbidity <0.5 NTU to prepare the calibration standards.

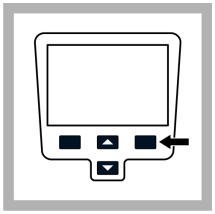
8.6.3 StablCal RapidCal calibration



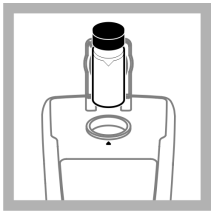
1. Push the **CALIBRATION** key to enter the Calibration mode. Follow the instructions on the display.
Note: *Gently invert each standard before inserting the standard.*



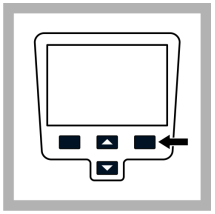
2. Push the **UP** and **DOWN** key to access Cal Options and then select Cal.Curve.



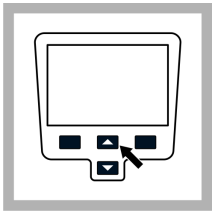
3. Select StablCal RapidCal from the list and push **OK**.



4. Insert the 20 NTU StablCal Standard and close the lid.
Note: *The standard to be inserted is bordered.*



5. Push **Read**. The display shows Stabilizing and then shows the result.



6. Push **Done** to review the calibration details.

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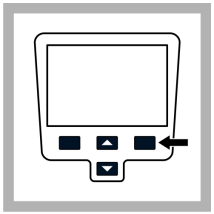

7. Push **Store** to save the results. After a calibration is complete, the meter automatically goes into the Verify Cal mode, refer to Calibration verification (Verify Cal) on page 19.

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8.6.4 Verification options

The Verification Options contain: Set Verification Standard, Set Acceptance Criteria and Verification Reminder.

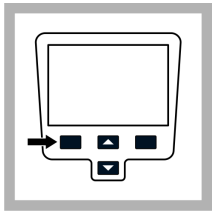
1. Push the **Left** key (Verify Cal) and then the **UP** and **DOWN** keys.

Option	Description
Set Verification Standard	To change the verification standard use the **UP** and **DOWN** keys to enter a new standard value. Range 0.50–20.0 NTU (Default setting: 10.00 NTU) Range 0–20 NTU for RapidCal (0–40 NTU) 0–800 NTU for calibration curves with a range from 0–1000 NTU
Set Acceptance Criteria	Enter the Acceptance Criteria for comparison against the initial calibration verification reading to determine passing or failing. Range 1–50% (Default setting: 10%)
Verification Reminder	Verification Reminder—The meter will make an audible sound when verification is due. Select one of the following options for time interval and push **OK**:Off, 30 min (Default setting), 2 h, 4 h, 8 h, 24 h Allow Defer—Push **Allow Defer** and select Yes or No to postpone the verification due time

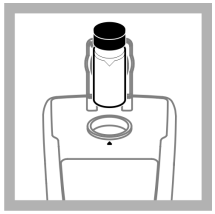
8.6.5 Calibration verification (Verify Cal)

The manufacturer recommends a calibration verification once a week. After a calibration is complete, the meter automatically goes into the Verify Cal mode.

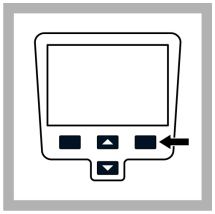
Make sure that the sample cell is clean. Oil the sample cell with silicone oil, refer to Apply silicone oil to a sample cell on page 20. Check the standard solution. Prepare a formazin standard at the same value and read the value.



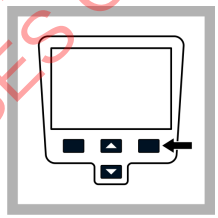
1. Push **Verify Cal** to enter the Verify menu.



2. Gently invert the standard. Insert the 10.0 NTU (or other defined value) Verification Standard and close the lid.



3. Push **Read**. The display shows Stabilizing and then shows the result and tolerance range.



4. Push **Done** to return to the reading display. Repeat the calibration verification if the verification failed.

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8.7 Reading modes

1. Push the **UP** or **DOWN** key to enter the Reading Options menu.
2. Select Reading Mode to select one of the following options:

Option	Description
Normal (Default setting)	The normal mode reads and averages three readings. The result is shown after the reading.
Signal Average 	The Signal Average mode compensates for reading fluctuations caused by drifting of sample particles through the light path. The X-bar icon is shown on the display when signal averaging is on. The Signal Average mode measures 12 times and starts to show the average after three readings. The final result is the average of all 12 readings.
Rapidly Settling Turbidity (RST) 	The Rapidly Settling Turbidity (RST) mode calculates and continuously updates the turbidity reading of the sample to a confidence of 95%, based on the accumulated trend of the real time measured values. The RST mode is best used on samples that settle rapidly and continuously change in value. The reading is based on a correctly prepared sample that is homogeneous at the beginning of the reading. It is best applied to samples that are greater than 20 NTU. The sample must be mixed thoroughly by inversion immediately before inserting it into the meter. The target icon is shown on the display when the Rapidly Settling Turbidity is on. The Rapidly Settling Turbidity reads and calculates five readings while showing intermediate results.

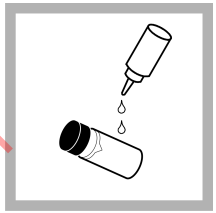
8.8 Apply silicone oil to a sample cell

Sample cells and caps must be extremely clean and free from significant scratches. Apply a thin coating of silicone oil on the outside of the sample cells to mask minor imperfections and scratches that may contribute to light scattering.

Note: *Use only the provided silicone oil. This silicone oil has the same refractive index as the sample cell glass.*



1. Clean the inside and outside of the cells and caps by washing with a laboratory glass cleaning detergent. Follow with multiple rinses with distilled or demineralized water.



2. Apply a small bead of silicone oil from the top to the bottom of the cell.



3. Use the provided oiling cloth to spread the oil uniformly. Wipe off the excess so that only a thin coat of oil is left. Make sure that the sample cell is almost dry with little or no visible oil.

Note: *Store the oiling cloth in a plastic storage bag to keep the cloth clean.*

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8.9 Indexing a single cell

Precise measurements for very low turbidity samples require the use of a single cell for all measurements or optically matching the cells. Use one cell to provide the best precision and repeatability. When one cell is used, an index or orientation mark (other than the factory-placed diamond) can be placed on the cell so it is inserted into the instrument with the same orientation each time.
When using a single cell, make an index or orientation mark on the cell as follows:

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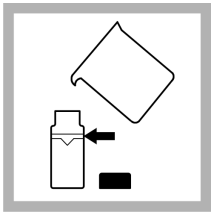
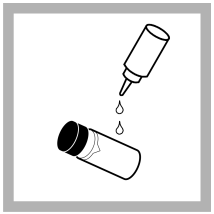


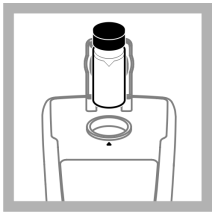
1. Fill the clean sample cell to the line with high quality water (< 0.5 NTU) and cap immediately. Let the sample cell degas for at least five minutes.



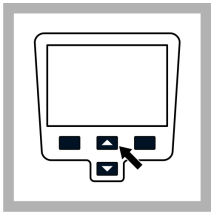
2. Wipe with lint-free cloth. Apply a thin film of silicone oil (Apply silicone oil to a sample cell on page 20).



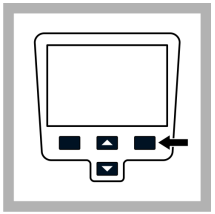
3. Push the **POWER** key to turn the meter on. Place the instrument on a flat, sturdy surface. ***Note:*** *Do not hold the instrument while making measurements.*



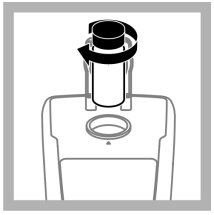
4. Insert the sample cell in the instrument cell compartment so the diamond or orientation mark always aligns with the raised orientation mark in front of the cell compartment. Close the lid.



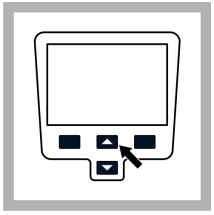
5. Push the **UP** and **DOWN** key to access the Reading Options and then select Indexing Sample Cell. ***Note:*** *The instruments always stays in the last selected reading mode.*



6. Push **Read**. The display shows Stabilizing then the turbidity in NTU. Record the cell position in the cell compartment and the reading result.



7. Remove the cell, rotate it slightly approximately ⅛ of a turn and insert it again into the cell compartment. Close the lid.



8. Push **Read**. Record the cell position in the cell compartment and the reading result.



9. Repeat step 6 until the lowest reading is shown. Place an orientation mark on the cell marking band near the top of the cell so the cell can be consistently inserted in the position that yields the lowest reading.

FOR BIDDING PURPOSES ONLY

Section 9 Maintenance

⚠ CAUTION



Multiple hazards. Only qualified personnel must conduct the tasks described in this section of the document.

9.1 Clean the meter

The meter is designed to be maintenance-free and does not require regular cleaning for normal operation. Exterior surfaces of the meter may be cleaned as necessary.

Note: *Do not clean the meter with solvents to avoid damaging the material.*

1. Clean the meter with a dust- and lint-free dry or slightly damp cloth. A mild soap solution can also be used for liposoluble contamination.

9.2 Store the sample cells

NOTICE

Do not air dry the sample cells.

Note: *Always store the sample cells with caps on to prevent the cells from drying.*

1. Fill the sample cells with distilled or demineralized water.
2. Cap and store the sample cells.
3. Wipe the outside of the sample cells dry with the a soft cloth.

9.3 Replace the battery

⚠ WARNING



Explosion hazard. An expired battery can cause hydrogen gas buildup inside the instrument. Replace the battery before it expires. Do not store the instrument for long periods with a battery installed.

⚠ WARNING

Potential fire hazard. Use only alkaline or nickel metal hydride batteries (NiMH) in the meter. Other battery types or incorrect installation can cause a fire. Never mix battery types in the meter.

For battery replacement refer to Install the battery on page 7.

1. Remove the battery cover.
2. Remove the batteries.
3. Install 4 AA alkaline or 4 AA nickel metal hydride (NiMH) batteries. Make sure that the batteries are installed in the correct orientation.
4. Replace the battery cover.

9.4 Replace the lamp

⚠ CAUTION

Burn Hazard. Wait until lamp cools down. Contact with the hot lamp can cause burns.

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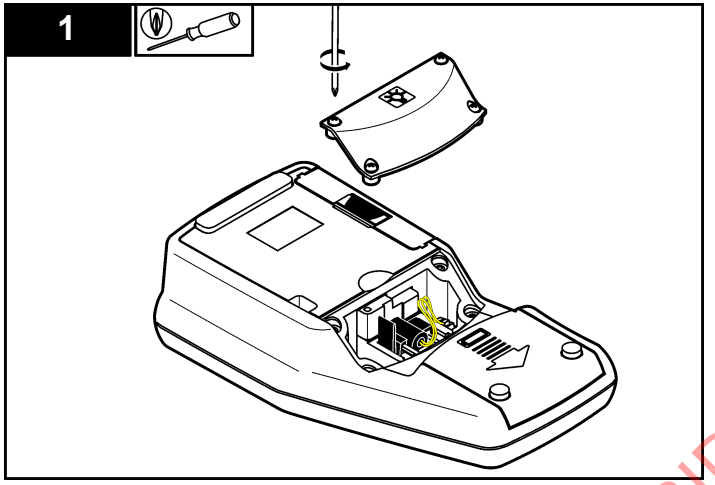

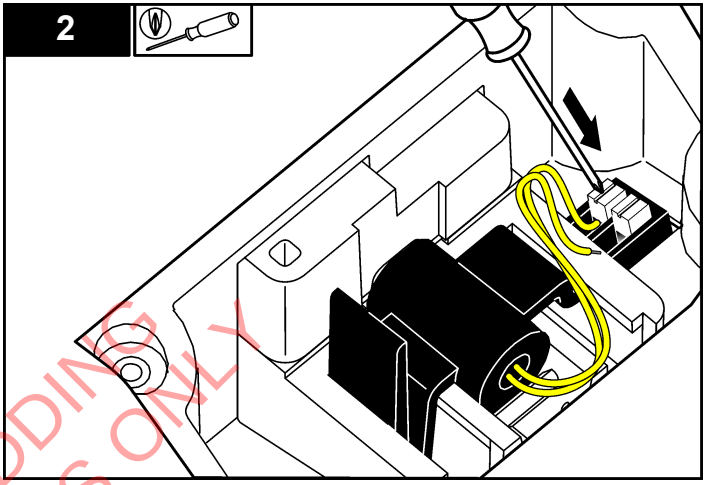

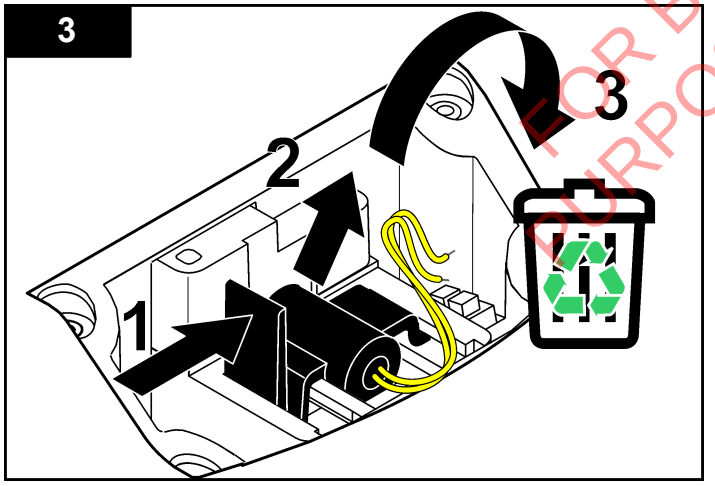

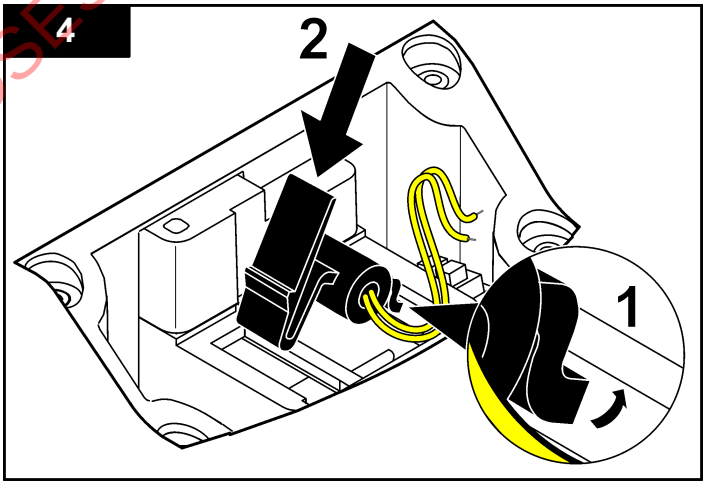

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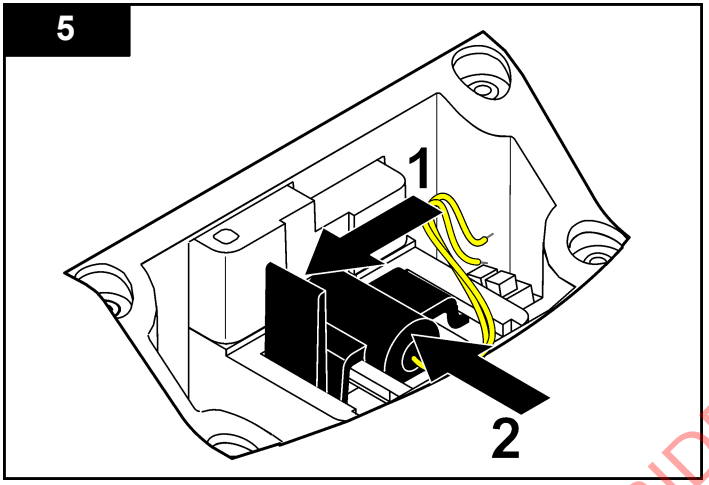

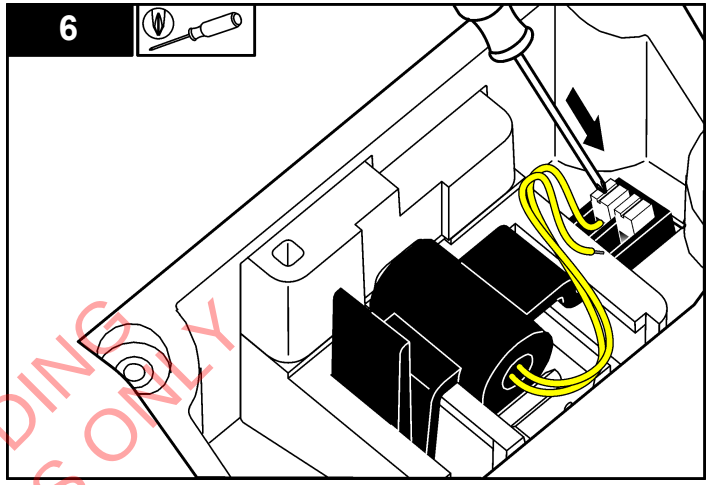

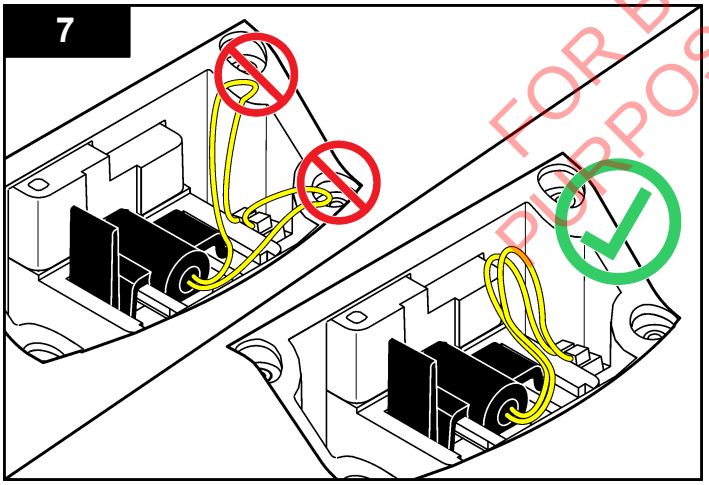

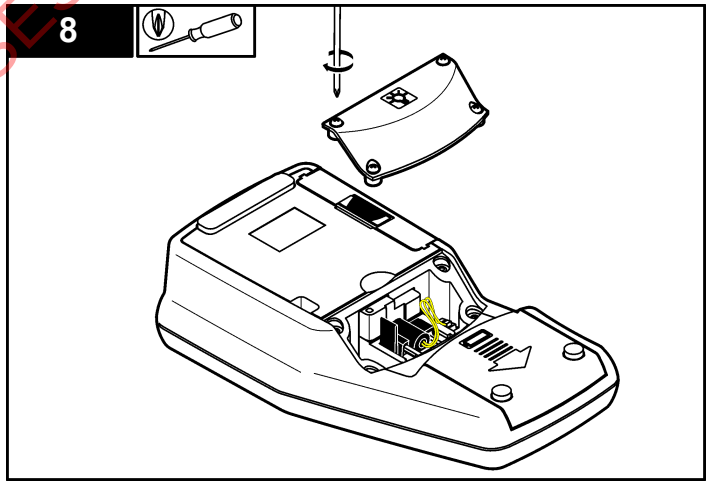

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Section 10 Troubleshooting

Refer to the following table for common problem messages or symptoms, possible causes and corrective actions.

Error/Warning	Description	Solution
Close lid and push Read.	The lid is open or lid detection failed.	Make sure that the lid is closed during reading and re-read.
Low Battery!	Battery is low.	• Insert new batteries • Connect USB/power module if rechargeable batteries are used
ADC Failure!	Hardware error causing reading to fail.	Repeat the reading.
Detector signal too low!	Insufficient light on the 180° detector.	• Check for obstructed light path. • Check the lamp.
Overrange!	Turbidity too high-caused probably by calibrating with RapidCal only.	• Calibrate the upper range. • Dilute the sample.
Underrange!	The measured absorbance is below the calibration range.	Repeat calibration
Please check the lamp!	Signals are too low on the 90° and 180° detector.	**2100Q:** The lamp is defective. Change the lamp (refer to Replace the lamp on page 23). **2100Q*is*:** Contact technical support.
Temperature too high! Switch off instrument.	Temperature has exceeded the meter limits (>60 °C or >140 °F).	Turn off the meter and let it cool down.
RST: Average value!	Solids are settling too slowly. The reading mode is not suitable for this sample.	Select Normal or Signal Average reading mode.
Confidence level is < 95%	The reading mode Rapidly Settling Turbidity did not meet the range of ≥ 95% confidence.	• Invert the sample several times so that the solids allocate. Repeat the reading again. • Switch to the Normal reading mode if the sample is stable and does not have settable solids.
Standard value out of range. Insert standard and push Read	Used incorrect standard value for the reading.	Insert the appropriate standard and read again.
ID already in use. Enter new ID	The Operator or Sample ID is unavailable as it is already assigned.	Create a new ID.

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Error/Warning	Description	Solution
Error - Security Please set password before activating security	No password is created.	Create a new password.
Please enter at least one character.	Password must contain minimum of one character.	Create a password of at least one character.
Password incorrect. Please retry.	Incorrect password was entered.	Enter the appropriate password.
Please disconnect the USB cable from your computer.	Data storage does not respond while connected to the meter and the computer.	Disconnect the USB cable from the meter and try sending data again.
USB module memory full. Delete data and try again.	Data storage is full.	**1.** Connect USB/power module to the computer. **2.** Download the stored data to the computer. **3.** Delete Data Log on the module.

Error/Warning	Description	Solution
Delete Last Reading Failed!	Error in the data storage.	Turn the meter off and on. If the error message still occurs, contact technical support.
Delete Data Log failed!		
Can't read data set!		
Can't store data!		
Can't store to the Reading Log!		
Can't store to the Verify Cal Log!		
Error storing data!		
Error reading data!		

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Section 11 Replacement parts and accessories

11.1 Replacement parts

Description	Quantity	Item no.
StablCal ampule calibration kit	1	2971205
10 NTU verification standard	100 mL	2961701
Silicone Oil	15 mL	126936
Insert, molded bottom	1	2971507
Sample cell oiling cloth	1	4707600
1" glass sample cell (10 ml) w/cap (Turb)	pkg/6	2434706
Carrying case (includes insert)	1	2971500

11.1 Replacement parts (continued)

Description	Quantity	Item no.
Battery set, AA alkaline batteries	pkg/4	1938004
Lamp assy	1	4653900
Blank module	1	LZV797
Rubber foot set	1	LZV821
Lamp cover (includes screws)	1	LZV822
Battery cover (includes 2 feet)	1	LZV823
Module cover	1	LZV824
Connector cover for USB/power module	1	LZV825
Connector cover for power module	1	LZV826
Lid (includes magnet)	1	LZV827

11.2 Accessories

Description	Quantity	Item no.
USB/power module (includes: universal power supply, USB cable, instruction sheet)	1	LZV813.99.00001[2]
Power module (includes: universal power supply, instruction sheet)	1	LZV804.99.00001[1]
USB module with USB cable (2x)	1	LZV949.99.00001[1]
StablCal 0.1 NTU Standard	100 mL	2723342

11.2 Accessories (continued)

Description	Quantity	Item no.
StablCal 0.3 NTU Standard	100 mL	2697943
StablCal 0.5 NTU Standard	100 mL	2698042
StablCal calibration kit	100 mL	2971210
StablCal calibration kit	500 mL	2971200
Gelex secondary standards set	1	2464105
Deionized water	4 vials	27217
Filter	0.2 micron	2323810
Formazin	500 ml	246149
Formazin	1000 ml	246142
Sample degassing kit	1	4397500
Sample degassing and filtration kit	1	4397510
Battery, NiMH AA	pk/4	2971304

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[2] Not available in all regions

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Dear Customer,

Thank you for choosing a Hanna Instruments product. Please read this instruction manual carefully before using the tester. For more information about Hanna Instruments and our products, visit www.hannainst.com or e-mail us at sales@hannainst.com.

For technical support, contact your local Hanna Instruments Office or e-mail us at tech@hannainst.com.

Preliminary Examination

Remove the tester and accessories from the packing material and examine it carefully. If you require any further information, please contact Hanna Instruments technical support team at tech@hannainst.com.

Each HI98129 is delivered in a cardboard box and is supplied with:

- HI70004 pH 4.01 buffer solution, 20 mL sachet (1 pc.)
- HI70007 pH 7.01 buffer solution, 20 mL sachet (1 pc.)
- HI70300N Storage solution for pH & ORP electrodes, 20 mL sachet (1 pc.)
- HI70031 1413 µS/cm conductivity standard, 20 mL sachet (1 pc.)
- HI70032 1382 ppm TDS standard, 20 mL sachet (1 pc.)
- HI700601 pH & ORP electrode cleaning solution, 20 mL sachet (1 pc.)
- HI73127 pH electrode
- HI73128 Electrode removal tool
- 1.5V batteries (4 pcs.)
- Instrument quality certificate
- Instruction manual

Each HI98130 is delivered in a cardboard box and is supplied with:

- HI70004 pH 4.01 buffer solution, 20 mL sachet (1 pc.)
- HI70007 pH 7.01 buffer solution, 20 mL sachet (1 pc.)
- HI70300N Storage solution for pH & ORP electrodes, 20 mL sachet (1 pc.)
- HI70030 12880 µS/cm conductivity standard, 20 mL sachet (1 pc.)
- HI70038 6.44 ppt TDS standard, 20 mL sachet (1 pc.)
- HI700601 pH & ORP electrode cleaning solution, 20 mL sachet (1 pc.)
- HI73127 pH electrode
- HI73128 Electrode removal tool
- 1.5V batteries (4 pcs.)
- Instrument quality certificate
- Instruction manual

Note: *Save all packing material until you are sure that the tester works correctly. Any damaged or defective item must be returned in its original packing material with the supplied accessories.*

General Description & Intended Use

HI98129 & HI98130 are compact pH, EC/TDS and temperature testers. They feature a two-buttons operation system and are easy to use. The compact and waterproof casing is designed to float if accidentally dropped in water. The testers measure temperature in both °C and °F. All pH and EC/TDS measurements are temperature compensated automatically (ATC). EC/TDS measurements have user-selectable EC/TDS conversion factor (CONV) and temperature compensation coefficient (β). The testers display a stability tag (⏱) that will disappear once the reading has stabilized.

Battery level and low-battery indicator are clearly displayed on the LCD to alert the user in the event that low battery power could adversely affect readings.

BEPS (Battery Error Prevention System) Testers will automatically shut off if there is not enough power to get an accurate measurement.

pH Probe: HI98129 & HI98130 are supplied together with HI73127 pH replaceable electrode with a stainless steel round connector and extendable cloth junction. This design has no pins to line up or that can break.

Temperature Sensor: The stainless steel temperature sensor facilitates faster and more accurate temperature measurement.

Specifications

Range	0.0 to 60.0 °C / 32.0 to 140.0 °F 0.00 to 14.00 pH 0 to 3999 µS/cm (HI98129) 0.00 to 20.00 mS/cm (HI98130) 0 to 2000 ppm (HI98129) 0.00 to 10.00 ppt (HI98130)
Resolution	0.1 °C (0.1 °F) 0.01 pH 1 µS/cm ; 1 ppm (HI98129) 0.01 mS/cm ; 0.01 ppt (HI98130)
Accuracy (@25 °C / 77 °F)	±0.5 °C (±1.0 °F) ±0.05 pH ±2% f.s. (EC/TDS)
Temperature compensation	Automatic EC/TDS: β=0.0 to 2.4% / °C
Environment	0 to 50 °C (32 to 122 °F) RH 100%
TDS factor	0.45 to 1.00 (CONV)
Calibration	pH: automatic, one or two-point with two sets of standard buffers (pH 4.01 / 7.01 / 10.01 or pH 4.01 / 6.86 / 9.18) EC/TDS: automatic, one-point calibration
EC/TDS Calibration Solutions HI98129 HI98130	HI70031 (1413 µS/cm) HI70032 (1382 ppm; CONV=0.50) HI70442 (1500 ppm; CONV=0.70) HI70030 (12.88 mS/cm) HI70038 (6.44 ppt; CONV=0.50 or 9.02 ppt; CONV=0.70)
Electrode	HI73127 pH electrode (included)
Battery type	1.5V (4 pcs.)
Battery life	Approx. 100 hours
Auto-off	After 8 minutes of non-use
Dimensions	171 x 41 x 26 mm (6.7 x 1.6 x 1.0")
Weight	93 g (3.4 oz.)

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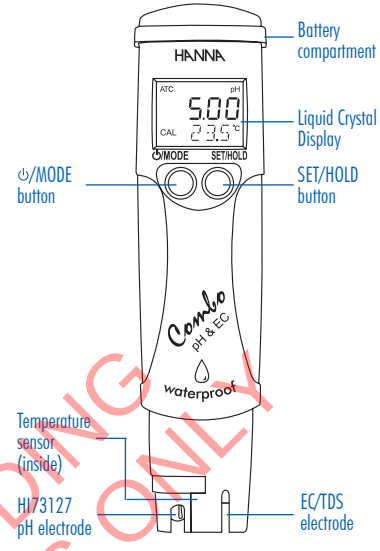
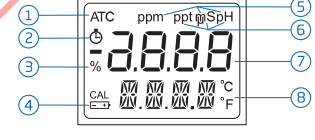
Functional Description



LCD Display



1. Automatic Temperature Compensation (ATC) indicator
2. Stability tag
3. Battery life percentage indicator
4. Low battery indicator
5. Measurement unit (HI98129)
6. Measurement unit (HI98130)
7. First LCD line
8. Second LCD line

Operational Guide

Turning the Tester ON / OFF

Press and hold ⏻/MODE. All LCD segments will be displayed for a few seconds followed by battery life percentage indicator. To turn the tester off, from measurement mode, press ⏻/MODE. "OFF" will be displayed on the second LCD line and then the tester will turn off.

HOLD Mode

From measurement mode, press and hold SET/HOLD until "HOLD" is displayed. pH, EC/TDS or temperature readings will be frozen on the LCD. Press either buttons to resume measurement mode.

Setup

Setup mode allows the selection of temperature unit and pH buffer set. To enter the setup mode, select pH mode and press ⏻/MODE until "TEMP" and the current temperature unit are displayed (e.g. "TEMP °C"). Then:

- Press SET/HOLD to select temperature unit. After the temperature unit has been selected, press ⏻/MODE to select the buffer set. To return to measurement mode, press ⏻/MODE twice.
- After setting the temperature unit, the tester will display the current buffer set: "pH7.01 BUFF" (for pH 4.01/7.01/10.01) or "pH6.86 BUFF" (for NIST pH 4.01/6.86/9.18). Press SET/HOLD to change the buffer set and press ⏻/MODE to resume measurement mode.

pH Calibration & Measurement

It is recommended to calibrate the tester frequently, especially if high accuracy is required. More frequent calibrations may be required depending on the type of sample being tested. The tester should be recalibrated:

- whenever the pH electrode is replaced
- at least once a month
- after testing aggressive samples

From measurement mode, press and hold ⏻/MODE until "CAL" is displayed. The tester enters calibration mode and displays "pH 7.01 USE" or "pH 6.86 USE", if NIST buffer was selected. Buffer value will be displayed on the first LCD line and "REC" message will be displayed on the second line. If used buffer was not valid, "USE" message will be displayed for 12 seconds and replaced by "WRNG" indicating measured sample is not valid.

- For one-point calibration using pH 4.01, 10.01 or 9.18 buffer solution, once the reading has stabilized, the tester automatically accepts the calibration point. Accepted buffer point and "OK 1" message are displayed and then the tester returns to measurement mode.
- For one-point calibration using pH 7.01 (or 6.86) buffer solution, press ⏻/MODE after calibration point has been accepted. The tester will display "pH 7.01" (or "pH 6.86") and "OK 1" and then return to measurement mode.
- For a two-point calibration using pH 7.01 (or pH 6.86) buffer solution, after the first calibration point has been accepted, "pH 4.01 USE" will be displayed for 12 seconds (unless a valid buffer is recognized).
- If valid buffer solution is recognized (pH 4.01, 10.01 or 9.18), the calibration point is accepted and the accepted value and "OK 2" are displayed. The tester then returns to measurement mode.
- If no valid buffer solution is recognized, "WRNG" message is displayed.

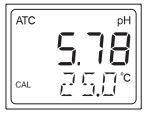
Note: *When the calibration procedure is completed, the "CAL" tag is turned on.*

Exiting Calibration & Resetting Default Values

- When in calibration mode, it is possible to exit calibration procedure by pressing ⏻/MODE, before first-point calibration has been accepted. The tester displays "ESC" and returns to measurement mode and last calibrated data.
- When in calibration mode, it is possible to clear a previous calibration and return to default values by pressing SET/HOLD, before the first calibration point has been accepted. The tester displays "CLR" on the second LCD line, "CAL" tag dissappears and tester returns to default calibration.

Measurement

Use SET/HOLD to select pH mode. Place the electrode in the solution to be tested while stirring gently. The measurement should be taken after the stability tag has disappeared. The pH value is displayed on the first LCD line and the temperature on the second LCD line.



Note: *Before taking any pH measurement make sure the tester has been calibrated ("CAL" tag is displayed).*

EC/TDS Calibration & Measurement

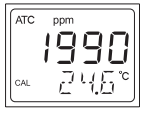
Calibration Procedure

- From measurement mode, press and hold ⏻/MODE until "CAL" is displayed on the second LCD line.
- Place the probe in calibration solution: HI70031 (1413 µS/cm) for HI98129 and HI70030 (12.88 mS/cm) for HI98130.
- The LCD displays "OK" for 1 second and the tester returns to measurement mode.

Note: *The "CAL" tag on the LCD indicates that the tester is calibrated.*

Measurement

Use SET/HOLD to select either EC or TDS mode. Place the electrode in the solution to be tested while stirring gently. Use plastic beakers to minimize any electromagnetic interferences. The measurement should be taken after the stability tag has disappeared. The EC/TDS value is displayed on the first LCD line and the temperature on the second LCD line.



Note: *Before taking any measurement make sure the tester has been calibrated ("CAL" tag is displayed).*

Changing EC/TDS Conversion Factor (CONV) & Temperature Compensation Coefficient ß (BETA)

- From measurement mode, press and hold ⏻/MODE until "TEMP" and the current temperature unit are displayed on the second LCD line (e.g. "TEMP °C").
- Press ⏻/MODE again to show the current conversion factor (e.g. "0.50 CONV") and SET/HOLD to change the conversion factor.
- Press ⏻/MODE to show the current temperature compensation coefficient ß (e.g. "% 2.1 BETA") and SET/HOLD to change the temperature compensation coefficient ß.
- Press ⏻/MODE to return to measurement mode.

Maintenance

Please read the information below to ensure the highest possible accuracy.

- Fresh buffer solution should be used for each calibration.
- For improved accuracy a two-point calibration is recommended.
- If measurements are taken successively, rinse the probe thoroughly in distilled or deionized water to eliminate cross-contamination.
- Clean the electrode monthly using pH and EC cleaning solution. Keep the electrode in HI7061 - General purpose cleaning solution for 30 minutes and rinse the probe thoroughly with water.
- When not in use, add a few drops of HI70300 Storage solution to the protective cap. Never store the probe in distilled or deionized water.

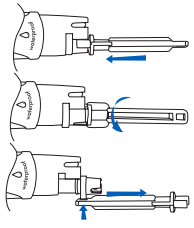
Electrode Replacement

Use supplied removal tool (HI73128) to replace the pH electrode.

Insert the tool into the probe cavity.

Rotate the tool counterclockwise.

Pull the electrode out by using the other side of the tool. Insert a new pH electrode following the above instructions in reverse order.



Battery Replacement

Battery life percentage indicator is displayed at power on. If the battery level drops below 5%, the ▭ symbol lights up indicating that the batteries should be replaced soon.

If the battery level is not adequate to guarantee an accurate reading, the tester automatically turns off.

To replace the batteries, follow the next steps:

1. Turn OFF the tester.
2. Remove the four screws on the top of the tester to open the battery compartment (figure 1).
3. Remove the old batteries.
4. Insert four new 1.5V AA batteries in the battery compartment while paying attention to the correct polarity (figure 2).
5. Close the battery compartment using the four screws.

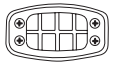
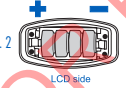
fig. 1 

fig. 2 

Note: *Only use the battery type specified in the manual. Old batteries should be disposed in accordance with local regulations.*

Accessories

Electrode	
HI73127	Replaceable pH electrode
HI73128	Electrode removal tool
Solutions	
HI70004P	pH 4.01 solution, 20 mL sachet (25 pcs.)
HI70006P	pH 6.86 solution, 20 mL sachet (25 pcs.)
HI70007P	pH 7.01 solution, 20 mL sachet (25 pcs.)
HI70009P	pH 9.18 solution, 20 mL sachet (25 pcs.)
HI70010P	pH 10.01 solution, 20 mL sachet (25 pcs.)
HI770710P	pH 10.01 & 7.01 solution, 20 mL sachet (10 pcs., 5 each)
HI77400P	pH 4.01 & 7.01 solutions, 20 mL sachet (10 pcs., 5 each)
HI70030P	12.88 mS/cm solution, 20 mL sachet (25 pcs.)
HI70031P	1413 µS/cm solution, 20 mL sachet (25 pcs.)
HI70032P	1382 ppm solution, 20 mL sachet (25 pcs.)
HI70038P	6.44 ppt solution, 20 mL sachet (25 pcs.)
HI70442P	1500 ppm solution, 20 mL sachet (25 pcs.)
Electrode Cleaning Solution	
HI7061M	General purpose cleaning solution, 230 mL
Electrode Storage Solution	
HI70300M	Electrode storage solution, 230 mL
Other Accessories	
HI740026P	Replacement 1.5 V batteries (12 pcs.)

Certification

All Hanna Instruments conform to the **CE European Directives.**

RoHS compliant

Disposal of Electrical & Electronic Equipment. The product should not be treated as household waste. Instead hand it over to the appropriate collection point for the recycling of electrical and electronic equipment which will conserve natural resources.

Disposal of waste batteries. This product contains batteries, do not dispose of them with other household waste. Hand them over to the appropriate collection point for recycling.

Ensuring proper product and battery disposal prevents potential negative consequences for the environment and human health. For more information, contact your city, your local household waste disposal service, the place of purchase or go to www.hannainst.com.

Recommendations for Users

Before using this tester, make sure that it is entirely suitable for your specific application and the environment in which it is used. The glass bulb at the end of the electrode is sensitive to electrostatic discharges. Avoid touching the glass bulb at all times. Any variation introduced by the user to the supplied equipment may degrade the tester's performance. For yours and the tester's safety do not use or store the tester in hazardous environments.

Warranty

HI98129 and HI98130 are warranted for a period of one year against defects in workmanship and materials when used for their intended purpose and maintained according to instructions. The electrode is warranted for a period of six months. This warranty is limited to repair or replacement free of charge. Damage due to accidents, misuse, tampering or lack of prescribed maintenance is not covered. If service is required, contact your local Hanna Instruments Office. If under warranty, report the model number, date of purchase, serial number and the nature of the problem. If the repair is not covered by the warranty, you will be notified of the charges incurred.

If the instrument is to be returned to Hanna Instruments Office, first obtain a Returned Goods Authorization (RGA) number from the Technical Service department and then send it with shipping costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

Hanna Instruments reserves the right to modify the design, construction, or appearance of its products without advance notice.

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US DESIGN PATENT D462,024

IST98129 09/19

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INSTRUCTION MANUAL

HI98129 • HI98130

Waterproof pH, EC/TDS & Temperature Testers



HANNA® instruments

Multi Water Quality Checker
U-50 Series

Instruction Manual

CODE:GZ0000144342C

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Preface

This manual describes the operation of the Multi Water Quality Checker, U-50 Series.
Be sure to read this manual before using the product to ensure proper and safe operation of the instrument. Also safely store the manual so it is readily available whenever necessary.

Product specifications and appearance, as well as the contents of this manual are subject to change without notice.

■ Warranty and Responsibility

HORIBA warrants that the Product shall be free from defects in material and workmanship and agrees to repair or replace free of charge, at HORIBA's option, any malfunctioned or damaged Product attributable to HORIBA's responsibility for a period of one (1) year from the delivery unless otherwise agreed with a written agreement. In any one of the following cases, none of the warranties set forth herein shall be extended;

- Any malfunction or damage attributable to improper operation
- Any malfunction attributable to repair or modification by any person not authorized by HORIBA
- Any malfunction or damage attributable to the use in an environment not specified in this manual
- Any malfunction or damage attributable to violation of the instructions in this manual or operations in the manner not specified in this manual
- Any malfunction or damage attributable to any cause or causes beyond the reasonable control of HORIBA such as natural disasters
- Any deterioration in appearance attributable to corrosion, rust, and so on
- Replacement of consumables

HORIBA SHALL NOT BE LIABLE FOR ANY DAMAGES RESULTING FROM ANY MALFUNCTIONS OF THE PRODUCT, ANY ERASURE OF DATA, OR ANY OTHER USES OF THE PRODUCT.

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■ Trademarks

Generally, company names and brand names are either registered trademarks or trademarks of the respective companies.

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Conformable Directive

This equipment conforms to the following directives and standards:

Directives: the EMC Directive 2004/108/EC

Standards: [the EMC Directive]
EN61326-1:2006 Class B, Portable test and measurement equipment

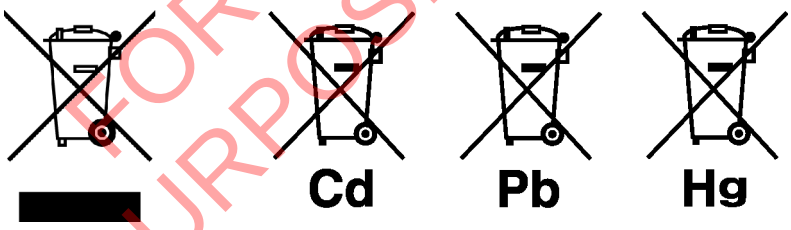
■ Information on Disposal of Electrical and Electronic Equipment and Disposal of Batteries and Accumulators

The crossed out wheeled bin symbol with underbar shown on the product or accompanying documents indicates the product requires appropriate treatment, collection and recycle for waste electrical and electronic equipment (WEEE) under the Directive 2002/96/EC, and/or waste batteries and accumulators under the Directive 2006/66/EC in the European Union.

The symbol might be put with one of the chemical symbols below. In this case, it satisfies the requirements of the Directive 2006/66/EC for the object chemical.

This product should not be disposed of as unsorted household waste.
Your correct disposal of WEEE, waste batteries and accumulators will contribute to reducing wasteful consumption of natural resources, and protecting human health and the environment from potential negative effects caused by hazardous substance in products.

Contact your supplier for information on applicable disposal methods.



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FCC Rules

Any changes or modifications not expressly approved by the party responsible for compliance shall void the user's authority to operate the equipment.

■ WARNING

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

For your safety

Warning messages are described in the following manner. Read the messages and follow the instructions carefully.

● Meaning of warning messages

⚠ DANGER	This indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.
⚠ WARNING	This indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	This indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. Without safety alert indication of hazardous situation which, if not avoided, could result in property damage.

● Symbols

	Description of what should be done, or what should be followed
	Description of what should never be done, or what is prohibited

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■ Safety Precautions

This section provides precautions to enable you to use the product safely and correctly and to prevent injury and damage. The terms of DANGER, WARNING, and CAUTION indicate the degree of imminency and hazardous situation. Read the precautions carefully as it contains important safety messages.

⚠ WARNING
Do not disassemble or modify the meter. May cause overheating or fire, resulting in accidents.

⚠ CAUTION
The pH and ORP sensors are made of glass. Handle them carefully to avoid breakage.
Do not ingest the DO, pH or ORP standard solutions. If it comes into contact with the eyes, rinse thoroughly with water. If swallowed, consult a physician.
Keep away from water when using USB communication. Improper use may result in fire or damage.

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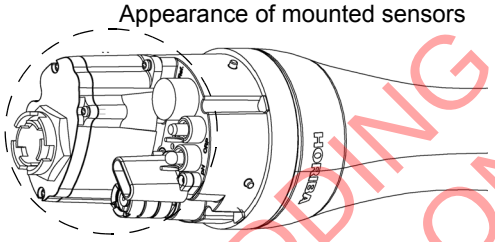
Points of concern

Use of the equipment in a manner not specified by the manufacturer may impair the protection provided by the equipment. It may also reduce equipment performance.

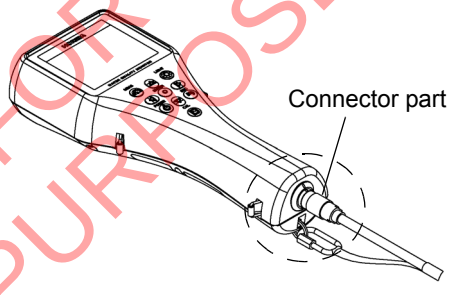
Sensor probe

- Do not immerse the sensor probe in seawater or other samples with high salinity. Doing so may erode metallic parts. After use, promptly wash the sensor probe thoroughly in water.
- Do not immerse the sensor probe in alcohol, organic solvent, strong acid, strong alkaline, and other similar solutions.
- Do not subject to strong shocks.
- Do not perform measurement in environments of magnetic fields. Measurement errors may result.
- The sensor probe is no longer waterproof when the sensors are not mounted.

Appearance of mounted sensors



- Does not support measurement of samples containing fluorine.
- To disconnect the sensor cable or interface cable, pull them out with holding the connector part. Do not pull the cable part; it may cause breakage.



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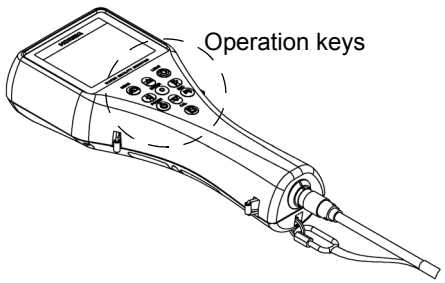
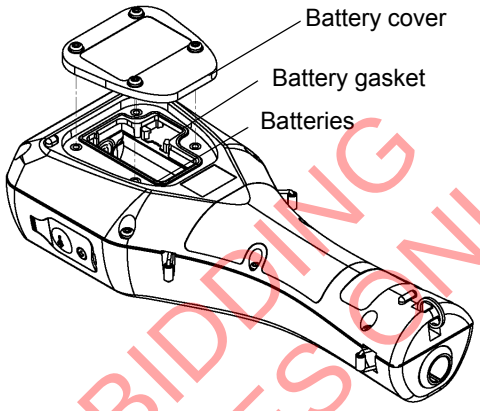
Control unit

- Do not subject to strong shocks.
- The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.



- The control unit is no longer waterproof when the USB cable is connected.
- When operating the control unit only, protect the connector with the connector cap provided.

- Remove the batteries when not using the control unit for an extended period of time. Battery fluid leakage may cause equipment failure.
- Do not wipe the control unit with organic solvents or powder polish. The surface may deteriorate or its printing may disappear. If the display becomes dirty, wipe the dirt off with a soft cloth soaked in neutral detergent.
- Do not turn the power OFF or disconnect the cable during calibration or setting. Memory data may be erased.
- To perform measurement, connect the sensor probe cable before turning the power ON.
- Do not remove the battery gasket or twist it.
- When opening the battery case, make sure that no foreign matter is attached to the battery gasket.
- Do not use any unspecified batteries; it may cause breakage.



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Measurement

- Do not pull the cable when lowering the sensor probe into the sample during measurement. Lower the sensor probe into the sample on a chain or string.
- Before lowering the sensor probe into the sample, do not connect the hook on the unit to a human body.
- The correct values are not displayed if the sensor is not mounted when the measurement display is activated.
- Perform DO measurement with no air bubbles in the internal solution.
- Do not reuse a membrane cap of DO sensor.
- Use the spanner for DO sensor provided to attach or remove the DO sensor.
- Avoid both U-53 and U-53G turbidity measurement in air, since the rubber wiper will quickly become damaged.
- Avoid turbidity measurement in direct sunlight, since the readout may be affected.

Calibration

During atmosphere calibration for the DO electrode with DO salinity compensation set to automatic, values are compensated based on electrical conductivity, but calibration is performed normally.

Location of use and storage

- Storage temperature: −10°C to 60°C
- Relative humidity: Under 80% and free from condensation

Store the meter in locations void of dust, strong vibrations, direct sunlight, corrosive gases, near air conditioners or windy areas.

Disposal of the product

When disposing of the product, follow the related laws and/or regulations of your country for disposal of the product.

Description in this manual

Note

This interprets the necessary points for correct operation and notifies the important points for handling the unit.

Reference

This indicates where to refer for information.

Tip

This indicates reference information.

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1 About this Unit

The U-50 Series Multi Water Quality Checker features an integrated control unit and sensors. It is capable of making a maximum of eleven simultaneous measurements for various parameters, and is perfect for use in the field. The U-50 Series is designed with on-site ease-of-use in mind, provides a wide variety of functions, and can be used for water quality measurements and inspections of river water, groundwater, and waste water.

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2 Device Information

2.1 Measurement parameters

Parameters	Model				
	U-51	U-52	U-52G	U-53	U-53G
pH (pH)	✓	✓	✓	✓	✓
pH (mV)	✓	✓	✓	✓	✓
Oxidation reduction potential (ORP)	✓	✓	✓	✓	✓
Dissolved oxygen (DO)	✓	✓	✓	✓	✓
Electrical conductivity (COND)	✓	✓	✓	✓	✓
Salinity (SAL) [expressed as electrical conductivity]	✓	✓	✓	✓	✓
Total dissolved solids (TDS) [expressed as electrical conductivity]	✓	✓	✓	✓	✓
Seawater specific gravity (SG) [expressed as electrical conductivity]	✓	✓	✓	✓	✓
Water temperature (TEMP)	✓	✓	✓	✓	✓
Turbidity (TURB) [LED transmission/front 30° scattering method]	–	✓	✓	–	–
Turbidity (TURB) [tungsten lamp 90° transmission/scattering method] with wiper	–	–	–	✓	✓
Water depth (DEP)	–	–	✓	✓	✓
GPS	–	–	✓	–	✓

"✓" indicates a measurable parameter.

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2.2 Packing list

Parts Name	Quantity	Note
Control unit	1	
Sensor probe	1	
pH sensor (#7112)	1	
ORP sensor (#7313)	1	
Reference electrode (#7210)	1	
DO sensor (#7543)	1	
Turbidity sensor (#7800)	1	With U-52/U-52G only. Attached to the sensor probe.
Turbidity sensor (#7801)	1	With U-53/U-53G only. Attached to the sensor probe.
pH 4 standard solution (#100-4)	1	500 mL
pH reference internal solution (#330)	1	250 mL
DO sensor internal solution set (#306)	1	Internal solution (50 mL), Sandpaper (#8000, #600), Syringe
DO Membrane spare parts set	1	
Spanner for DO sensor	1	
Cleaning brush	1	
calibration cup	1	transparent calibration cup, black calibration cup
Back pack	1	
Strap	1	
Alkaline batteries	4	LR14
Silicon grease	1	
Instruction manual	1	

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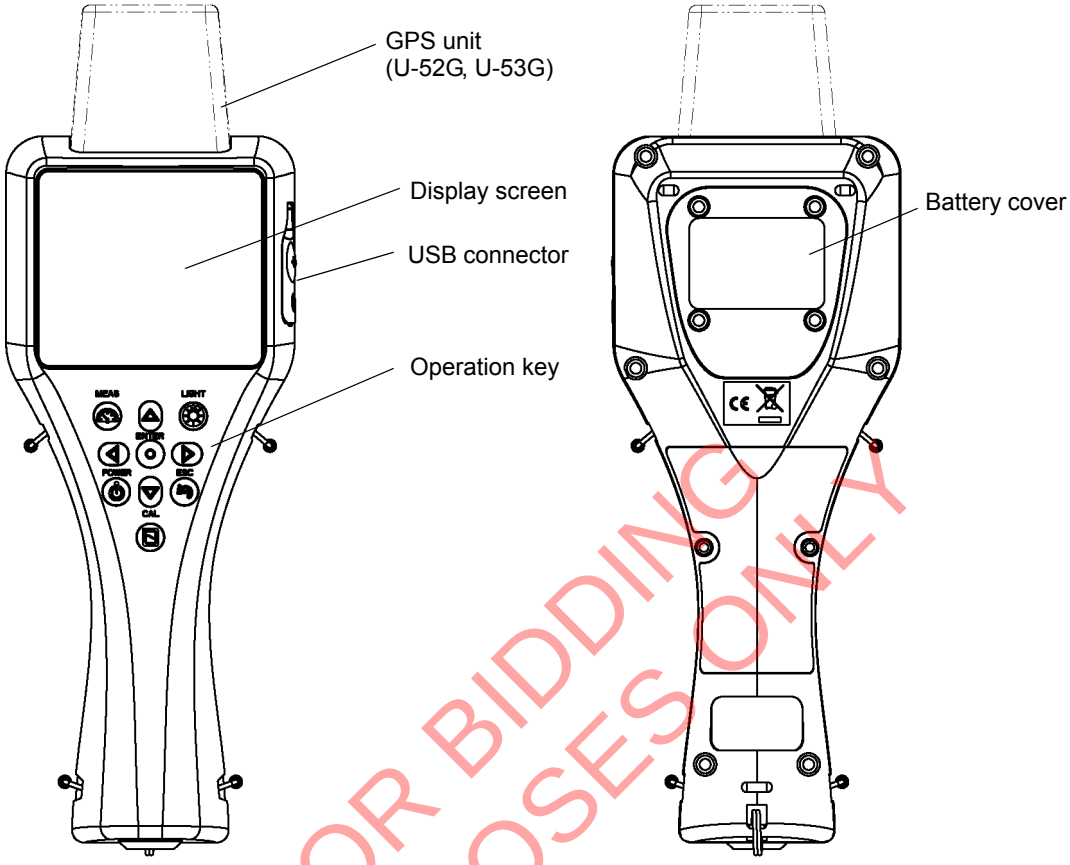
2.3 Parts name and functions

● Display



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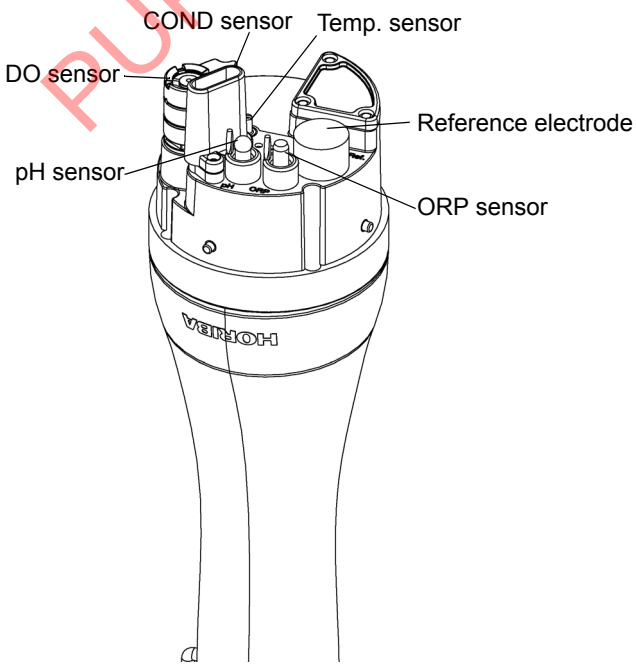
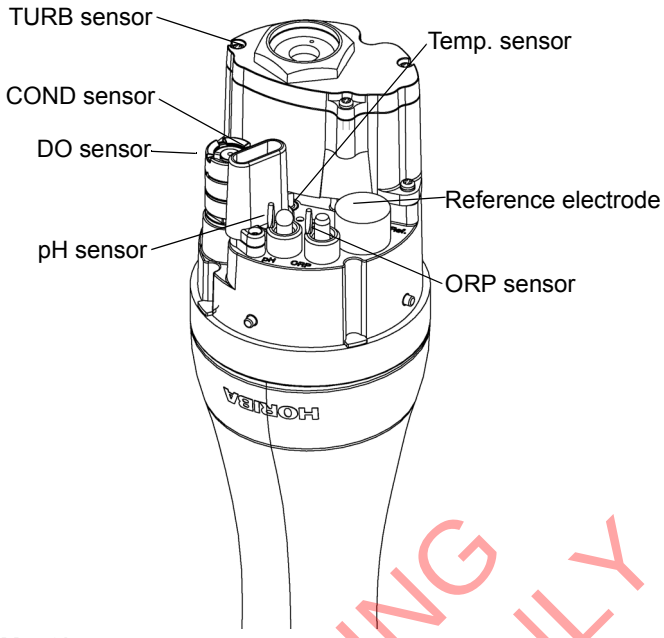
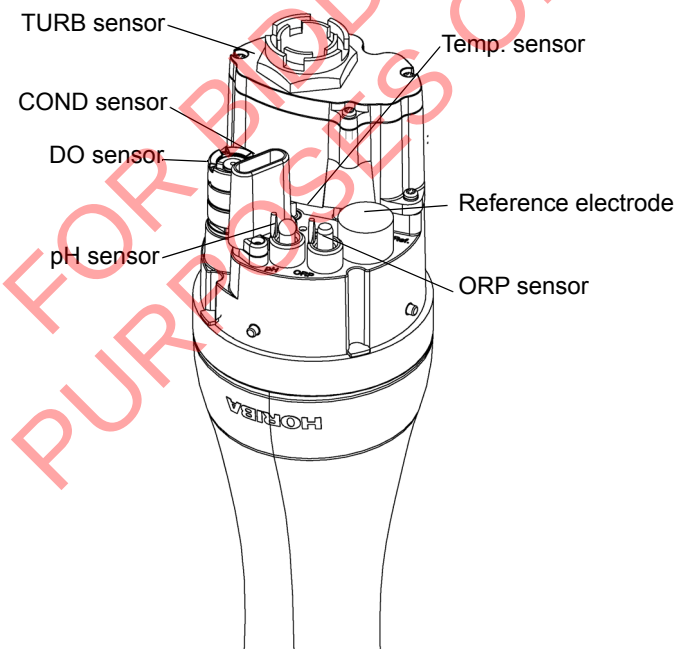
● Sensor probe (U-51)



● Sensor probe (U-52)



● Sensor probe (U-53)



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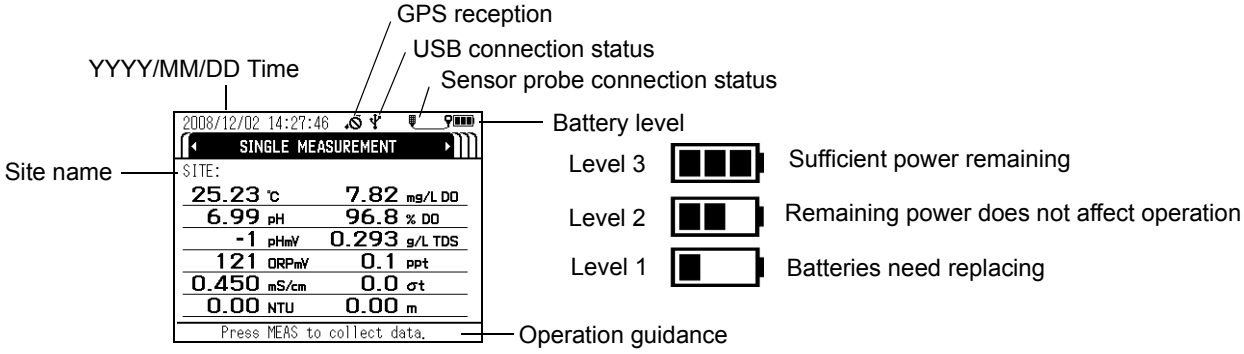
● Display screen



● Operation key

	Key name	description
	POWER key	Turns the system's power ON/OFF. The initial screen appears immediately after turning the power ON. Press and hold down the POWER key for about 3 seconds to turn the power ON and OFF.
	MEAS key	When pressed in the measurement screen, used to set the measurement values of all the measurement parameters. Measurement values flash until the data stabilizes.
		When pressed in the setting, calibration or data operation screen, returns to the measurement screen.
	ENTER key	Used to execute functions, set entered values or store data in memory.
	CAL key	Switches to the calibration screen.
	ESC key	Returns to the immediately preceding operation.
	LIGHT key	Turns the backlight ON/OFF. ● Using the backlight shortens battery life. ● The backlight does not light for about 3 seconds after power ON. ● When the sensor probe is connected while the display's backlight is lit, the backlight goes out for about 3 seconds.
	Left key	Moves the cursor to the left.
	Right key	Moves the cursor to the right.
	Up key	Moves the cursor up.
	Down key	Moves the cursor down.

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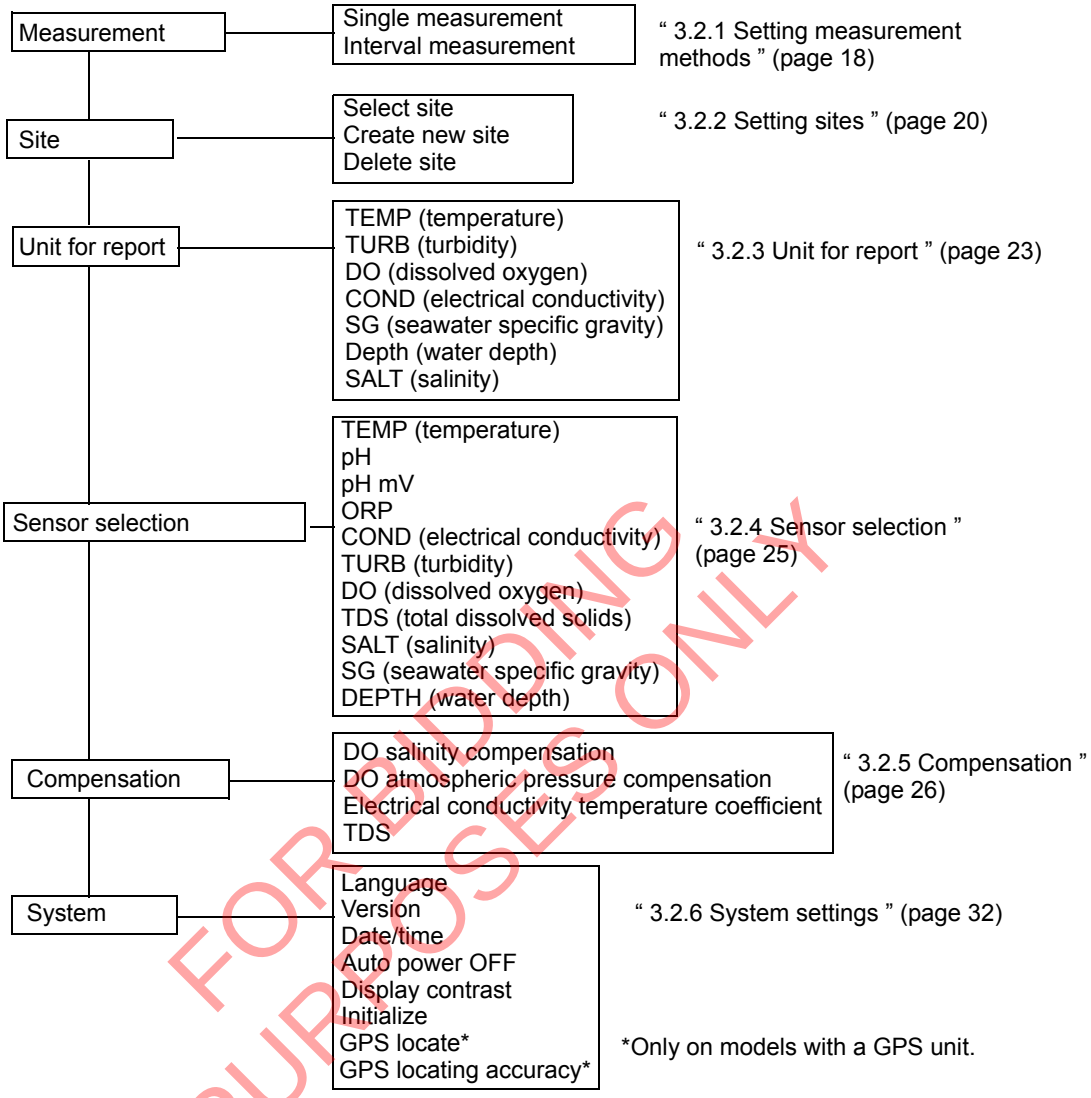
2.4 Setting menu items



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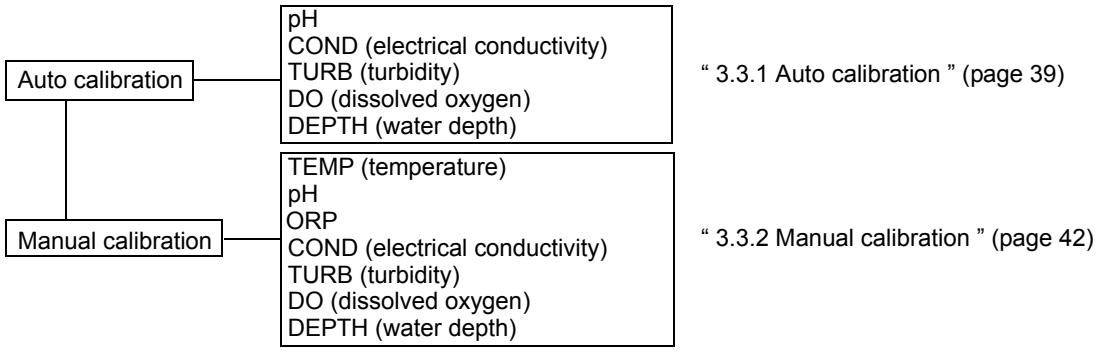
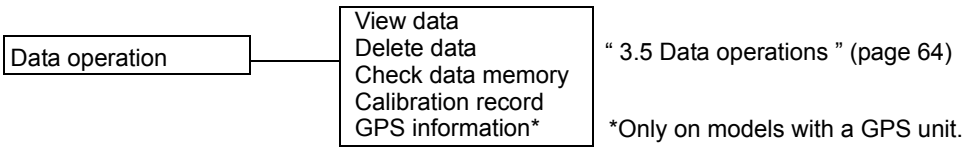
2.5 Calibration menu items



2.6 Data operation menu items



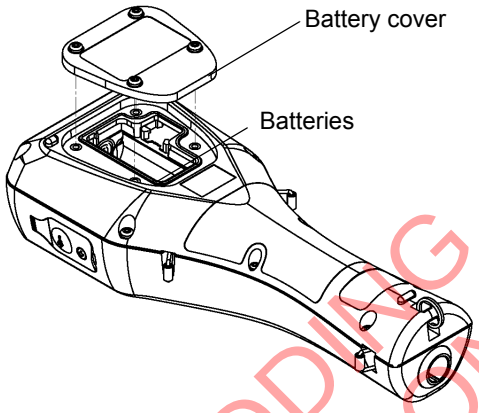
3 Basic Operation

3.1 System setup

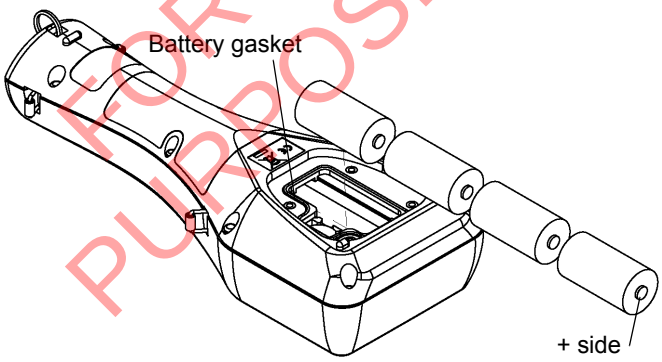
3.1.1 Inserting and replacing the batteries

The control unit is shipped without batteries. Follow the steps below to insert the batteries when using the system for the first time or replacing old batteries.

1. **Loosen the 4 screws on the battery cover by using No. 2 Phillips head screwdriver and remove the cover.**



2. **If replacing the batteries, discard the old batteries.**
3. **Insert new batteries in the control unit.**
   Check that the battery gasket is not dirty or twisted.



4. **Replace the battery cover and fasten it with the 4 screws.**
   Tighten the screws to less than 0.5 N·m.

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Note

- **Data and settings will not be lost when the batteries are replaced.**
- **If dirty or twisted, the battery gasket will fail to keep the batteries dry. Check its condition before closing the cover.**
- **To ensure long service life, replacing the battery gasket periodically (once a year) is recommended.**

Precautions when using dry cell batteries

- **Batteries to use: LR14 alkaline dry cell batteries (C-size dry cell batteries) or rechargeable nickel-metal hydride dry cell batteries (C-size)**
  Do not use manganese batteries.
- **Dry cell batteries used incorrectly may leak or burst. Always observe the following**
  - Orient the batteries correctly (positive and negative ends in correct positions).
  - Do not combine new and used batteries, or batteries of different types.
  - Remove the batteries when not using the system for a prolonged period.
  - If batteries leak, have the system inspected at your nearest Horiba service station.

● Battery life

- The battery life for continuous operation when using C-size alkaline dry cell batteries is about 70 hours.
- Using the backlight consumes a proportionate amount of battery power, shortening battery life.
- Searching position information using the GPS unit consumes a proportionate amount of battery power, shortening battery life.
- Nickel-metal hydride secondary batteries can be used, but the battery life is not guaranteed since it will vary according to usage (number of times data is saved, number of charges and amount of each charge). In general, secondary batteries have one-half to one-third the life of C-size alkaline batteries.
- The 70-hour battery life figure applies to a control unit operating temperature of 20°C or more. The battery characteristics shorten the battery life at operating temperatures lower than 20°C, so check the remaining battery level, and replace the batteries before it reaches Level 1.
- The batteries packed with the system at the time of shipment are for checking operation. Their life is not guaranteed.
- The 70-hour battery life figure is the amount of operating time the batteries can provide until the system stops operating. The system may fail during operation if the remaining battery level is low, so it is a good idea to check the remaining battery level and replace the batteries with new ones well before the batteries run out completely.

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U-51/52

Battery life: 70 hours (backlight off)

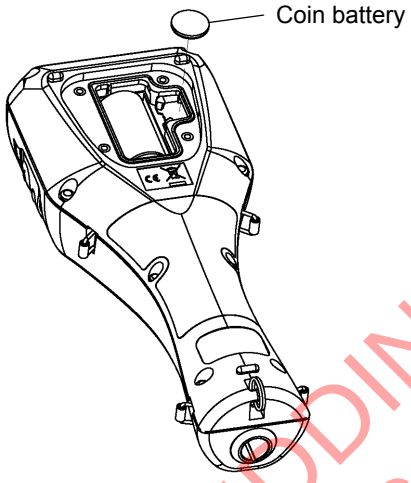
U-53

Battery life: 500 measurements (backlight off)

- Since U-53 is designed for turbidity measurement with wiper, its battery life is estimated in terms of the number of turbidity measurement sequences performed.
- Battery power is also consumed by measurement operations other than turbidity measurement.
- The battery life when turbidity measurement is not performed is about 70 hours.

3.1.2 Replacing the coin battery

- Coin battery to use: CR-2032
- The coin battery is only for the clock. It will provide problem-free operation for three years, but when using the clock continuously, it should be replaced every two years as a precaution.
- When replacing the coin battery for the clock, leave the control unit ON. If the coin battery is replaced when the control unit is turned OFF, the clock will be reset to the default settings.



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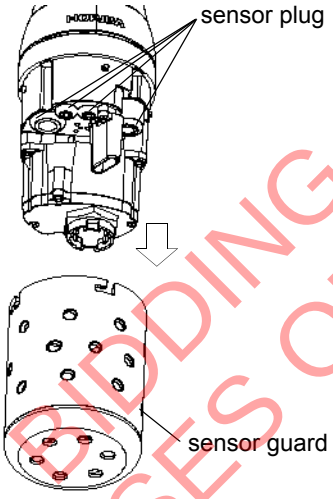
3.1.3 Attaching sensors

Note

- When attaching or replacing a sensor, wipe any moisture off the sensor probe and sensor.
- Be sure to keep water out of sensor connectors. If moisture comes in contact with a sensor connector, blow-dry it with dry air.
- The sensor probe is not waterproof when the sensor is not mounted.
- Take care not to tighten the sensor too much.

● Attaching the pH sensor

1. Remove the sensor guard.

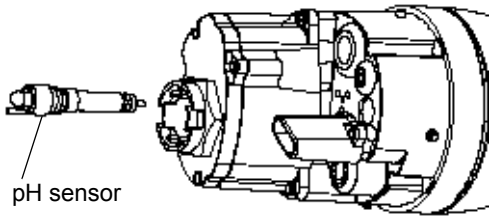


2. Remove the sensor plug.
3. Coat the pH sensor O-ring with a thin layer of silicon grease (part No. 3014017718).

Note

Be sure no grease from the O-ring gets on the sensor connector. If the sensor connector gets grease on it, wipe it off with a soft cloth soaked in alcohol.

4. Make sure there is no moisture on the sensor probe's sensor connector (marked "pH").
5. Fasten the pH sensor securely by hand.



6. Clean the sensor with an alcohol-soaked cloth.

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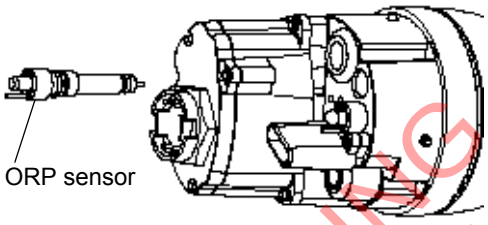
Attaching the ORP sensor

1. Remove the sensor guard.
2. Remove the sensor plug.
3. Coat the ORP sensor O-ring with a thin layer of grease (part No. 3014017718).

Note

Be sure no grease from the O-ring gets on the sensor connector. If the sensor connector gets grease on it, wipe it off with a soft cloth soaked in alcohol.

4. Make sure there is no moisture on the sensor probe's sensor connector (marked "ORP").
5. Fasten the ORP sensor securely by hand.



6. Clean the sensor with an alcohol-soaked cloth.

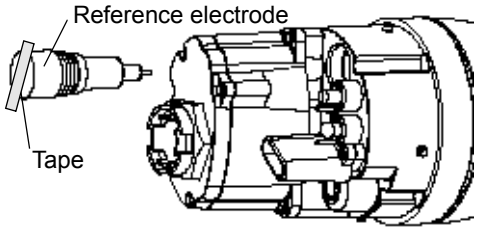
Attaching the reference electrode

1. Remove the sensor guard.
2. Remove the sensor plug.
3. Coat the reference electrode O-ring with a thin layer of grease (part No. 3014017718).

Note

Be sure no grease from the O-ring gets on the sensor connector. If the sensor connector gets grease on it, wipe it off with a soft cloth soaked in alcohol.

4. Make sure there is no moisture on the sensor probe's sensor connector (marked "REF").
5. Fasten the reference electrode securely by hand.
6. Remove the tape from the liquid junction part of the reference electrode.



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Attaching the dissolved oxygen (DO) sensor

1. **Remove the membrane cap mounted on the DO sensor beforehand, and replace it with the new membrane cap provided. Replace the internal solution with fresh solution. The main component of the internal solution is potassium chloride (KCl), so the old solution can be disposed of down a sink or other drain.**

Reference

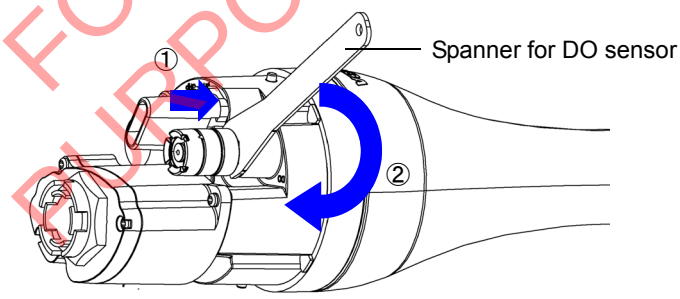
“ 4.5 Replacing the membrane cap ” (page 87)

2. **Screw in the DO sensor to attach it, allowing the internal solution to overflow slightly.**
3. **Use a soft cloth to wipe off the internal solution that overflowed onto the DO sensor.**
4. **Remove the sensor guard.**
5. **Remove the sensor plug.**
6. **Coat the DO sensor O-ring with a thin layer of grease (part No. 3014017718).**

Note

Be sure no grease from the O-ring gets on the sensor connector. If the sensor connector gets grease on it, wipe it off with a soft cloth soaked in alcohol.

7. **Make sure there is no moisture on the sensor probe’s sensor connector (marked "DO").**
8. **Fasten the DO sensor securely using the spanner for DO sensor.**
   - Hold the DO sensor with the provided spanner for DO sensor and push the sensor down. (Step 1 in figure below)
   - Screw the DO sensor in place. (Step 2 in figure below)

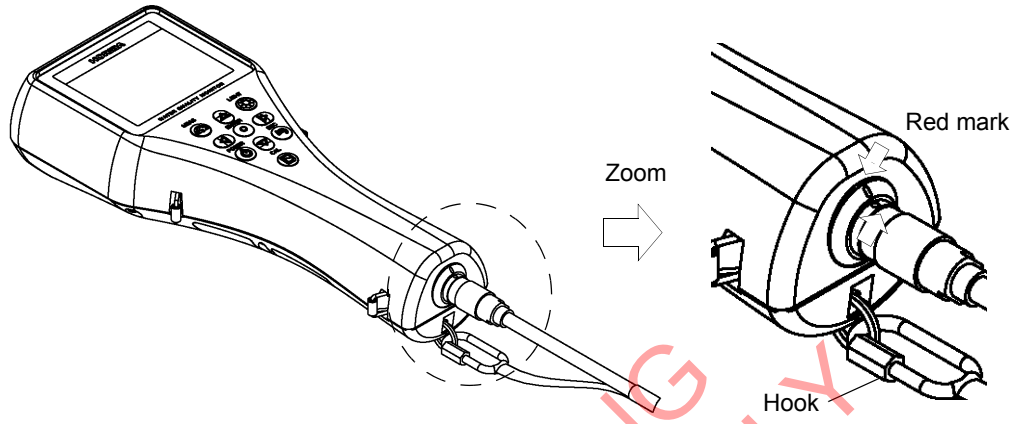


FOR BIDDING PURPOSES ONLY

3.1.4 Connecting the control unit and sensor probe

Note

Connect the control unit with its power OFF.

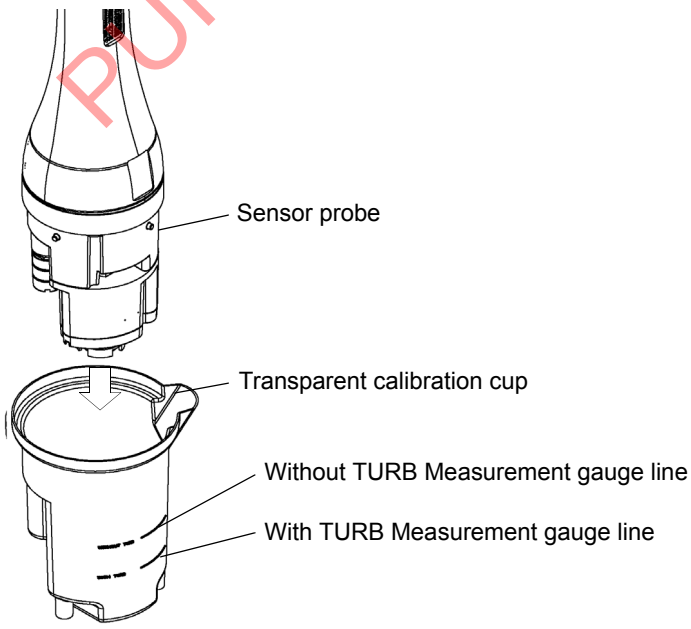


1. **Align the red mark on the connector, and press the connector in until you hear it click.**
2. **Connect the cable's hook to the display.**

3.1.5 Conditioning

Carry out the steps below when using the unit for the first time or when the system has not been used for 3 months or longer.

1. **Fill the transparent calibration cup to the line with pH 4 standard solution.**
   The transparent calibration cup has With TURB Measurement and Without TURB Measurement gauge lines.
2. **Insert the sensor probe in the transparent calibration cup.**



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Note

Check that all sensors are attached.

3. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON. Leave the unit for at least 20 minutes to condition the sensors.**

Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

Tip

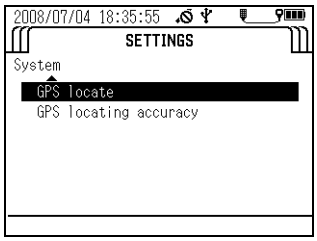
- **The procedure for immersing the sensor probe in the pH standard solution is the same as that described in " 3.3.1 Auto calibration " (page 39).**
  Auto calibration can be performed using the same pH 4 standard solution that was used in the conditioning procedure.
- **Immersing the sensor in the standard solution is generally required for sensor conditioning, but a voltage supply is required for DO sensor conditioning. Turning ON the power of the control unit is necessary during sensor conditioning.**

3.1.6 GPS (U-52G, U-53G)

The GPS position measurement precision is proportional to the GPS position measurement time. When the position measurement precision increases, the position measurement time also increases. See " ● GPS locating accuracy" (page 17) for how to set the position measurement precision. See " ● GPS locate" (page 15) below for how to check acquired GPS data.

● GPS locate

1. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**
2. **Press the down (▽) key to move the cursor to "System", then press the ENTER key.**
3. **Press the down (▽) key to move the cursor to "GPS locate", then press the ENTER key.**



4. **The message "Press ENT key to start position measurement." appears. Press the ENTER key.**

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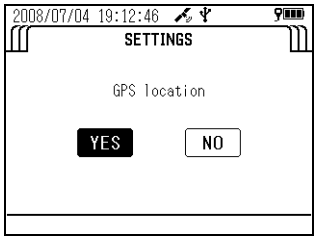
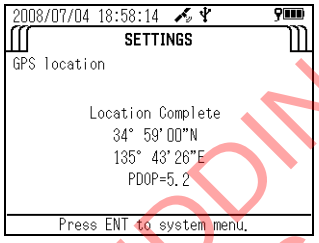
5. **The message "Execute GPS position measurement?" appears. Move the cursor to "YES", then press the ENTER key.**

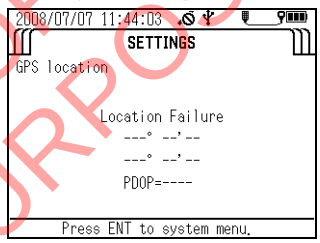


6. **The message "Warming up. Please wait." appears. Wait until the system has finished warming up (about 10 seconds).**

- Position measurement starts automatically when warmup has finished. Position measurement is performed up to 10 times.
- The GPS location complete screen appears after successful position measurement.



- The GPS location failure screen appears after position measurement has failed. Redo the measurement in a location free from obstacles, or wait for the meteorological conditions to improve before redoing the measurement.



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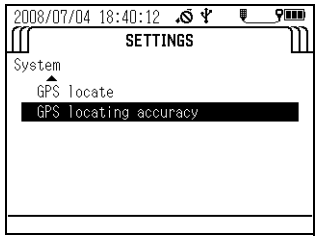
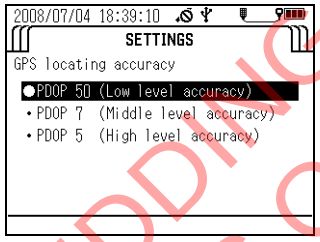
● GPS locating accuracy

1. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**
2. **Press the down (▽) key to move the cursor to "System", then press the ENTER key.**
3. **Press the down (▽) key to move the cursor to "GPS locating accuracy", then press the ENTER key.**



4. **The screen below appears. Move the cursor to the locating accuracy, then press the ENTER key. The black circle (●) indicates the currently set precision.**



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3.2 Settings

3.2.1 Setting measurement methods

This section describes how to set the measurement method.

● Measurement methods

● U-51/U-52

Single measurement	Pressing the MEAS key acquires the 5-second average for the selected measurement parameter.
Interval measurement	Pressing the MEAS key acquires and saves the 5-second average for the selected measurement parameter in the set interval. The measurement interval can be set to any value between 10 seconds and 24 hours.

● U-53

The U-53 turbidity sensor uses a tungsten lamp. The lamp lights for about 10 seconds, and the average measurement value acquired during this interval is displayed.

Single measurement	Pressing the MEAS key acquires the 5-second average for the selected measurement parameter after wiper operation. The 10-second average is acquired when measuring turbidity.
Interval measurement	Pressing the MEAS key acquires and saves the 5-second average for the selected measurement parameter in the set interval. The 10-second average is acquired when measuring turbidity. The measurement interval can be set to any value between 10 seconds (final check of this value required; 30 seconds may be better for U-52) and 24 hour.

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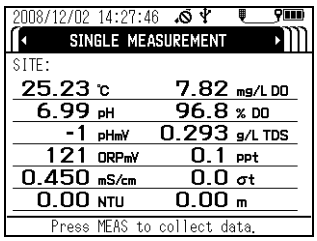
Reference

“ 3.4 Measurement ” (page 61)

● Operation method

1. **Press and hold down the control unit’s POWER key for about 3 seconds to turn the power ON.**

The "MEASUREMENT" screen appears after about 10 seconds.

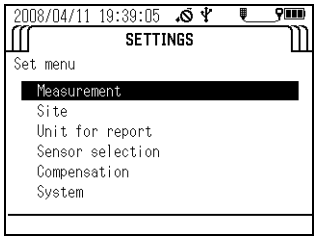


Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

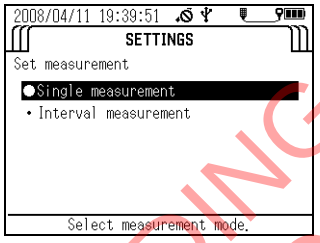
2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**

3. **Press the down (▽) key to move the cursor to "Measurement", then press the ENTER key.**



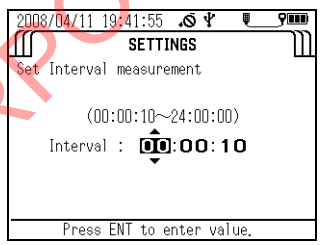
4. **Press the down (▽) key to move the cursor to the desired measurement mode. Press the ENTER key to save the setting.**

The black circle (●) indicates the currently selected measurement mode.



5. **If you selected "Interval measurement", the display switches to the screen used to set the measurement interval. Press the up (△) and down (▽) keys to set the measurement interval.**

The measurement interval can be set to any value between 10 seconds and 24 hours in the case of the U-51 and U-52, or between 30 seconds and 24 hours in the case of the U-53.



FOR BIDDING PURPOSES ONLY

3.2.2 Setting sites

The site function allows position data to be connected to corresponding measurement data. Sites have the following specifications and features:

Site names: Text data consisting of up to 20 one-byte alphanumeric characters, spaces, etc.
Site names can be used for control unit searches and as labels for computer processing.
Site names allow measurement data to be saved with a name corresponding to the actual location where it was measured.

You can use site information as a search key when viewing data uploaded by a PC or data saved in the control unit (see “ 3.5 Data operations ” (page 64)).

- **Selecting sites**

  You can select previously created sites. The black circle (●) indicates the name of the currently selected site. No sites are created at new purchasing or after initialization. Select a site after first creating one from the "Create new site" menu.

- **Creating new sites**

  You can create and save new sites. Up to 20 site names can be registered.

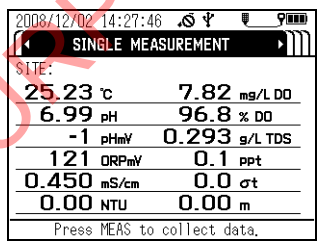
- **Deleting sites**

  You can select a previously created site and delete it.

● Operation methods

- **Selecting a site**

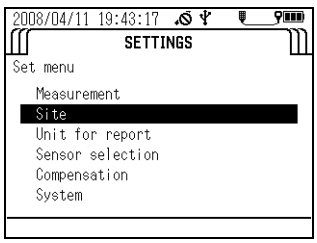
  1. **Press and hold down the control unit’s POWER key for about 3 seconds to turn the power ON.**
     The "MEASUREMENT" screen appears after about 10 seconds.



Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

  2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**
  3. **Press the down (▽) key to move the cursor to "Site", then press the ENTER key.**



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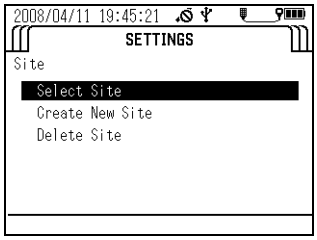
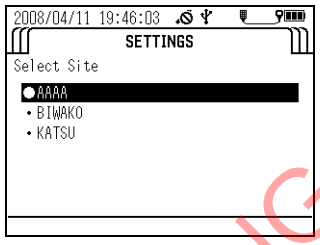
4. **Press the down (▽) key to move the cursor to "Select Site", then press the ENTER key to display the names of the currently saved sites.**

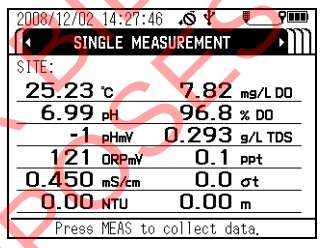


The black circle (●) indicates the currently selected site.



● **Creating a new site**

1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
The "MEASUREMENT" screen appears after about 10 seconds.



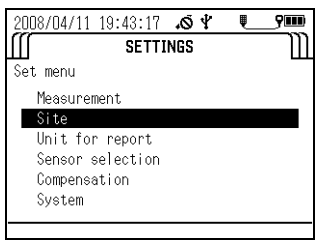
FOR BIDDING PURPOSES ONLY

Note

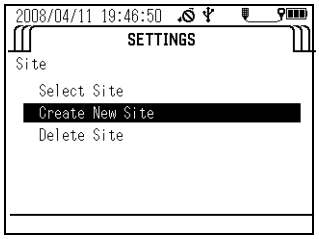
The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**

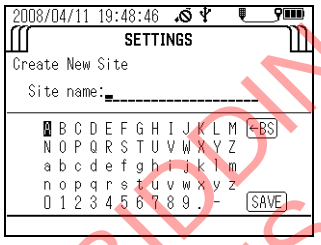
3. **Press the down (▽) key to move the cursor to "Site", then press the ENTER key.**



4. **Press the down (▽) key to move the cursor to "Create New Site", then press the ENTER key.**
   Enter the desired site name (up to 20 alphanumeric non-Asian width characters).



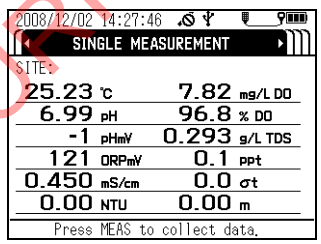
5. **Press the up (△), down (▽), right (▷), and left (◁) keys to move the cursor to each letter or number to use in the name, then press the ENTER key to confirm the entered characters. To delete incorrectly entered characters, move the cursor to "BS" and press the ENTER key to start deleting from the last character. When you have finished entering the name, save it by moving the cursor to "SAVE" and pressing the ENTER key.**



FOR BIDDING PURPOSES ONLY

● Deleting a site

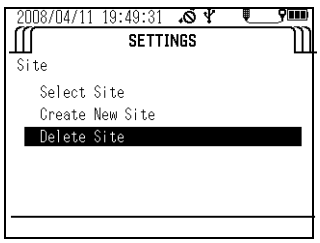
1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.



Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

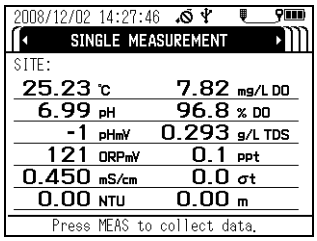
2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**



3. **Press the down (▽) key to move the cursor to "Site", then press the ENTER key.**

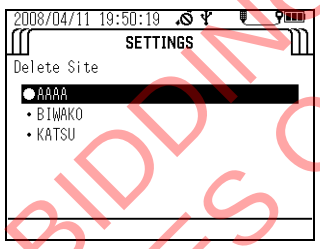
4. **Press the down (▽) key to move the cursor to "Delete Site", then press the ENTER key.**

   A list of the currently saved sites appears. The black circle (●) indicates the currently selected site.



5. **Press the down (▽) key to move the cursor to the site to delete, then press the ENTER key to delete it.**

   The currently selected site can be deleted after a different site has been selected from the site selection menu or after all unselected sites have been deleted. The same site name cannot be registered more than once.



FOR BIDDING PURPOSES ONLY

3.2.3 Unit for report

Note

Units can only be selected when the sensor probe is connected.

Follow the steps below to set the measurement units of measurement parameters. No units are displayed if a measurement parameter has not been selected in the measurement parameter selection screen (see “ 3.2.4 Sensor selection ” (page 25)).

1. **Press and hold down the control unit’s POWER key for about 3 seconds to turn the power ON.**

   The "MEASUREMENT" screen appears after about 10 seconds.

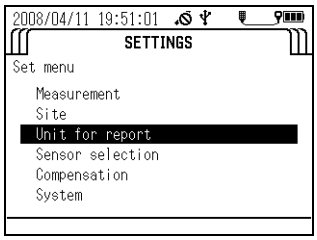
Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

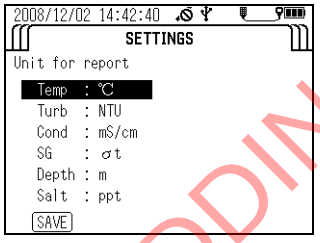
2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**

3. Press the down (▽) key to move the cursor to "Unit for report", then press the ENTER key.

A list of the currently selected measurement parameters and their units appears. Note that measurement parameters not selected (in the measurement parameter selection screen) are not displayed.

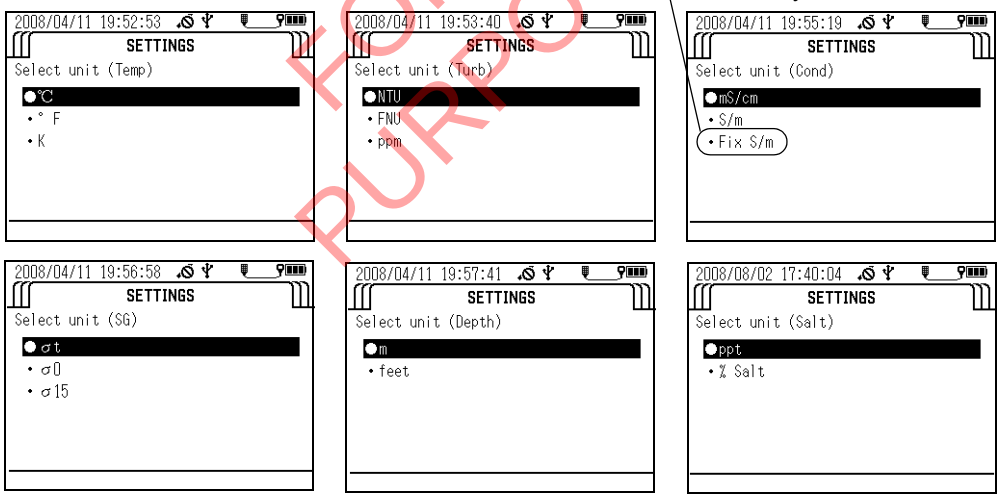


4. Press the up (△) and down (▽) keys to move the cursor to the item to change, then press the ENTER key.

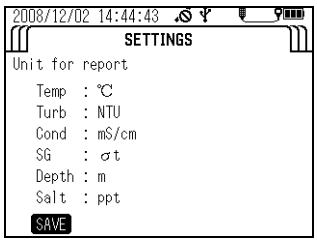


5. A list of the units that can be selected appears. The black circle (●) indicates the currently selected unit. Press the up (△) and down (▽) keys to move the cursor to the desired unit, then press the ENTER key.

Fix S/m: Fixes S/m with no auxiliary units for any measurement range.



6. To save the changes, press the up (△) and down (▽) keys to move the cursor to SAVE, then press the ENTER key. If you do not want to save the changes, press the ESC key.



FOR BIDDING PURPOSES ONLY

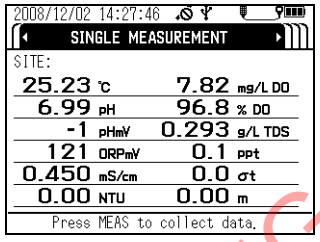
3.2.4 Sensor selection

Note

Measurement parameters can only be selected when the sensor probe is connected.

You can set between 1 and 11 measurement parameters to display in the control unit screen. Follow the steps below to select the desired measurement parameters.

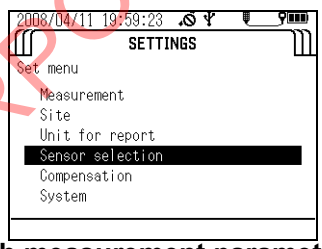
1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.



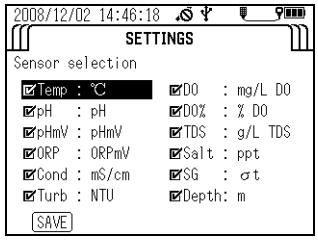
Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**
3. **Press the down (▽) key to move the cursor to "Sensor selection", then press the ENTER key.**
   A list of the measurement parameters that can be set and the currently set units are displayed.



4. **Move the cursor to each measurement parameter to change, then press the ENTER key.**
   A check in the check box of a measurement parameter indicates it will be displayed.
5. **To save the changes, press the up (△), down (▽), left (◁) and right (▷) keys to move the cursor to SAVE, then press the ENTER key. If you don't want to save the changes, press the ESC key.**



Note

Available measurement parameters differ according to product specifications.

FOR BIDDING PURPOSES ONLY

3.2.5 Compensation

Note

Compensation settings can only be made when the sensor probe is connected.

U-50 series have following functions of compensation.

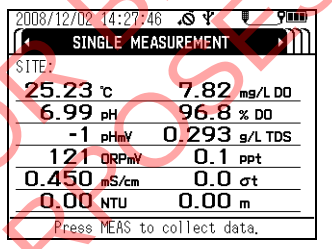
- Salinity compensation and atmospheric pressure compensation for dissolved oxygen (DO)
- Temperature compensation for conductivity (COND)
- Setting total dissolved solid (TDS) coefficient for TDS

● Salinity compensation (DO)

The dissolved oxygen (DO) value is presented higher than actual value if salinity compensation is not added, because the increase of salinity gives higher DO value. To obtain correct value salinity compensation is needed. The following modes are available for calculation of salinity compensation.

AUTO:	Salinity compensation is performed automatically with salinity converted from conductivity.
Value input:	Press the up (△) and down (▽) keys to enter a setting value when the salinity is known.

1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
The "MEASUREMENT" screen appears after about 10 seconds.



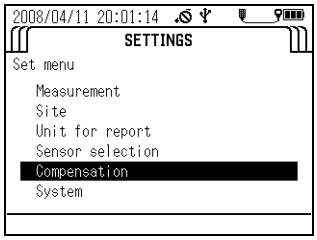
FOR BIDDING PURPOSES ONLY

Note

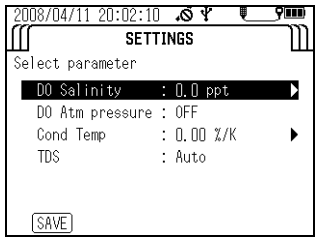
The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**

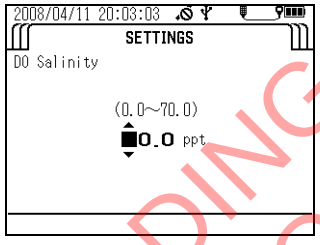
3. **Press the down (▽) key to move the cursor to "Compensation", then press the ENTER key.**



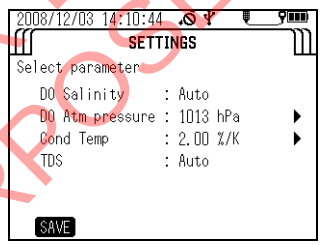
4. **Press the down (▽) key to move the cursor to "DO Salinity", then press the ENTER key to toggle the setting between "Auto" and "Input mode".**
   Default: Auto



5. **If you selected "Input mode", press the right (▷) key to display the compensation value input screen. Press the up (△) and down (▽) keys to enter the desired value, then press the ENTER key to set it.**



6. **To save the change, press the up (△) and down (▽) keys to move the cursor to SAVE, then press the ENTER key. If you don't want to save the change, press the ESC key.**

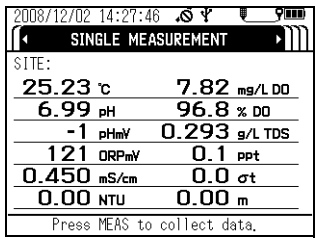


FOR BIDDING PURPOSES ONLY

● **Atmospheric pressure compensation (DO)**

Differences in the atmospheric pressure of the measurement location influence the Dissolved Oxygen (DO) measurement. By setting (input) the actual atmospheric pressure of the measurement location into the control unit, it is possible to standardize the measured Dissolved Oxygen (DO) value to a value at the standard atmospheric pressure (1013 hPa).

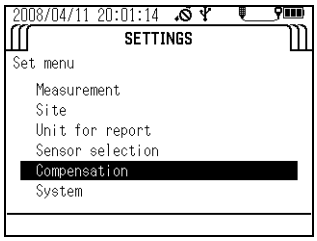
1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.



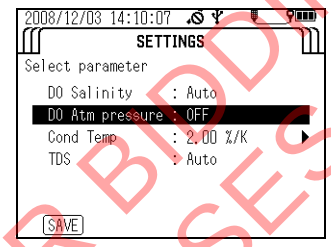
Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

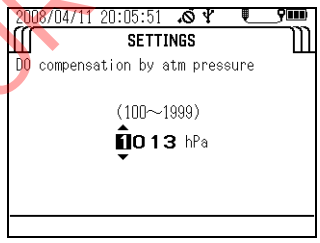
2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**
3. **Press the down (▽) key to move the cursor to "Compensation", then press the ENTER key.**



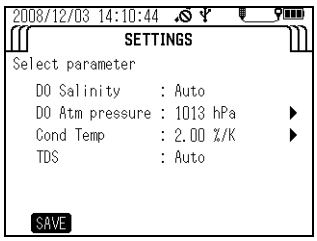
4. **Press the down (▽) key to move the cursor to "Cond Temp", then press the ENTER key to toggle the setting between "OFF" and "Input mode".**
   Default: OFF



5. **If you selected "Input mode", press the right (▷) key to display the compensation value input screen. Press the up (△) and down (▽) keys to enter the desired value, then press the ENTER key to set it.**



6. **To save the change, press the up (△) and down (▽) keys to move the cursor to SAVE, then press the ENTER key. If you don't want to save the change, press the ESC key.**

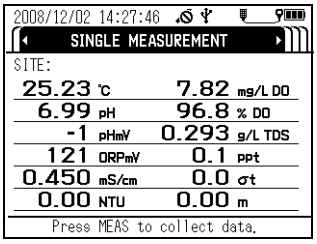


FOR BIDDING PURPOSES ONLY

Temperature compensation for conductivity (COND)

Sample conductivity (COND) varies with temperature, and this control unit uses a temperature compensation coefficient to automatically standardize the conductivity (COND) at 25°C. The initial setting coefficient is 2%/K, which is the generally used.

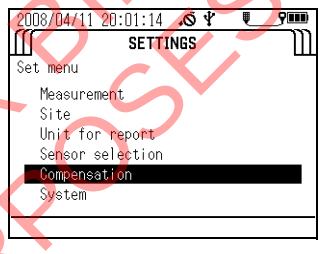
1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.



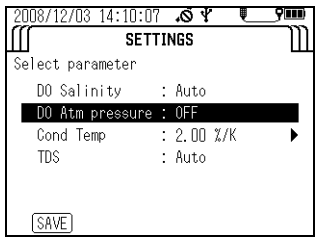
Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**
3. **Press the down (▽) key to move the cursor to "Compensation", then press the ENTER key.**

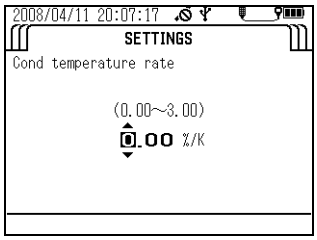


4. **Press the down (▽) key to move the cursor to "Cond Temp", then press the ENTER key to toggle the setting between "OFF" and "Input mode".**
   Default: 2.00%/K

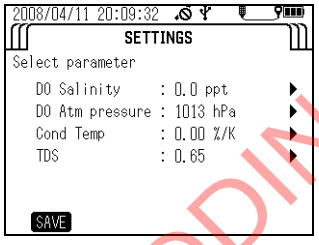


FOR BIDDING PURPOSES ONLY

5. **If you selected "Input mode", press the right (▷) key to display the compensation value input screen. Press the up (△) and down (▽) keys to enter the desired value, then press the ENTER key to set it.**



6. **To save the change, press the up (△) and down (▽) keys to move the cursor to SAVE, then press the ENTER key.**
If you don't want to save the change, press the ESC key.



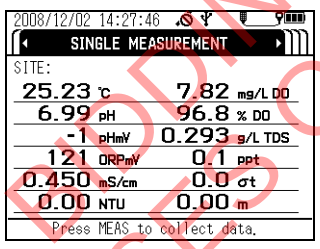
FOR BIDDING PURPOSES ONLY

Setting a total dissolved solid (TDS) coefficient

The total dissolved solid amount (TDS) is a converted value obtained by multiplying the conductivity (COND) by a known coefficient. The coefficient initially set for the control unit is based on a conversion for KCl and $CaCO_3$ solutions and it depends on the conductivity (COND) value as shown below.

Conductivity (COND) (S/m)	Conversion coefficient
< 0.05	0.65
0.05 to 0.5	0.64
0.5 to 1	0.63
1 to 3	0.62
3 to 5	0.61
> 5	0.60

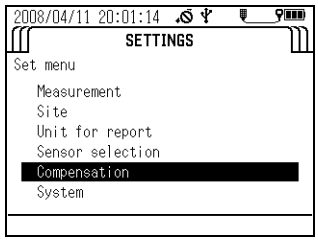
1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.



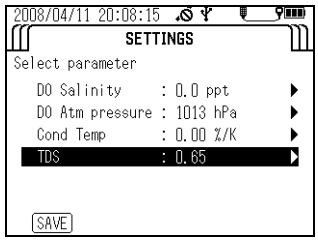
Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**
3. **Press the down (▽) key to move the cursor to "Compensation", then press the ENTER key.**

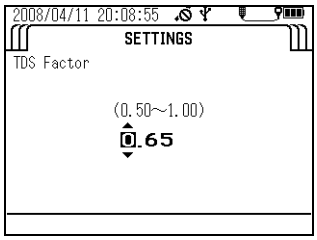


4. **Press the down (▽) key to move the cursor to "TDS", then press the ENTER key to toggle the setting between "AUTO" and "Input mode".**
   Default: Auto

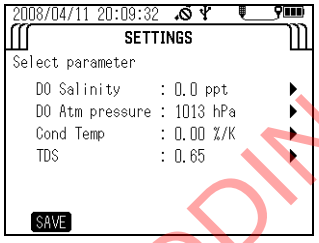


FOR BIDDING PURPOSES ONLY

5. **If you selected "Input mode", press the right (▷) key to display the compensation value input screen. Press the up (△) and down (▽) keys to enter the desired value, then press the ENTER key to set it.**



6. **To save the change, press the up (△) and down (▽) keys to move the cursor to SAVE, then press the ENTER key. If you don't want to save the change, press the ESC key.**



FOR BIDDING PURPOSES ONLY

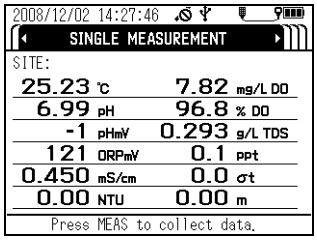
3.2.6 System settings

The system settings let you change the display language, check the system software version, set the date/time, set the auto power OFF time, set the display contrast, and initialize the settings.

● **Display language**

Follow the steps below to select either English or Japanese as the display language.

1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.

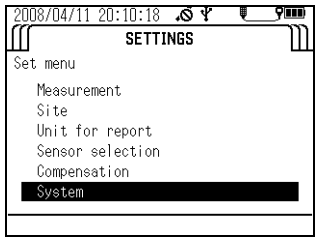


Note

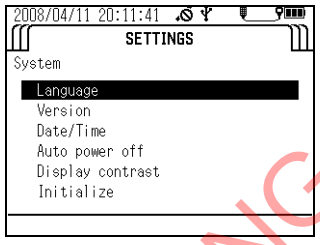
The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**

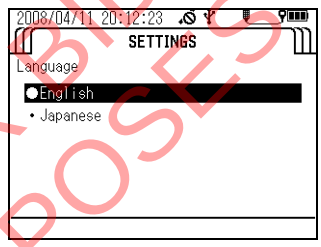
3. **Press the down (▽) key to move the cursor to "System", then press the ENTER key.**



4. **Press the down (▽) key to move the cursor to "Language", then press the ENTER key.**



5. **A list of the supported display languages appears. Press the up (△) and down (▽) keys to move the cursor to the desired language, then press the ENTER key.**
The black circle (●) indicates the currently selected display language.

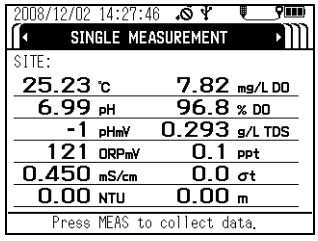


FOR BIDDING PURPOSES ONLY

● Version

Follow the steps below to display the program No. and version of the control unit and sensor probe software.
The program No. and version of the sensor probe software will not be displayed if the sensor probe is not connected.

1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
The "MEASUREMENT" screen appears after about 10 seconds.

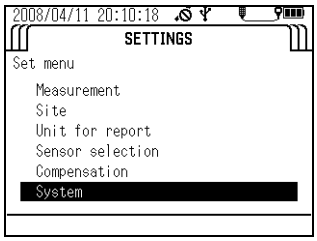


Note

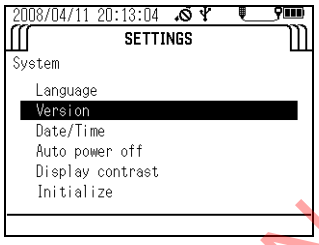
The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**

3. **Press the down (▽) key to move the cursor to "System", then press the ENTER key.**



4. **Press the down (▽) key to move the cursor to "Version", then press the ENTER key.**
   The program No. of the control unit and sensor probe software appears.

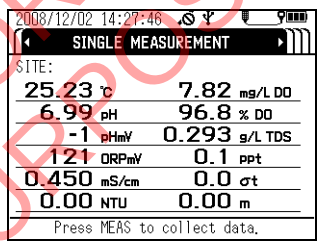


FOR BIDDING PURPOSES ONLY

● Setting the date/time

Follow the steps below to set the date and time.

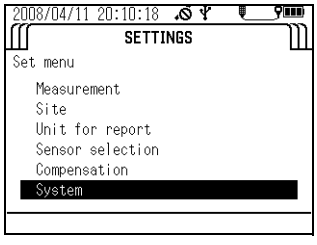
1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.



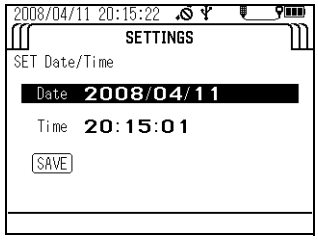
Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

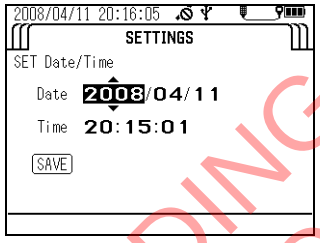
2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**
3. **Press the down (▽) key to move the cursor to "System", then press the ENTER key.**



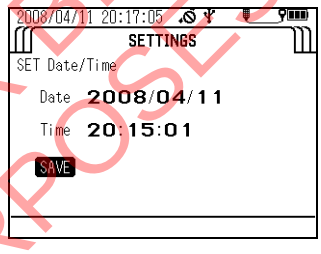
4. **Press the down (▽) key to move the cursor to "Date/time", then press the ENTER key.**



5. **Move the cursor to the date, then press the ENTER key.**
6. **Press the right (▷) key to move the cursor to the year, month, day, hour, minute and second, and press the up (△) and down (▽) keys to enter each value.**



7. **When finished entering settings, press the ENTER key to move the cursor to SAVE, then press the ENTER key again to save the settings.**

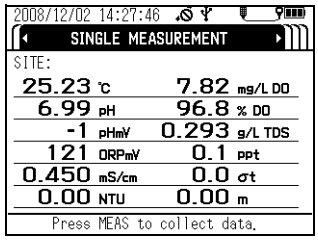


FOR BIDDING PURPOSES ONLY

● Setting the auto power OFF time

Follow the steps below to set the time for the auto power OFF function (which turns the power OFF automatically when no operation is performed for the preset amount of time).

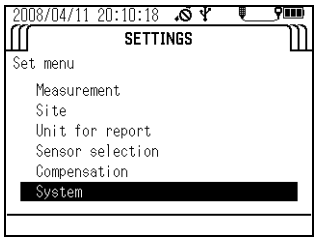
1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.



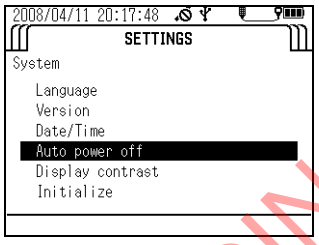
Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

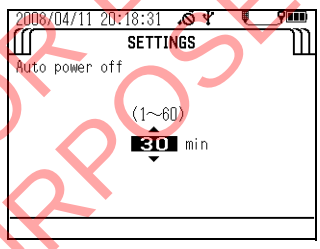
2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**
3. **Press the down (▽) key to move the cursor to "System", then press the ENTER key.**



4. **Press the down (▽) key to move the cursor to "Auto power off", then press the ENTER key.**



5. **Press the up (△) and down (▽) keys to select the desired time setting, then press the ENTER key.**
   You can select OFF, or settings of 1, 2, 5, 10, 20, 30 or 60 minutes.
   Default: 30 minutes

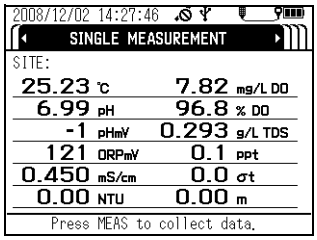


FOR BIDDING PURPOSES ONLY

● Display contrast

Follow the steps below to adjust the display's contrast.

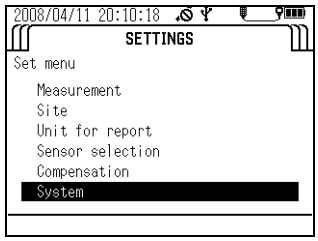
1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.



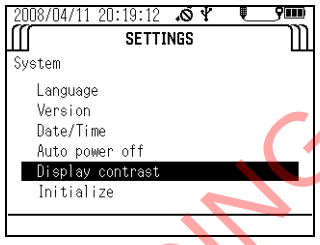
Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

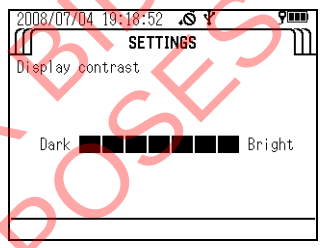
2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**
3. **Press the down (▽) key to move the cursor to "System", then press the ENTER key.**



4. **Press the down (▽) key to move the cursor to "Display contrast", then press the ENTER key.**



5. **Press the left (◁) and right (▷) keys to adjust the contrast.**
   Adjustment can be made in 26 steps.



6. **Press the ENTER key.**

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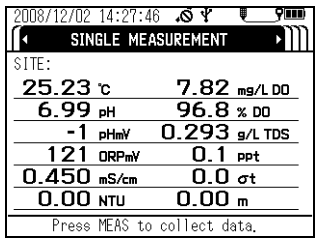
● Initialization

Follow the steps below to restore all the settings except date/time to their factory defaults. Factory default calibration data for the electrical conductivity and turbidity sensors will also be deleted at the same time.

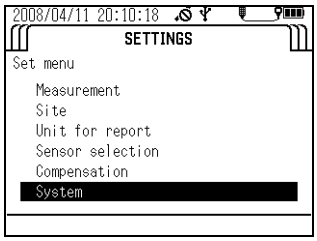
1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.



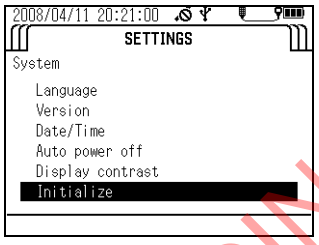
Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

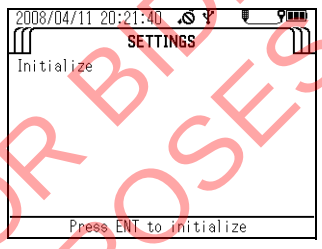
2. **Press the right (▷) key to switch the display to the "SETTINGS" screen.**
3. **Press the down (▽) key to move the cursor to "System", then press the ENTER key.**



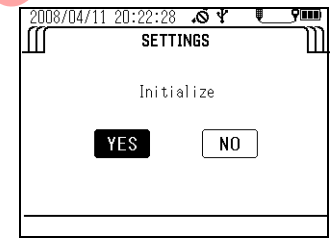
4. **Press the down (▽) key to move the cursor to "Initialize", then press the ENTER key.**



5. **Press the ENTER key again.**



6. **A confirmation message appears asking whether to execute initialization. Press the left (◁) key to move the cursor to YES, then press the ENTER key.**
   The message "Initialize Complete" appears to indicate the process has finished.



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3.3 Calibration

To obtain correct measurement values, the sensors need to be calibrated using standard solution before measurement. You can select simultaneous auto calibration of the pH, COND and TURB sensors in pH4 standard solution and DO and DEP sensors simultaneously in air, or manual calibration of individual measurement parameters. You can check the result of the previous calibration using the procedure on “ 3.5.4 Checking the calibration record ” (page 70).

Note

- **Wait at least 20 minutes after turning the system power ON before calibrating the DO sensor.**
- **Make the DO and COND compensation settings before calibration since these settings are applied during calibration.**
- **You can select only the desired parameters for calibration and calibrate just those parameters (see “ 3.2.4 Sensor selection ” (page 25)).**
- **Use about 200 mL of standard solution in the calibration cup.**
- **Calibration data is stored in the sensor probe.**

3.3.1 Auto calibration

Tip

- **The following parameters are calibrated (at 25°C):**
  pH: Set to 4.01 (zero-point calibration); the span is adjusted to the factory default value.
  COND: 0.449 S/m (4.49 mS/cm, span calibration); the zero point is adjusted to the factory default value.
  TURB: 0 NTU (zero-point calibration); the span is adjusted to the factory default value.
  DO: 8.92 mg/L (span calibration); the zero point is adjusted to the factory default value.
  DEP: 0 m (zero-point calibration); the zero point is adjusted to the factory default value.
- **If the air temperature changes, the readout value may not be stable. Ensure that the ambient air temperature is the same temperature as the calibration solution, because the internal probe temperature sensor and external temperature sensor (in the calibration solution) are used for the auto calibration. Allow the probe and standard solution to equilibrate for 1 hour if a thermometer is not available to verify that these temperatures are the same.**
- **Do not hold the probe while performing the auto calibration. Body temperature may elevate the internal temperature sensor measurement creating DO calibration error.**

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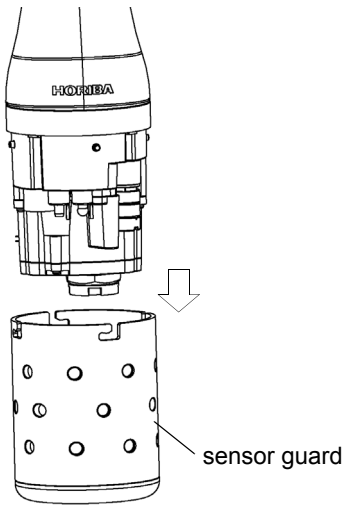
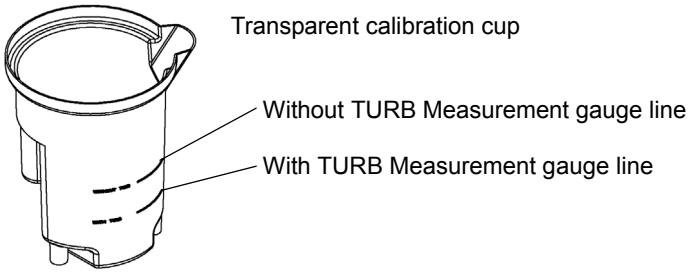
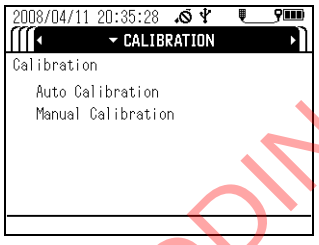
1. **Remove the sensor guard and wash the sensor probe 2 or 3 times with deionized water.**



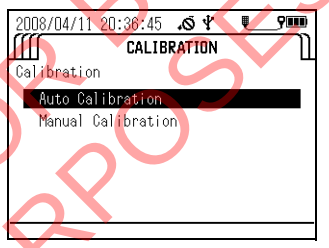
2. **Remove the transparent calibration cup.**
3. **Fill the transparent calibration cup to the line with pH 4 standard solution.**
   The transparent calibration cup has With TURB Measurement and Without TURB Measurement gauge lines.



4. **Press the control unit's CAL key to set the calibration mode.**



5. **Press the down (▽) key to move the cursor to "Auto Calibration", then press the ENTER key.**



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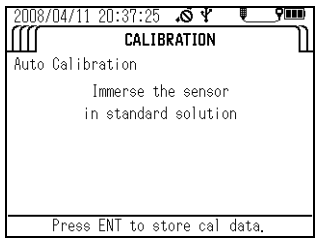
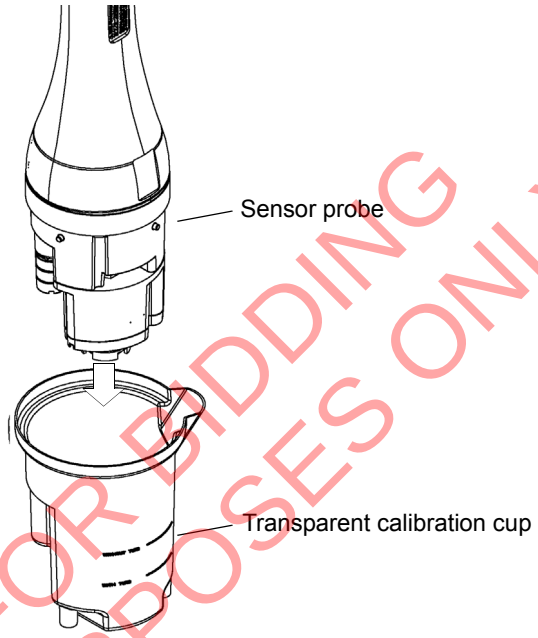
6. **Immerse the sensor probe in the transparent calibration cup.**
   Check that the pH sensor, ORP sensor, reference electrode, COND sensor, TURB sensor and temperature sensor are submerged in the pH 4 standard solution and check that there are no air bubbles on the sensor.





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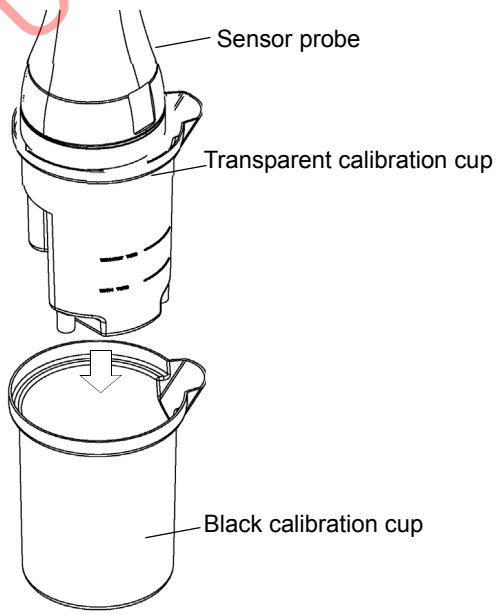
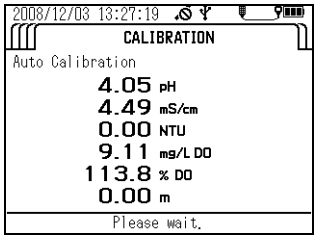
7. **With the sensor probe still in the transparent calibration cup, place the transparent calibration cup into the black calibration cup.**



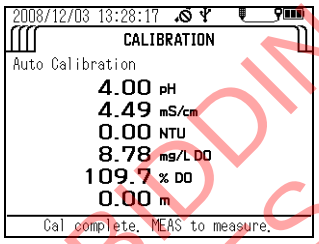
8. **When all the sensor values have stabilized, press the ENTER key to start calibration.**

Note

Do not remove the sensor probe from the calibration solution. U-53 turbidity data will display "----" until the calibration is completed.



Calibration is finished when the message "Cal complete. MEAS to measure." appears. Press the MEAS key to set the measurement screen, then start measurement.



If a calibration error occurs, start calibration after first resolving the issue according to the instructions in " 4.6 Troubleshooting " (page 89).

FOR BIDDING PURPOSES ONLY

3.3.2 Manual calibration

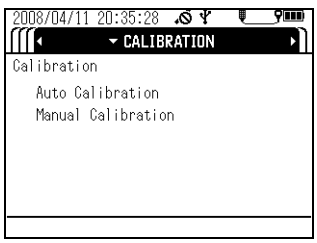
The procedures below describe how to calibrate each sensor individually.

Note

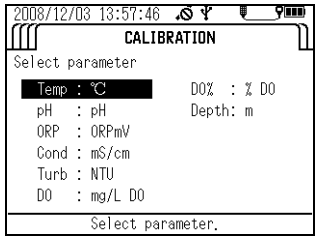
The displayed units are the units set by selecting "Unit for report" in the "SETTINGS" screen.

● **Temperature (TEMP) calibration**

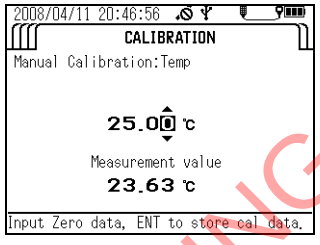
1. **Fill a bucket or similar container with water of a known temperature, and insert the sensor probe in it.**
   Wait 5 minutes before starting calibration to allow the sensor probe temperature to stabilize.
2. **Press the control unit's CAL key to set the calibration mode.**
3. **Press the down (▽) key to move the cursor to "Manual Calibration", then press the ENTER key.**



4. **In the parameter selection screen, move the cursor to “Temp”, then press the ENTER key.**



5. **Press the up (△) and down (▽) keys to set the calibration value - the temperature of the water containing the submerged sensor probe.**



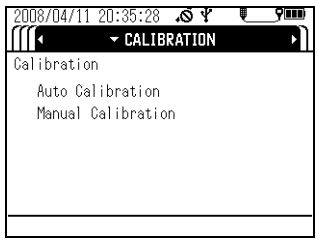
6. **Check that “Measurement value” has stabilized, then press the ENTER key to start calibration.**
   Calibration is finished when the message “Cal complete. CNT to measure.” appears.

● pH calibration

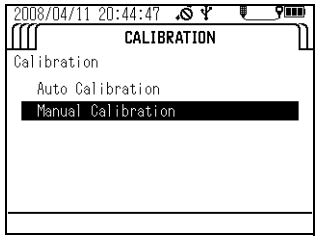
Note

You can select one calibration point (zero-point calibration) or two calibration points (zero-point calibration and span calibration). Carry out two calibration procedures to ensure good measurement precision throughout all measurement ranges.

1. **Calibrate the zero point. Wash the transparent calibration cup 2 or 3 times with deionized water, then fill it to the reference line with pH 7 standard solution.**
2. **Wash the sensor probe 2 or 3 times in deionized water to remove any dirt, then submerge the sensor probe in the transparent calibration cup.**
3. **Press the control unit’s CAL key to set the calibration mode.**



4. **Press the down (▽) key to move the cursor to "Manual Calibration", then press the ENTER key.**



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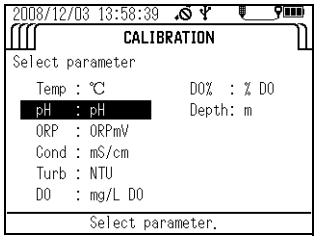
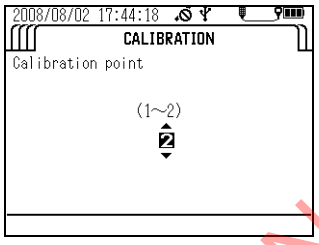
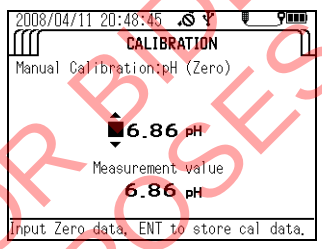
5. **In the parameter selection screen, move the cursor to "pH", then press the ENTER key.**



6. **Set the number of calibration points, then press the ENTER key.**



7. **Press the up (△) and down (▽) keys to set the pH value of the pH 7 standard solution containing the submerged sensor probe at the measurement temperature**



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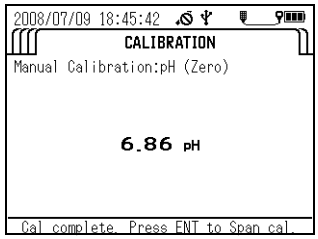
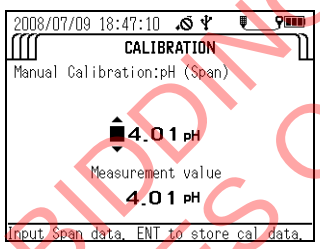
Temp. (°C)	pH 4 standard solution Phthalate	pH 7 standard solution Neutral phosphate	pH 9 standard solution Borate
0	4.01	6.98	9.46
5	4.01	6.95	9.39
10	4.00	6.92	9.33
15	4.00	6.90	9.27
20	4.00	6.88	9.22
25	4.01	6.86	9.18
30	4.01	6.85	9.14
35	4.02	6.84	9.10
40	4.03	6.84	9.07
45	4.04	6.84	9.04

8. **Check that "Measurement value" has stabilized, then press the ENTER key to start calibration.**

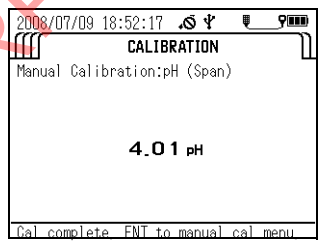
9. **Press the ENTER key to start the span calibration procedure when the message "Cal complete. Press ENT to Span cal." appears.**



10. **Wash the transparent calibration cup 2 or 3 times with deionized water, then fill it to the reference line with pH 4 or pH 9 standard solution.**
11. **Wash the sensor probe 2 or 3 times in deionized water to remove any dirt, then submerge the sensor probe in the transparent calibration cup.**
12. **Press the up (△) and down (▽) keys to set the pH value of the pH 4 or pH 9 standard solution containing the submerged sensor probe at the measurement temperature.**



13. **Check that "Measurement value" has stabilized, then press the ENTER key to start calibration.**
14. **Calibration is finished when the message "Cal complete. ENT to manual cal menu." appears. Press the ENTER key to return to the calibration parameter**



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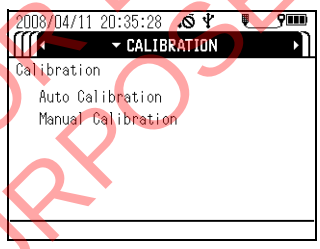
● ORP calibration

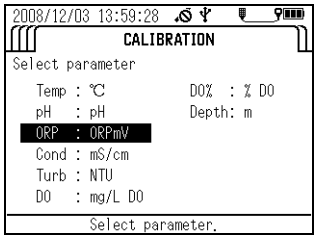
Note

- **If the prepared ORP standard solution is left in open air for one hour or more, the solution may be transformed. For this reason ORP standard solution cannot be stored.**
  Calibrate within one hour of preparing the solution.
- **When measuring sample with low concentrations of oxidants and reductants after conducting an operational check using a standard substance, the measured values may not stabilize or the results of measurement might not be repeatable. If this is the case, start the measurement after immersing the sensors in the sample water sufficiently.**
- **Note that when measuring the ORP of solution with extremely low concentrations of oxidants and reductants, such as tap water, well water, or water treated with purifying equipment, there may be less responsiveness, repeatability, and stability, in general.**
- **When alkaline ion water is left for 5 minutes, its ORP undergoes changes significantly. Always measure alkaline ion water promptly.**

1. **Fill a clean beaker with one bag of ORP standard powder No. 160-22 or No. 160-51. Add 250 mL of deionized water and agitate the solution thoroughly (there will be some excess quinhydrone (a black powder) that floats on the surface when agitating the solution). Fill the transparent calibration cup to the reference line with this standard solution.**
2. **Wash the sensor probe 2 or 3 times in deionized water to remove any dirt, then submerge the sensor probe in the transparent calibration cup.**
3. **Press the control unit's CAL key to set the calibration mode.**
4. **Press the down (▽) key to move the cursor to "Manual Calibration", then press the ENTER key.**



5. **In the parameter selection screen, move the cursor to ORP, then press the ENTER key.**



6. **Press the up (△) and down (▽) keys to set the mV value of the ORP standard solution containing the submerged sensor probe at the measurement temperature.**

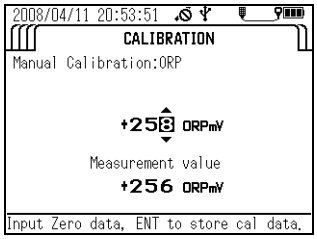


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Table 1 Indicated value of ORP standard solution at various temperatures (mV)

Temperature	160-22	16051
5	+274	+112
10	+271	+107
15	+267	+101
20	+263	+95
25	+258	+89
30	+254	+83
35	+249	+76
40	+244	+69

7. **Check that "Measurement value" has stabilized, then press the ENTER key to start calibration.**
8. **Calibration is finished when the message "Cal complete. ENT to manual cal menu." appears. Press the ENTER key to return to the calibration parameter selection screen.**

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Conductivity (COND) calibration

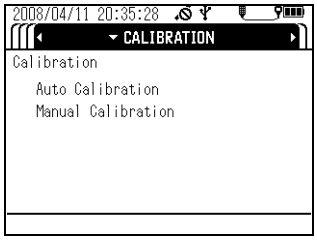
Note

- **To support a wide range of sample concentrations, electrical conductivity is divided into three measurement ranges: 0.0 mS/m to 99.9 mS/m, 0.090 S/m to 0.999 S/m, and 0.9 S/m to 9.99 S/m.**
- **When manually calibrating conductivity, you can select two calibration points (one zero-point calibration point and a span calibration point for one of the three measurement ranges) or four calibration points (one zero-point calibration point and span calibration points for all three measurement ranges). Carry out the four calibration points to ensure good measurement precision throughout all measurement ranges.**
- **Make the compensation setting before calibration since this setting is applied during calibration. (Refer to " 6.5.3 Temperature coefficient " (page 104)).**

1. **Prepare the standard solution. Dry Potassium chloride (KCl) powder (high-grade commercially available) at 105°C for two hours, and leave it to cool in a desiccator.**
2. **Consult the following table and weigh potassium chloride (KCl), then prepare three standard potassium chloride (KCl) solutions following the procedure below.**

Potassium chloride (KCl) standard solution	Conductivity (COND) value	Potassium chloride (KCl) mass (g) at solution temperature of 25 °C	Calibration range
0.005 mol/L	71.8 mS/m (0.718 mS/cm)	0.373	0.0 mS/m to 99.9 mS/m (0.00 mS/cm to 0.999 mS/cm)
0.050 mol/L	0.667 S/m (6.67 mS/cm)	3.73	0.090 S/m to 0.999 S/m (1.00 mS/cm to 9.99 mS/cm)
0.500 mol/L	5.87 S/m (58.7 mS/cm)	37.2	0.9 S/m to 9.99 S/m (10.0 mS/cm to 99.9 mS/cm)

3. **Dissolve the weighed Potassium Chloride (KCl) in deionized water.**
4. **Put the dissolved Potassium Chloride (KCl) into a 1 L measuring flask, and fill to the 1 L mark with deionized water.**
5. **Calibrate the zero point. Wash the sensor probe 2 or 3 times in deionized water to remove any dirt, then remove all moisture from the sensor probe (it will be calibrated in air).**
6. **Press the control unit's CAL key to set the calibration mode.**
7. **Press the down (▽) key to move the cursor to "Manual Calibration", then press the ENTER key.**



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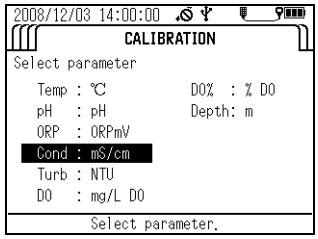
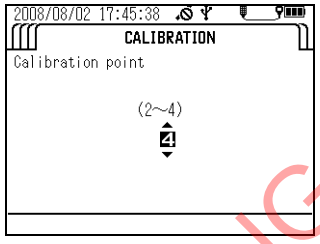
8. **In the parameter selection screen, move the cursor to “Cond”, then press the ENTER key.**

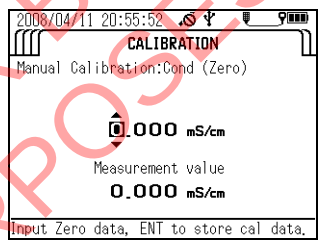


9. **Set the number of calibration points, then press the ENTER key.**

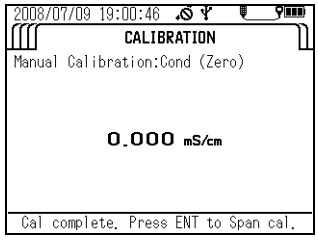


The instructions below assume that four calibration points have been set.

10. **Press the up (△) and down (▽) keys to set the "Cond" value to 0.0 mS/m (0.000 mS/cm).**
11. **Check that "Measurement value" has stabilized, then press the ENTER key to start calibration.**



12. **When the message "Cal complete. Press ENT to Span cal." appears, press the ENTER key to start the first span calibration procedure.**



13. **Wash the transparent calibration cup 2 or 3 times with deionized water, then fill it to the reference line with 71.8 mS/m (0.718 mS/cm) standard solution.**
14. **Wash the sensor probe 2 or 3 times in deionized water to remove any dirt, then submerge the sensor probe in the transparent calibration cup.**

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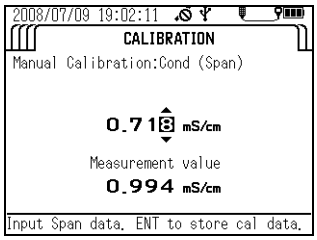
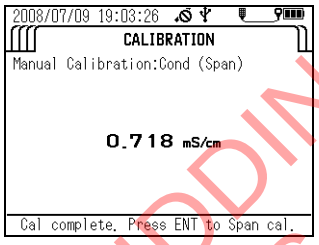
15. **Press the up (△) and down (▽) keys to set the "Cond" value to 71.8 mS/m (0.718 mS/cm).**
    Calibration range = 0 mS/m to 99.9 mS/m (0 mS/cm to 0.999 mS/cm)



16. **Check that "Measurement value" has stabilized, then press the ENTER key to start calibration.**
17. **When the message "Cal complete. Press ENT to Span cal." appears, press the ENTER key to start the next span calibration procedure.**



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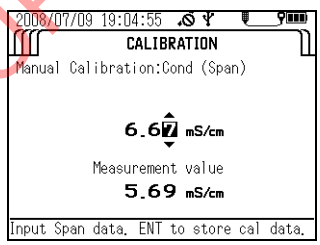
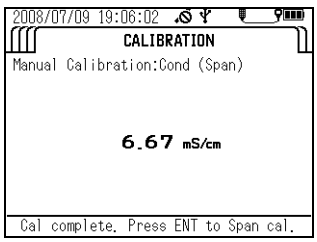
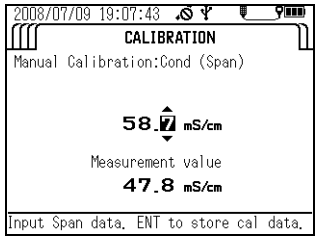
18. **Wash the transparent calibration cup 2 or 3 times with deionized water, then fill it to the reference line with 0.667 S/m (6.67 mS/cm) standard solution.**
19. **Wash the sensor probe 2 or 3 times in deionized water to remove any dirt, then submerge the sensor probe in the transparent calibration cup.**
20. **Press the up (△) and down (▽) keys to set the "Cond" value to 0.667 S/m (6.67 mS/cm).**
    Calibration range = 0.100 S/m to 0.999 S/m (1.00 mS/cm to 9.99 mS/cm)



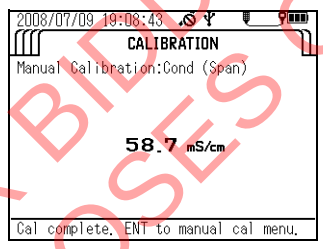
21. **Check that "Measurement value" has stabilized, then press the ENTER key to start calibration.**
22. **When the message "Cal complete. Press ENT to Span cal." appears, press the ENTER key to start the next span calibration procedure.**



23. **Wash the transparent calibration cup 2 or 3 times with deionized water, then fill it to the reference line with 5.87 S/m (58.7 mS/cm) standard solution.**
24. **Wash the sensor probe 2 or 3 times in deionized water to remove any dirt, then submerge the sensor probe in the transparent calibration cup.**
25. **Press the up (△) and down (▽) keys to set the "Cond" value to 5.87 S/m (58.7 mS/cm).**
    Calibration range = 1.00 S/m to 10.00 S/m(10.0 mS/cm to 100.0 mS/cm)



26. **Check that "Measurement value" has stabilized, then press the ENTER key to start calibration.**
27. **Calibration is finished when the message "Cal complete. ENT to manual cal menu." appears. Press the ENTER key to return to the calibration parameter selection screen.**



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● Turbidity (TURB) calibration

Note

- **To support a wide range of sample concentrations, turbidity is divided into three measurement ranges: 0.0 to 9.9 NTU, 10 to 100 NTU, and over 100 NTU.**
- **When manually calibrating turbidity, you can select two calibration procedures (one zero-point calibration procedure and a span calibration procedure for one of the three measurement ranges), three calibration procedures (one zero-point calibration procedure and a span calibration procedure for two of the three measurement ranges) or four calibration procedures (one zero-point calibration procedure and span calibration procedures for all three measurement ranges). Carry out the four calibration procedures to ensure good measurement precision throughout all measurement ranges.**
- **Always use the calibration cup provided. Using other containers can create effects from ambient light that cause incorrect calibration.**

● Preparing the standard solutions

1. **Weigh out 5.0 g of hydrazine sulfate (commercial special grade or above), and dissolve it in 400 mL of deionized water. Dissolve 50 g of hexamethylene tetramine (commercial special grade or above) in 400 mL of deionized water in anther flask.**
2. **Mix the two solutions and add deionized water until the total solution volume is 1000 mL, and mix well. Store this solution at a temperature of 25°C ±3°C for 48 hours.**
   The turbidity value (TURB) of this solution is equivalent to 4000 NTU.
3. **Dilute 4000 NTU-solution 5 times (use a pipette to measure 50 mL of the 4000 NTU solution and pour it into a 250 mL measuring flask, and fill up to 250 mL meniscus)**
   The turbidity value (TURB) of this solution is equivalent to 800 NTU.
4. **Dilute 800 NTU solution 10 times (use a pipette to measure 25 mL of the 800 NTU solution and pour it into a 250 mL measuring flask, and fill up to 250 mL meniscus)**
   The turbidity value (TURB) of this solution is equivalent to 80 NTU.
5. **Dilute 80 NTU solution 10 times (use a pipette to measure 25 mL of the 80 NTU solution and pour it into a 250 mL measuring flask, and fill up to 250 mL meniscus)**
   The turbidity value (TURB) of this solution is equivalent to 8 NTU.

Note

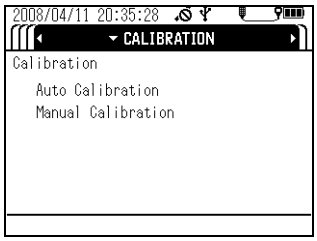
Instead of the standard solutions above, you can use other standard solutions of known concentration measured with other standard instruments.

● U-52, U-53 turbidity calibration

Set the number of calibration points.

You can set between 2 and 4 points.

1. **Press the control unit's CAL key to set the calibration mode.**
2. **Press the down (▽) key to move the cursor to "Manual Calibration", then press the ENTER key.**



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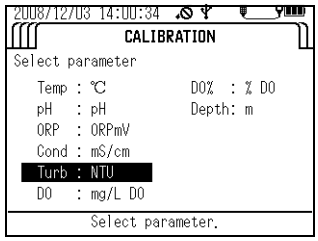
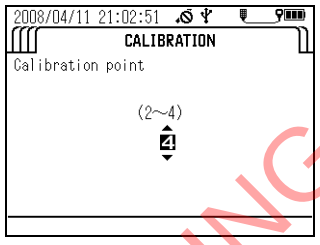
3. **In the parameter selection screen, move the cursor to "Turb", then press the ENTER key.**

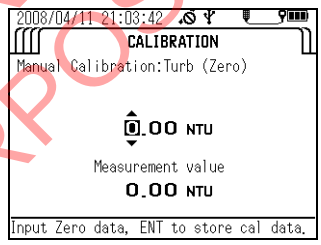


4. **Press the up (△) and down (▽) keys to set the number of calibration points, then press the ENTER key.**

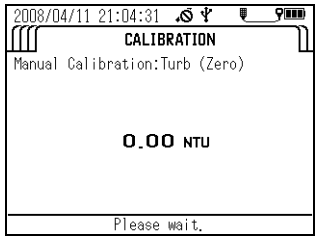


The instructions below assume that four calibration points have been set.

5. **Calibrate the zero point. Wash the transparent calibration cup 2 or 3 times with deionized water, then fill it to the reference line with deionized water.**
6. **Wash the sensor probe 2 or 3 times in deionized water to remove any dirt, then submerge the sensor probe in the transparent calibration cup.**
7. **Press the up (△) and down (▽) keys to set the "Turb" value to 0.0 NTU.**



8. **Check that "Measurement value" has stabilized, then press the ENTER key to start calibration.**



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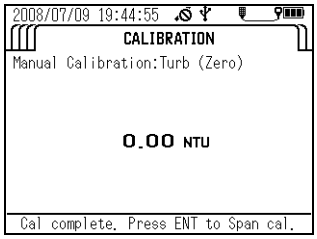
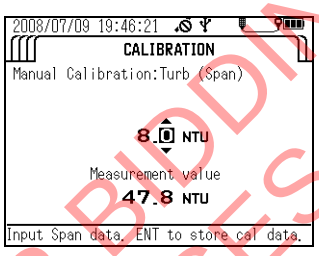
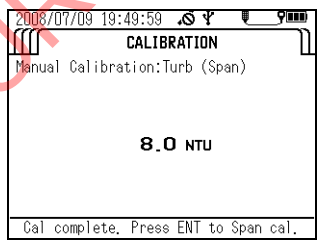
9. **When the message "Cal complete. Press ENT to Span cal." appears, press the ENTER key to start the first span calibration procedure.**



10. **Wash the transparent calibration cup 2 or 3 times with deionized water, then fill it to the reference line with 8 NTU standard solution, or a standard solution of known concentration between 0.1 and 10 NTU.**
11. **Wash the sensor probe 2 or 3 times in deionized water to remove any dirt, then submerge the sensor probe in the transparent calibration cup.**
12. **Press the up (△) and down (▽) keys to set the "TURB" value to 8 NTU, or to the known concentration of the standard solution between 0.1 and 10 NTU. (Input range = 0 NTU to 9.9 NTU (U-51) or 0 NTU to 9.99 NTU (U-52))**



13. **Check that "Current measurement value" has stabilized, then press the ENTER key to start calibration.**
14. **When the message "Cal complete. Press ENT to Span cal." appears, press the ENTER key to start the next span calibration procedure.**



15. **Wash the transparent calibration cup 2 or 3 times with deionized water, then fill it to the reference line with 80 NTU standard solution, or a standard solution of known concentration between 10 and 100 NTU.**
16. **Wash the sensor probe 2 or 3 times in deionized water to remove any dirt, then submerge the sensor probe in the transparent calibration cup.**

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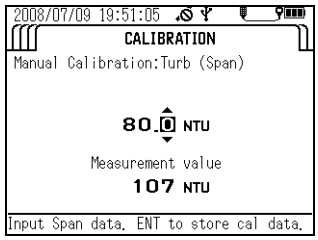
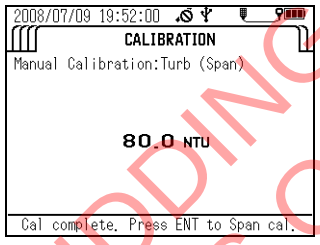
17. **Press the up (△) and down (▽) keys to set the "Turb" value to 80 NTU, or to the known concentration of the standard solution between 10 and 100 NTU. (Input range = 10.0 NTU to 99.9 NTU)**



18. **Check that "Measurement value" has stabilized, then press the ENTER key to start calibration.**
19. **When the message "Cal complete. Press ENT to Span cal." appears, press the ENTER key to start the next span calibration procedure.**



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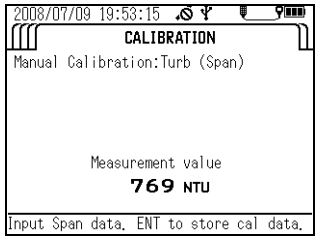
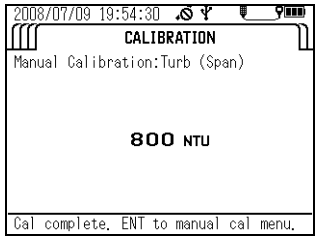
20. **Wash the transparent calibration cup 2 or 3 times with deionized water, then fill it to the reference line with 800 NTU standard solution, or a standard solution of known concentration 100 NTU above.**
21. **Wash the sensor probe 2 or 3 times in deionized water to remove any dirt, then submerge the sensor probe in the transparent calibration cup.**
22. **Press the up (△) and down (▽) keys to set the "TURB" value to 800 NTU, or to the known concentration of the standard solution 100 NTU above.**
(Input range = 100 NTU to 800 NTU (U-51), 100 NTU to 1000 NTU (U-52))



23. **Check that "Measurement value" has stabilized, then press the ENTER key to start calibration.**
24. **Calibration is finished when the message "Cal complete. ENT to manual cal menu." appears. Press the ENTER key to return to the calibration parameter selection screen.**

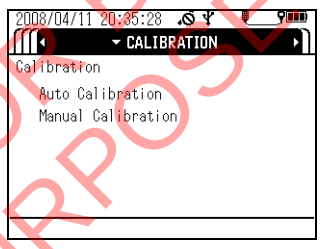


● Dissolved oxygen (DO) calibration

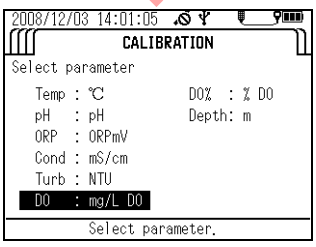
Note

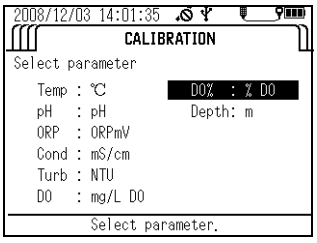
- **You can select one calibration procedure (span calibration) or two calibration procedures (zero-point calibration and span calibration). Carry out the two calibration procedures to ensure good measurement precision throughout all measurement ranges.**
- **It is necessary to prepare new solution before calibration of the Dissolved Oxygen (DO) sensor.**
- **The calibration cup (included) cannot be used to manually calibrate the DO sensor. Use a suitable bottle in which the DO sensor and the temperature sensor can be immersed.**
- **Wait at least 20 minutes after turning the system power ON before calibrating the DO sensor.**
- **Make the compensation setting before calibration since the setting is applied during calibration.**
- **The DO sensor is affected by flow. When performing span calibration with saturated dissolved oxygen water, move the cable slowly up and down (move the sensor probe at a rate of roughly 20 to 30 cm a second) or agitate the saturated dissolved oxygen water.**

1. **Prepare the standard solution.**
   - Add about 50 g of sodium sulfite to 1000 mL of water (either deionized water or tap water) and stir the mixture to dissolve the sodium sulfite in it.
   - Pour 1 to 2 liters of water into a suitable flask (either deionized water or tap water). Using a air pump, feed air into the water and aerate the solution until oxygen is saturated.
2. **First, calibrate the zero point. Press the control unit's CAL key to set the calibration mode.**
3. **Press the down (▽) key to move the cursor to "Manual Calibration", then press the ENTER key.**

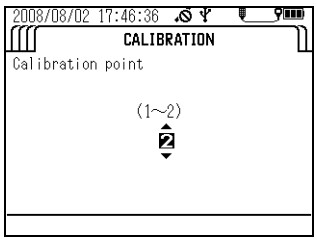


4. **In the parameter selection screen, move the cursor to DO or DO%, then press the ENTER key.**





5. **Set the number of calibration procedures, then press the ENTER key.**



The instructions below assume that two calibration points have been set.

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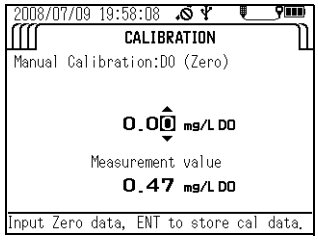
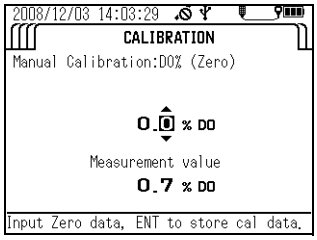
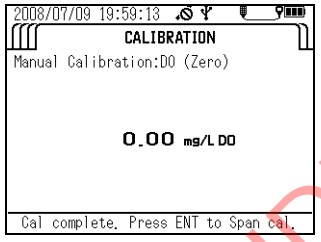
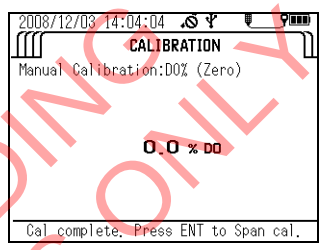
6. **Wash the sensor probe 2 or 3 times in deionized water to remove any dirt, then submerge the sensor probe in the bottle.**
7. **Press the up (△) and down (▽) keys to set the DO value to 0.00 mg/L or 0.0%.**



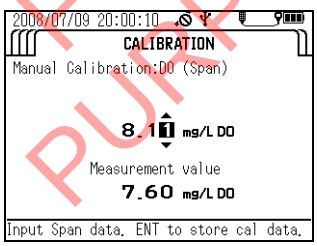


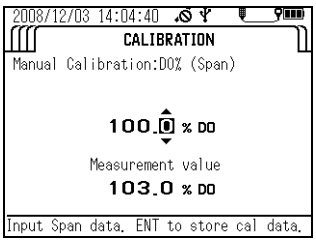
8. **Check that "Measurement value" has stabilized, then press the ENTER key to start calibration.**
9. **When the message "Cal complete. Press ENT to Span cal." appears, press the ENTER key to start the span calibration procedure.**



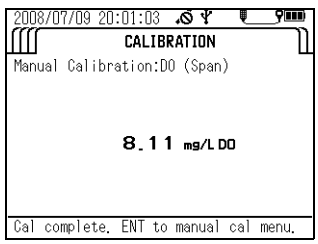


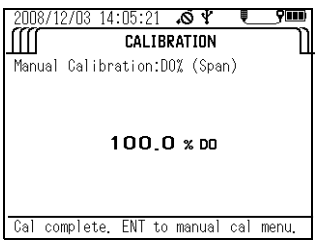
10. **Wash the sensor probe 2 or 3 times with deionized water to remove any dirt, then submerge the sensor probe in the container filled with the span solution.**
11. **Press the up (△) and down (▽) keys to set the DO value to the saturated dissolved oxygen value (mg/L) of the water at that temperature or the dissolved oxygen saturation ratio.**





12. **Check that "Measurement value" has stabilized, then press the ENTER key to start calibration.**
13. **Calibration is finished when the message "Cal complete. ENT to manual cal menu." appears. Press the ENTER key to return to the calibration parameter selection screen.**





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Amounts of saturated dissolved oxygen in water at various temperatures (salinity=0.0%)

JIS K0101

Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)
0	14.16						
1	13.77	11	10.67	21	8.68	31	7.42
2	13.40	12	10.43	22	8.53	32	7.32
3	13.04	13	10.20	23	8.39	33	7.22
4	12.70	14	9.97	24	8.25	34	7.13
5	12.37	15	9.76	25	8.11	35	7.04
6	12.06	16	9.56	26	7.99	36	6.94
7	11.75	17	9.37	27	7.87	37	6.86
8	11.47	18	9.18	28	7.75	38	6.76
9	11.19	19	9.01	29	7.64	39	6.68
10	10.92	20	8.84	30	7.53	40	6.59

ISO5814

Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)
0	14.62				
1	14.22	11	11.03	21	8.91
2	13.83	12	10.78	22	8.74
3	13.46	13	10.54	23	8.58
4	13.11	14	10.31	24	8.42
5	12.77	15	10.08	25	8.26
6	12.45	16	9.87	26	8.11
7	12.14	17	9.66	27	7.97
8	11.84	18	9.47	28	7.83
9	11.56	19	9.28	29	7.69
10	11.29	20	9.09	30	7.56

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● Span setting values for calibration in air

The software should display these values when auto calibration is performed.
Use this table to input values for manual span calibrations in air.

Tip

The DO measurement value of "air-saturated water" and air are different.
Due to the pressure difference against the membrane in air versus the membrane in water, the measurement value in air is about 10% higher than the value of air-saturated water on average.

Amounts of saturated dissolved oxygen in air at various temperatures

Following tables are applicable only to the air calibration of the U-50 DO sensor. Do not use them for other purpose.

Air calibration value in adopting evaluation based on JIS K0101

Temp (°C)	DO (mg/L)	Temp (°C)	DO (mg/L)	Temp (°C)	DO (mg/L)	Temp (°C)	DO (mg/L)
0	15.58						
1	15.15	11	11.74	21	9.55	31	8.16
2	14.74	12	11.47	22	9.38	32	8.05
3	14.34	13	11.22	23	9.23	33	7.94
4	13.97	14	10.97	24	9.08	34	7.84
5	13.61	15	10.74	25	8.92	35	7.74
6	13.27	16	10.52	26	8.79	36	7.63
7	12.93	17	10.31	27	8.66	37	7.55
8	12.62	18	10.10	28	8.53	38	7.44
9	12.31	19	9.91	29	8.40	39	7.35
10	12.01	20	9.72	30	8.28	40	7.25

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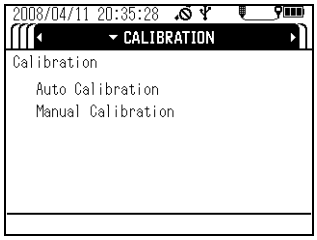
Air calibration value in adopting evaluation based on ISO5814

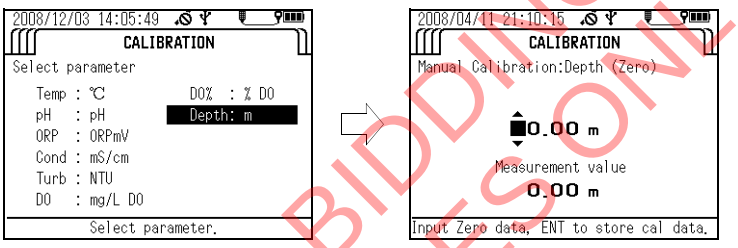
Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)	Temp. (°C)	DO (mg/L)
0	16.08				
1	15.64	11	12.13	21	9.80
2	15.21	12	11.86	22	9.61
3	14.81	13	11.59	23	9.44
4	14.42	14	11.34	24	9.26
5	14.05	15	11.09	25	9.09
6	13.70	16	10.86	26	8.92
7	13.35	17	10.63	27	8.77
8	13.02	18	10.42	28	8.61
9	12.72	19	10.21	29	8.46
10	12.42	20	10.00	30	8.32

● Water depth (DEPTH) calibration

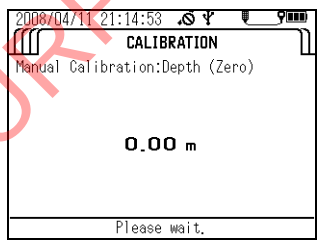
1. **Calibrate the zero point. Wash the sensor probe 2 or 3 times in deionized water to remove any dirt, then remove all moisture from the sensor probe (it will be calibrated in air).**
2. **Press the control unit's CAL key to set the calibration mode.**
3. **Press the down (▽) key to move the cursor to "Manual Calibration", then press the ENTER key.**



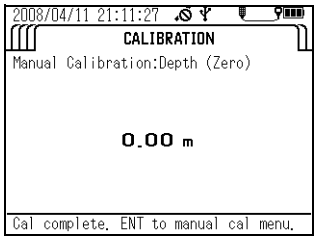
4. **In the parameter selection screen, move the cursor to "Depth", then press the ENTER key.**



5. **Press the up (△) and down (▽) keys to set the "Depth" value to 0.00 m.**
6. **Check that "Measurement value" has stabilized, then press the ENTER key to start calibration.**



7. **Calibration is finished when the message "Cal complete. ENT to manual cal menu." appears. Press the ENTER key to return to the calibration parameter selection screen.**



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3.4 Measurement

You can perform measurement by either of the methods below.

- Storing data in memory manually with reference to the measurement value (single measurement)
- Having data stored in memory automatically and continuously
  U-51/U-52: Interval measurement (minimum memory interval of 10 seconds)
  U-53: Interval measurement (minimum memory interval of 30 seconds)

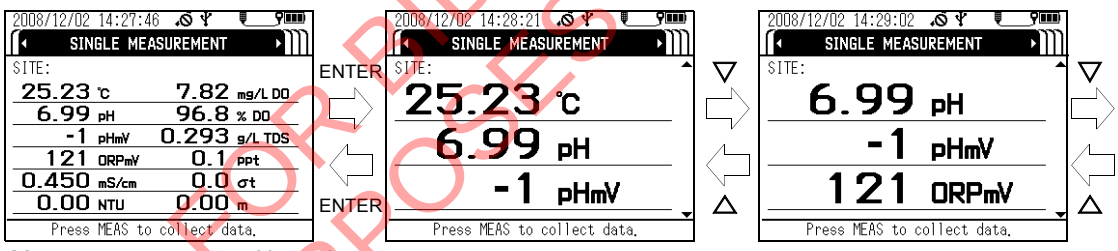
Select the measurement method that meets your requirements.

Note

- **Lower sensor probe slowly when submerging them in samples.**
- **Sensors may break if sensor probe are dropped from a height of 1 meter or more.**
- **Do not submerge sensor probe in water depths of over 30 meters. Sensor probe are only resistant to water pressure of up to 30 meters.**
- **After turning the power ON, check that the DO readout value has stabilized before starting measurement (takes around 20 minutes).**

Tip

- **When on the measurement screen, pressing the ENTER key enlarges the display and shows three measured values at a time.**
- **Pressing the up (△) and down (▽) keys scrolls through the measured values one item at a time.**
- **Pressing the ENTER key again reverts to the normal measurement screen display.**



Measurement screen Normal Enlarged

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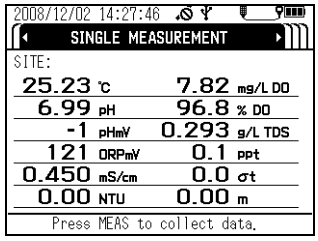
3.4.1 Storing data in memory manually

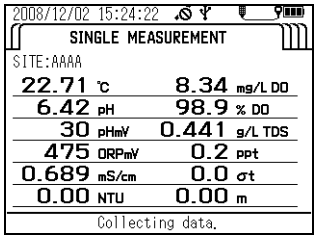
Follow the steps below to manually store data in memory while referring to the measurement value to check the readout value is stable.

● **U-51/U-52**

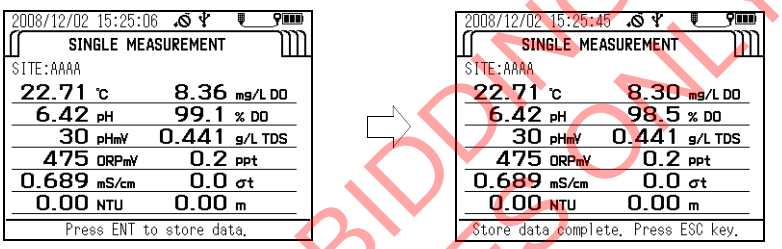
1. **Check that each sensor and sensor guard is mounted.**
2. **Check that "SINGLE MEASUREMENT" has been selected in the measurement screen.**



3. **Submerge the sensor probe in the sample, gently shaking them in the sample to remove any air bubbles from the sensors.**
   If the sample is non-flowing, move the cable slowly up and down (move the sensor probe at a rate of roughly 20 to 30 cm a second) to ensure that fresh sample is continuously supplied to the DO sensor.
4. **When the measurement values are stable, press the MEAS key to acquire the 5-second average.**



5. **Press the ENTER key to save the held measurement values, or press the ESC key to cancel the operation.**



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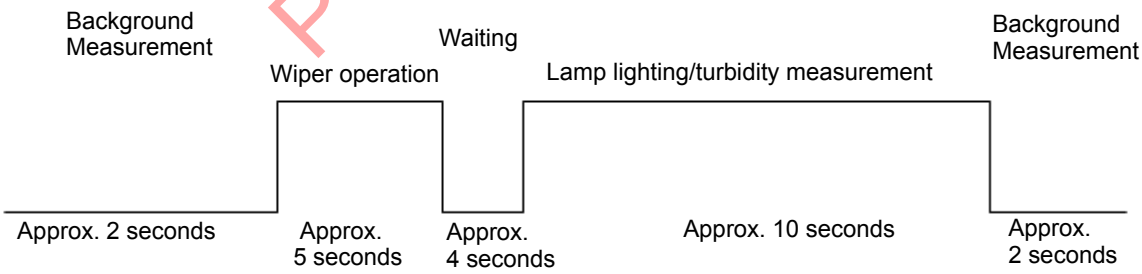
● U-53

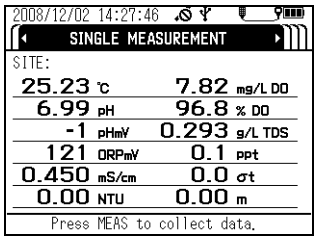
Note

Do not perform turbidity measurement in air as it may damage the wiper.

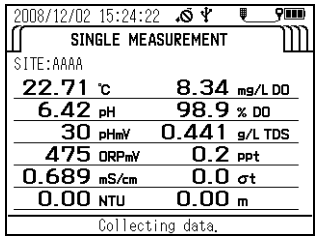
U-53 turbidity measurement follows the sequence below. The measurement values are held after each sequence.



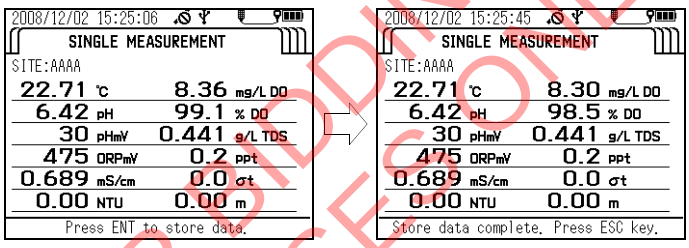
1. **Check that each sensor and sensor guard is mounted.**
2. **Check that "SINGLE MEASUREMENT" has been selected in the measurement screen.**



3. **Submerge the sensor probe in the sample, gently shaking them in the sample to remove any air bubbles from the sensors.**
   If the sample is non-flowing, move the cable slowly up and down (move the sensor probe at a rate of roughly 20 to 30 cm a second) to ensure that fresh sample is continuously supplied to the DO sensor.
4. **When the non-turbidity meter measurement values are stable, press the MEAS key to start the sequence above.**



5. **When the sequence has finished, hold the measurement values. Press the ENTER key to store the held measurement values, or press the ESC key to cancel the operation.**



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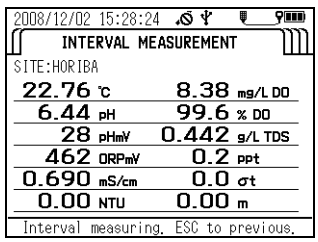
3.4.2 Automatic, continuous measurement

● **Interval measurement**

1. **Select the "Interval measurement" measurement setting (see " 3.2.1 Setting measurement methods " (page 18)).**
2. **Press the up (△) and down (▽) keys to set the interval value to the desired value (U-51/U-52: minimum interval: 10 seconds, U-53: minimum interval: 30 seconds), then press the ENTER key.**
   The measurement screen appears automatically, and the system becomes ready for measurement.
3. **Check that each sensor and sensor guard is mounted.**
4. **Submerge the sensor probe in the sample, gently shaking them in the sample to remove any air bubbles from the sensors.**
   If the sample is non-flowing, move the cable slowly up and down (move the sensor probe at a rate of roughly 20 to 30 cm a second) to ensure that fresh sample is continuously supplied to the DO sensor.
5. **Press the ENTER key to start measurement.**



3.5 Data operations

Use the procedures below to retrieve data stored in memory, delete all the data, check the remaining data memory capacity, and check the calibration record.

3.5.1 Displaying data

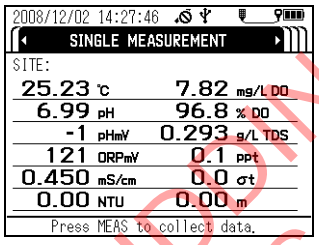
For maximum efficiency, there are 3 methods of displaying data.

- Displaying the data for a specified site
- Displaying the data for a specified date/time
- Displaying all the data

Use the method that best suits your requirements.

● **Displaying the data for a specified site**

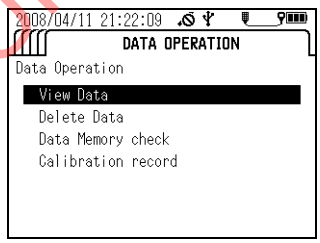
1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.



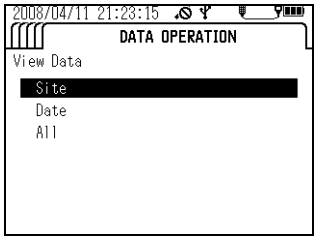
Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

2. **Press the right (▷) key 3 times to display the "DATA OPERATION" screen.**
3. **Press the down (▽) key to move the cursor to "View Data", then press the ENTER key.**



4. **Move the cursor to "Site", then press the ENTER key.**



5. **Press the up (△), down (▽), left (◁) and right (▷) keys to enter the site to retrieve.**

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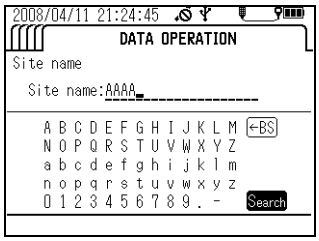
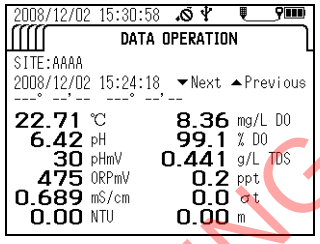
6. **Move the cursor to "Search", then press the ENTER key.**



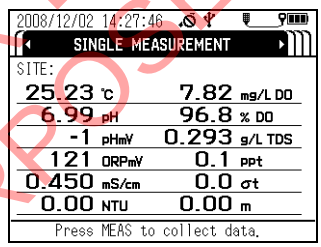
All site names that begin with the entered text are displayed.
The most recently measured data for the entered site is displayed.

7. **Press the up (△) and down (▽) keys to display earlier data.**



● Displaying the data for a specified date/time

1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.



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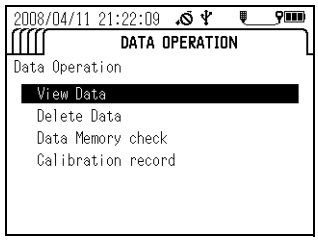
Note

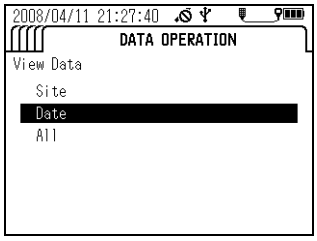
The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

2. **Press the right (▷) key 3 times to display the "DATA OPERATION" screen.**
3. **Press the down (▽) key to move the cursor to "View Data", then press the ENTER key.**



4. **Move the cursor to "Date", then press the ENTER key.**

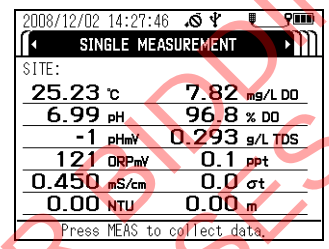
5. **With the cursor on the Date, press the ENTER key.**



6. **Press the up (△), down (▽), left (◁) and right (▷) keys to enter the desired date/time, then press the ENTER key to apply the setting.**
7. **The cursor moves to "Search". Press the ENTER key to start the search.**
8. **Press the up (△) and down (▽) keys to display earlier data.**

● Displaying all the data

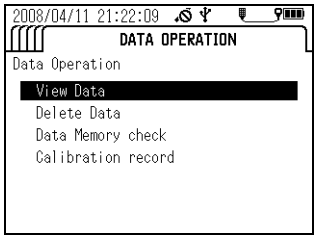
1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.



Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

2. **Press the right (▷) key 3 times to display the "DATA OPERATION" screen.**
3. **Press the down (▽) key to move the cursor to "View Data", then press the ENTER key.**



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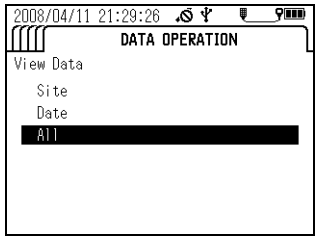
4. **Move the cursor to "All", then press the ENTER key.**
The most recently measured data is displayed.



5. **Press the up (△) and down (▽) keys to display earlier data.**

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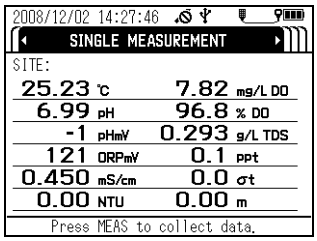
3.5.2 Deleting data

Follow the steps below to delete all the data stored in memory.

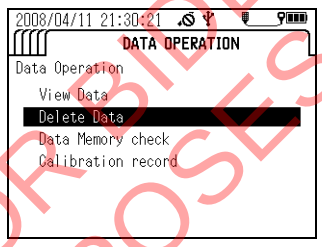
1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.



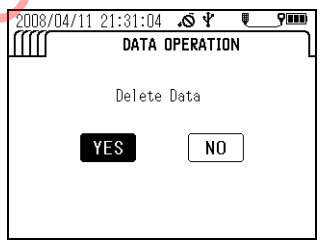
Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

2. **Press the right (▷) key 3 times to display the "DATA OPERATION" screen.**
3. **Press the down (▽) key to move the cursor to "Delete Data", then press the ENTER key.**



4. **Press the left (◁) key to move the cursor to YES, then press the ENTER key.**
   All the data has been deleted when the indicator appears along with the message "No data exists".



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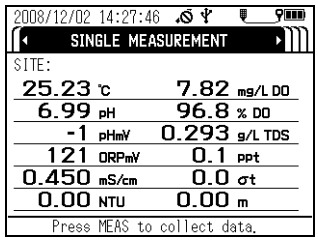
3.5.3 Checking the data memory

You can check the used data capacity and the remaining data capacity.

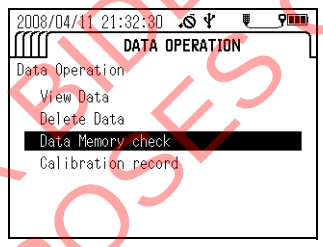
1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.



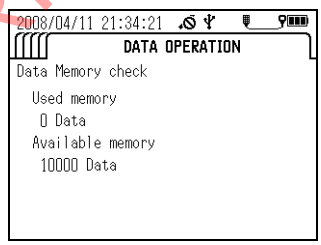
Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

2. **Press the right (▷) key 3 times to display the "DATA OPERATION" screen.**
3. **Press the down (▽) key to move the cursor to "Data Memory Check", then press the ENTER key.**



The amount of memory in use and amount of available memory are displayed.

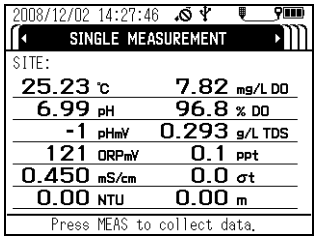


FOR BIDDING PURPOSES ONLY

3.5.4 Checking the calibration record

Follow the steps below to check the latest calibration history.

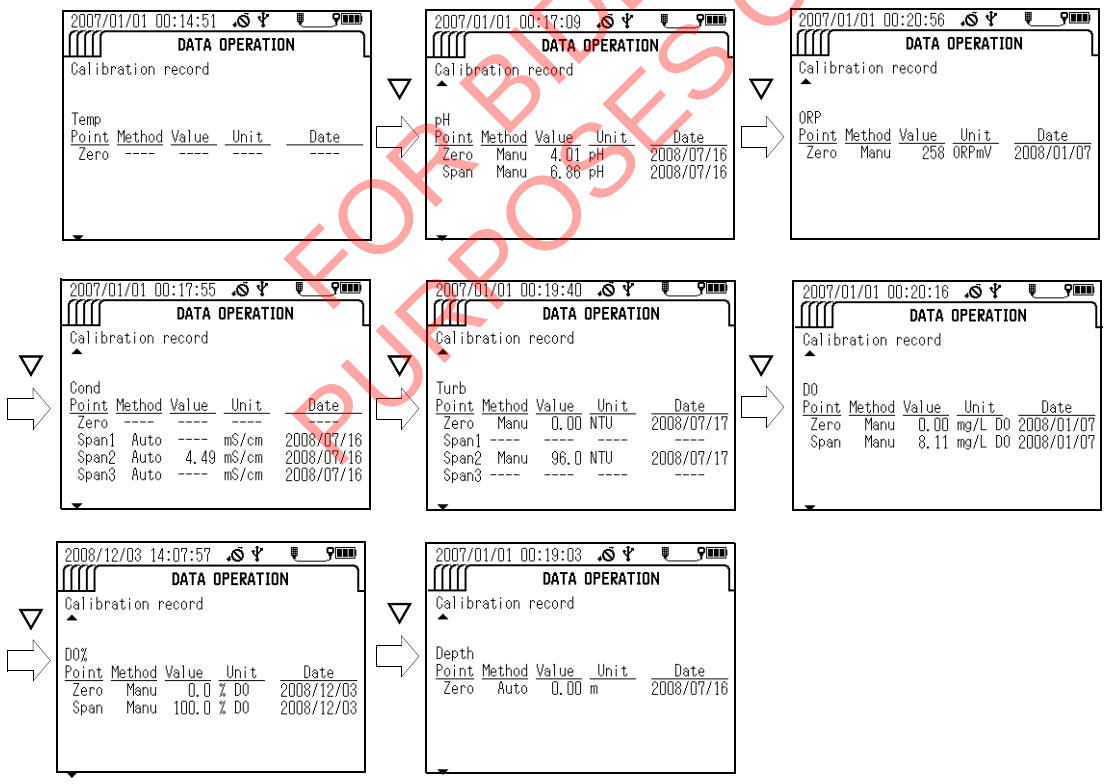
1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.



Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

2. **Press the right (▷) key 3 times to display the "DATA OPERATION" screen.**
3. **Press the down (▽) key to move the cursor to "Calibration record", then press the ENTER key.**
   The latest calibration record is displayed.



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3.5.5 GPS data operations

The menu for GPS data operations appears on the display to which the GPS unit is mounted.

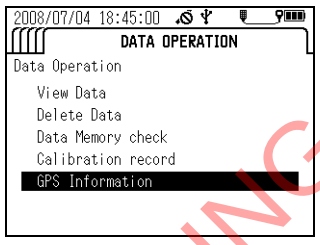
● GPS information

Follow the steps below to display acquired GPS information.

Note

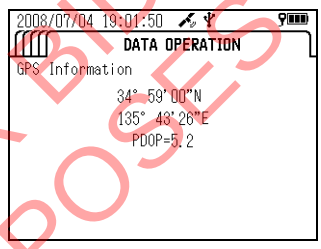
Turning the power OFF erases the GPS information.

1. **Press the right (▷) key to switch the display to the "DATA OPERATION" screen.**
2. **the down (▽) key to move the cursor to "GPS Information", then press the ENTER key.**

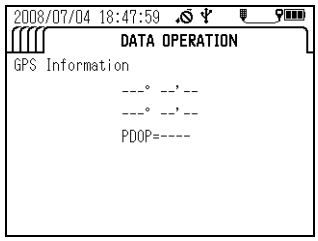


The last GPS information acquired is displayed.

● When received data exists



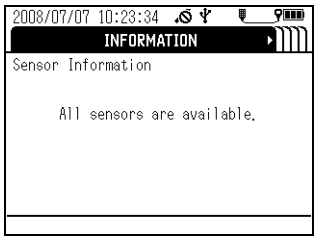
● When no received data exists



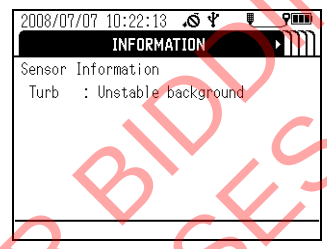
FOR BIDDING PURPOSES ONLY

3.6 Sensor information

1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON.**
   The "MEASUREMENT" screen appears after about 10 seconds.
2. **Press the left (◁) key once to display the "INFORMATION" screen.**
   The "Sensor Information" screen displays the sensor probe's status.
   - When the sensor probe is normal, the display below appears.



   - When there is a sensor probe problem, individual measurement parameters generate messages such as the one shown below. Follow the troubleshooting information to remove the problem before continuing to operate the system.

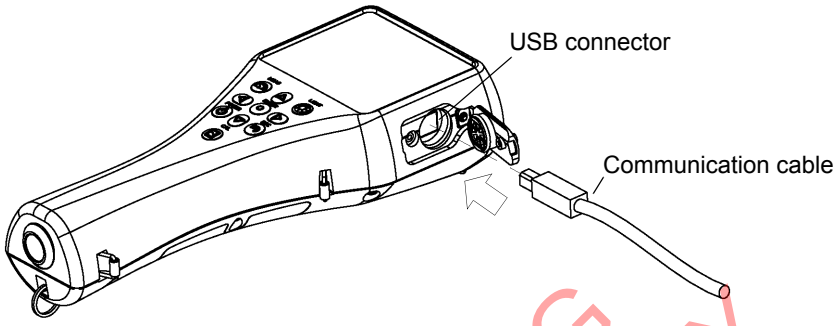


FOR BIDDING PURPOSES ONLY

3.7 USB communication

The separately-sold, dedicated PC connection cable comes with data collection software. This software allows data to be downloaded from the control unit in CSV format.
This section contains instructions for communication commands used for USB communication.

● Connecting the cable



Dedicated cable
Part name: Communication cable (with data collection software)
Part no.: 3200174823

● Cautions when using USB communication

Take care to observe the following when using USB communication.

- Use the dedicated cable (with data collection software) or a commercially-available USB cable (A-B type) to connect to a PC.
- Be sure to match the transmission format on the control unit and the computer.
  The control unit uses the following transmission format:

Baud rate:	19200 bps
Number of stop bits:	1 bit
Data bit length:	8 bits
Parity:	None
Flow control:	None

Tip

If the transmission formats do not match, a communication error occurs and USB communication will not function normally. After changing the transmission format, restart the control unit and the computer.

- If received data is not sent back or an error occurs after a data request has been sent, adjust the program configuration so that it allows a little waiting time before a data request is sent again. This will enable more stable communication.
- The unit does not use DCD, CTS, or DSR signals. Take care of this when creating programs.

3.7.1 Communication settings

Baud rate:	19200 bps
Number of stop bits:	1 bit
Data bit length:	8 bits
Parity:	None
Flow control:	None

FOR BIDDING PURPOSES ONLY

3.7.2 Commands

● Instant data requests

● Request command format

#	RD	@	XX	[CR]	[LF]
1	2	3	4		

1	Header	1 character
2	Command	2 characters
3	Delimiter character	1 character
4	Frame check sequence (FCS)	2 characters

The two ASCII-code characters created by converting the 8 bits of data created by successively combining the value of each character from # through @ in an exclusive OR (XOR) operation with the value of the next character.

Example: #RD@

(1)	0	XOR	35	(ASCII code of # symbol)	⇒	35
(2)	35	XOR	82	(ASCII code of R)	⇒	113
(3)	113	XOR	68	(ASCII code of D)	⇒	53
(4)	53	XOR	64	(ASCII code of @ symbol)	⇒	117 (decimal) ↓ 75 (hex) ↓ Sets "75".

Example: 35 XOR 82 operation

35 in binary	⇒	0	0	1	0	0	0	1	1	
82 in binary	⇒	0	1	0	1	0	0	1	0	
XOR result		0	1	1	1	0	0	0	1	⇒ 113 (decimal)

Note: Set "XX" if you do not want to test for communication frame errors with FCS.

● Response format

#	RD	AAAAAAAAAAAAAAAAAAAA	X	X	XXXX	XX	X	X	XXXXX	X
1	2	3	4	5	6	7	8	9	10	11

XX	X	X	XXXXX	X	XX	X	X	XXXXX	X	XX	X	X	XXXXX	X
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

XX	X	X	XXXXX	X	XX	X	X	XXXXX	X	XX	X	X	XXXXX	X
27	28	29	30	31	32	33	34	35	36	37	38	39	40	41

XX	X	X	XXXXX	X	XX	X	X	XXXXX	X	XX	X	X	XXXXX	X
42	43	44	45	46	47	48	49	50	51	52	53	54	55	56

FOR BIDDING PURPOSES ONLY

XX	X	X	XXXXX	X	XX	X	X	XXXXX	X	XX	X	X	XXXXX	X
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71

XX	XX	XX	XX	XX	XX	XX	XX	XX	X	X	XXX	XX	XX	X	X	@	XX	[CR]	[LF]
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89		

1	Header		1 character
2	Command		2 characters
3	Site name	Upper- and lowercase letters, numbers, periods (.) hyphens (-) and spaces ( )	20 characters
4	Probe status	(3) Status code	1 character
5	Probe error	(4) Status error code	1 character
6	Unused		4 characters
7	Parameter 1 code	(1) Parameter code	2 characters
8	Parameter 1 status	(5) Parameter status code	1 character
9	Parameter 1 error	(6) Parameter error code	1 character
10	Parameter 1 data	5 characters including decimal point, right-justified with blanks filled	5 characters
11	Parameter 1 unit	(2) Unit code	1 character
12	Parameter 2 code	(1) Parameter code	2 characters
13	Parameter 2 status	(5) Parameter status code	1 character
14	Parameter 2 error	(6) Parameter error code	1 character
15	Parameter 2 data	5 characters including decimal point, right-justified with blanks filled	5 characters
16	Parameter 2 unit	(2) Unit code	1 character
17	Parameter 3 code	(1) Parameter code	2 characters
18	Parameter 3 status	(5) Parameter status code	1 character
19	Parameter 3 error	(6) Parameter error code	1 character
20	Parameter 3 data	5 characters including decimal point, right-justified with blanks filled	5 characters
21	Parameter 3 unit	(2) Unit code	1 character
22	Parameter 4 code	(1) Parameter code	2 characters
23	Parameter 4 status	(5) Parameter status code	1 character
24	Parameter 4 error	(6) Parameter error code	1 character
25	Parameter 4 data	5 characters including decimal point, right-justified with blanks filled	5 characters
26	Parameter 4 unit	(2) Unit code	1 character
27	Parameter 5 code	(1) Parameter code	2 characters
28	Parameter 5 status	(5) Parameter status code	1 character
29	Parameter 5 error	(6) Parameter error code	1 character
30	Parameter 5 data	5 characters including decimal point, right-justified with blanks filled	5 characters
31	Parameter 5 unit	(2) Unit code	1 character
32	Parameter 6 code	(1) Parameter code	2 characters
33	Parameter 6 status	(5) Parameter status code	1 character
34	Parameter 6 error	(6) Parameter error code	1 character

FOR BIDDING PURPOSES ONLY

35	Parameter 6 data	5 characters including decimal point, right-justified with blanks filled	5 characters
36	Parameter 6 unit	(2) Unit code	1 character
37	Parameter 7 code	(1) Parameter code	2 characters
38	Parameter 7 status	(5) Parameter status code	1 character
39	Parameter 7 error	(6) Parameter error code	1 character
40	Parameter 7 data	5 characters including decimal point, right-justified with blanks filled	5 characters
41	Parameter 7 unit	(2) Unit code	1 character
42	Parameter 8 code	(1) Parameter code	2 characters
43	Parameter 8 status	(5) Parameter status code	1 character
44	Parameter 8 error	(6) Parameter error code	1 character
45	Parameter 8 data	5 characters including decimal point, right-justified with blanks filled	5 characters
46	Parameter 8 unit	(2) Unit code	1 character
47	Parameter 9 code	(1) Parameter code	2 characters
48	Parameter 9 status	(5) Parameter status code	1 character
49	Parameter 9 error	(6) Parameter error code	1 character
50	Parameter 9 data	5 characters including decimal point, right-justified with blanks filled	5 characters
51	Parameter 9 unit	(2) Unit code	1 character
52	Parameter 10 code	(1) Parameter code	2 characters
53	Parameter 10 status	(5) Parameter status code	1 character
54	Parameter 10 error	(6) Parameter error code	1 character
55	Parameter 10 data	5 characters including decimal point, right-justified with blanks filled	5 characters
56	Parameter 10 unit	(2) Unit code	1 character
57	Parameter 11 code	(1) Parameter code	2 characters
58	Parameter 11 status	(5) Parameter status code	1 character
59	Parameter 11 error	(6) Parameter error code	1 character
60	Parameter 11 data	5 characters including decimal point, right-justified with blanks filled	5 characters
61	Parameter 11 unit	(2) Unit code	1 character
62	Parameter 12 code	(1) Parameter code	2 characters
63	Parameter 12 status	(5) Parameter status code	1 character
64	Parameter 12 error	(6) Parameter error code	1 character
65	Parameter 12 data	5 characters including decimal point, right-justified with blanks filled	5 characters
66	Parameter 12 unit	(2) Unit code (6) Parameter error code	1 character
67	Parameter 13 code	(1) Parameter code	2 characters
68	Parameter 13 status	(5) Parameter status code	1 character
69	Parameter 13 error	(6) Parameter error code	1 character
70	Parameter 13 data	5 characters including decimal point, right-justified with blanks filled	5 characters
71	Parameter 13 unit	(2) Unit code	1 character
72	Year	00 to 99	2 characters

FOR BIDDING PURPOSES ONLY

73	Month	01 to 12	2 characters
74	Day	01 to 31	2 characters
75	Hour	00 to 23	2 characters
76	Minute	00 to 59	2 characters
77	Second	00 to 59	2 characters
78	Longitude (degrees)	00 to 90 or "--" (no GPS data)	2 characters
79	Longitude (minutes)	00 to 59 or "--" (no GPS data)	2 characters
80	Longitude (seconds)	00 to 59 or "--" (no GPS data)	2 characters
81	Unused	1 character	1 character
82	North latitude/South latitude	N: North; S: South	1 character
83	Latitude (degrees)	000 to 180 or "---" (no GPS data)	3 characters
84	Latitude (minutes)	00 to 59 or "--" (no GPS data)	2 characters
85	Latitude (seconds)	00 to 59 or "--" (no GPS data)	2 characters
86	Unused		1 character
87	East longitude/West longitude	E: East; W: West	1 character
88	Delimiter character		1 character
89	Frame check sequence (FCS)		2 characters

● Memory data requests

● Request command format

#	RM	X	X	AAAAAAAAAAAAAAAAAAAA	XX	XX	XX	@	XX	[CR]	[LF]
1	2	3	4	5	6	7	8	9	10		

1	Header		1 character
2	Command		2 characters
3	Data specification*1	0: Start search; 1: Next data item; 2: Previous data item; 3: Request same data again	1 character
4	Search method specification	0: All data; 1: Site search; 2: Date search	1 character
5	Search site*2	Upper- and lowercase letters, numbers, periods (.) hyphens (-) and spaces ( )	20 characters
6	Search year*3	00 to 99	2 characters
7	Search month*3	01 to 12	2 characters
8	Search day*3	01 to 31	2 characters
9	Delimiter character		1 character
10	Frame check sequence (FCS)		2 characters

*1: When sending the RM command, first send 0 [Start search], then 1 [Next data item], 2 [Previous data item] or 3 [Request same data again].

*2: [Search site] is only needed when [Site search] is specified as the search method. If another search method is specified, fill this field with spaces.

*3: [Search year], [Search month] and [Search day] are only needed when [Date search] is specified as the search method. If another search method is specified, fill this field with spaces.

FOR BIDDING PURPOSES ONLY

● **Response format**

(when data exists)

```
#   RM  AAAAAAAAAAAAAAAAAAAA  XX  X   X   XXXXX  X
1   2   3                     4   5   6   7      8

XX  X   X   XXXXX  X   XX  X   X   XXXXX  X   XX  X   X   XXXXX  X
9   10  11  12     13  14  15  16  17     18  19  20  21  22     23

XX  X   X   XXXXX  X   XX  X   X   XXXXX  X   XX  X   X   XXXXX  X
24  25  26  27     28  29  30  31  32     33  34  35  36  37     38

XX  X   X   XXXXX  X   XX  X   X   XXXXX  X   XX  X   X   XXXXX  X
39  40  41  42     43  44  45  46  47     48  49  50  51  52     53

XX  X   X   XXXXX  X   XX  X   X   XXXXX  X   XX  X   X   XXXXX  X
54  55  56  57     58  59  60  61  62     63  64  65  66  67     68

XX  XX  XX  XX  XX  XX  XX  XX  XX  X   X   XXX  XX  XX  X   X   @   XX  [CR]  [LF]
69  70  71  72  73  74  75  76  77  78  79  80   81  82  83  84  85  86
```

1	Header		1 character
2	Command		2 characters
3	Site name	Upper- and lowercase letters, numbers, periods (.) hyphens (-) and spaces ( )	20 characters
4	Parameter 1 code	(1) Parameter code	2 characters
5	Parameter 1 selection	0: No selection; 1: Selection made	1 character
6	Parameter 1 error	(6) Parameter error code	1 character
7	Parameter 1 data	5 characters including decimal point, right-justified with blanks filled	5 characters
8	Parameter 1 unit	(2) Unit code	1 character
9	Parameter 2 code	(1) Parameter code	2 characters
10	Parameter 2 selection	0: No selection; 1: Selection made	1 character
11	Parameter 2 error	(6) Parameter error code	1 character
12	Parameter 2 data	5 characters including decimal point, right-justified with blanks filled	5 characters
13	Parameter 2 unit	(2) Unit code	1 character
14	Parameter 3 code	(1) Parameter code	2 characters
15	Parameter 3 selection	0: No selection; 1: Selection made	1 character
16	Parameter 3 error	(6) Parameter error code	1 character
17	Parameter 3 data	5 characters including decimal point, right-justified with blanks filled	5 characters
18	Parameter 3 unit	(2) Unit code	1 character
19	Parameter 4 code	(1) Parameter code	2 characters
20	Parameter 4 selection	0: No selection; 1: Selection made	1 character

FOR BIDDING PURPOSES ONLY

21	Parameter 4 error	(6) Parameter error code	1 character
22	Parameter 4 data	5 characters including decimal point, right-justified with blanks filled	5 characters
23	Parameter 4 unit	(2) Unit code	1 character
24	Parameter 5 code	(1) Parameter code	2 characters
25	Parameter 5 selection	0: No selection; 1: Selection made	1 character
26	Parameter 5 error	(6) Parameter error code	1 character
27	Parameter 5 data	5 characters including decimal point, right-justified with blanks filled	5 characters
28	Parameter 5 unit	(2) Unit code	1 character
29	Parameter 6 code	(1) Parameter code	2 characters
30	Parameter 6 selection	0: No selection; 1: Selection made	1 character
31	Parameter 6 error	(6) Parameter error code	1 character
32	Parameter 6 data	5 characters including decimal point, right-justified with blanks filled	5 characters
33	Parameter 6 unit	(2) Unit code	1 character
34	Parameter 7 code	(1) Parameter code	2 characters
35	Parameter 7 selection	0: No selection; 1: Selection made	1 character
36	Parameter 7 error	(6) Parameter error code	1 character
37	Parameter 7 data	5 characters including decimal point, right-justified with blanks filled	5 characters
38	Parameter 7 unit	(2) Unit code	1 character
39	Parameter 8 code	(1) Parameter code	2 characters
40	Parameter 8 selection	0: No selection; 1: Selection made	1 character
41	Parameter 8 error	(6) Parameter error code	1 character
42	Parameter 8 data	5 characters including decimal point, right-justified with blanks filled	5 characters
43	Parameter 8 unit	(2) Unit code	1 character
44	Parameter 9 code	(1) Parameter code	2 characters
45	Parameter 9 selection	0: No selection; 1: Selection made	1 character
46	Parameter 9 error	(6) Parameter error code	1 character
47	Parameter 9 data	5 characters including decimal point, right-justified with blanks filled	5 characters
48	Parameter 9 unit	(2) Unit code	1 character
49	Parameter 10 code	(1) Parameter code	2 characters
50	Parameter 10 selection	0: No selection; 1: Selection made	1 character
51	Parameter 10 error	(6) Parameter error code	1 character
52	Parameter 10 data	5 characters including decimal point, right-justified with blanks filled	5 characters
53	Parameter 10 unit	(2) Unit code	1 character
54	Parameter 11 code	(1) Parameter code	2 characters
55	Parameter 11 selection	0: No selection; 1: Selection made	1 character
56	Parameter 11 error	(6) Parameter error code	1 character
57	Parameter 11 data	5 characters including decimal point, right-justified with blanks filled	5 characters
58	Parameter 11 unit	(2) Unit code	1 character
59	Parameter 12 code	(1) Parameter code	2 characters

FOR BIDDING PURPOSES ONLY

60	Parameter 12 selection	0: No selection; 1: Selection made	1 character
61	Parameter 12 error	(6) Parameter error code	1 character
62	Parameter 12 data	5 characters including decimal point, right-justified with blanks filled	5 characters
63	Parameter 12 unit	(2) Unit code	1 character
64	Parameter 13 code	(1) Parameter code	2 characters
65	Parameter 13 selection	0: No selection; 1: Selection made	1 character
66	Parameter 13 error	(6) Parameter error code	1 character
67	Parameter 13 data	5 characters including decimal point, right-justified with blanks filled	5 characters
68	Parameter 13 unit	(2) Unit code	1 character
69	Year	00 to 99	2 characters
70	Month	01 to 12	2 characters
71	Day	01 to 31	2 characters
72	Hour	00 to 23	2 characters
73	Minute	00 to 59	2 characters
74	Second	00 to 5	2 characters
75	Longitude (degrees)	00 to 90 or "--" (no GPS data)	2 characters
76	Longitude (minutes)	00 to 59 or "--" (no GPS data)	2 characters
77	Longitude (seconds)	00 to 59 or "--" (no GPS data)	2 characters
78	Unused		1 character
79	North latitude/South latitude	N: North; S: South	1 character
80	Latitude (degrees)	000 to 180 or "---" (no GPS data)	3 characters
81	Latitude (minutes)	00 to 59 or "--" (no GPS data)	2 characters
82	Latitude (seconds)	00 to 59 or "--" (no GPS data)	2 characters
83	Unused		1 character
84	East longitude/West longitude	E: East; W: West	1 character
85	Delimiter character		1 character
86	Frame check sequence (FCS)		2 characters

FOR BIDDING PURPOSES ONLY

When no data exists, or memory is at capacity)

#	RM	@	XX	[CR]	[LF]
1	2	3	4		

1	Header	1 character
2	Command	2 characters
3	Delimiter character\	1 character
4	Frame check sequence (FCS)	2 characters

● Memory data count request

● Request command format

#	RN	@	XX	[CR]	[LF]
1	2	3	4		

1	Header	1 character
2	Command	2 characters
3	Delimiter character\	1 character
4	Frame check sequence (FCS)	2 characters

● Response format

#	RN	XXXXX	@	XX	[CR]	[LF]
1	2	3	4	5		

1	Header		1 character
2	Command		2 characters
3	Total data count	0 to 10000	5 characters
4	Delimiter character\		1 character
5	Frame check sequence (FCS)		2 characters

● Command parse failure response

#	??	X	XX	X	@	XX	[CR]	[LF]
1	2	3	4	5	6	7		

1	Header	1 character
2	Command	2 characters
3	Command parse failure reason*4	1 character
4	Received command*5	2 characters
5	(3) Status code for probe status*5	1 character
6	Delimiter character	1 character
7	Frame check sequence (FCS)	2 characters

*4: List of command parse failure reasons

1: Frame length error
2: FCS mismatch
3: Undefined command
4: Data error
5: Data out of range
6: No "@" delimiter character
7: No "#" header character
8: No [Carriage return] + [Line feed] footer
9: Cannot accept command in this timing.

*5: Only set for command parse failure reason 9, [Cannot accept command in this timing]. Otherwise this field is filled with spaces.

FOR BIDDING PURPOSES ONLY

4 Maintenance

Tip

HORIBA recommends regular manufacturer maintenance checks in order to ensure a long product life.

4.1 Routine care

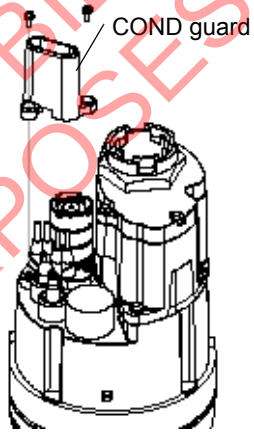
● **After measurement**

1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power OFF.**

Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

2. **Remove the sensor guard, and clean the sensor with tap water.**
3. **Clean the turbidity sensor with the cleaning brush provided.**
4. **Remove the two screws securing the COND guard, and the COND guard itself, and use a test tube brush to gently remove any dirt from the electrical conductivity electrode.**



5. **Wipe off any dirt with a soft cloth. If parts are very dirty, clean them with neutral detergent, then rinse them. If parts are contaminated by oil, wipe it off with a soft cloth soaked in alcohol.**
6. **Put the COND guard back in place.**
7. **Remove the sensor guard's guard cap, wash off any dirt with tap water, then put the guard cap back in place.**

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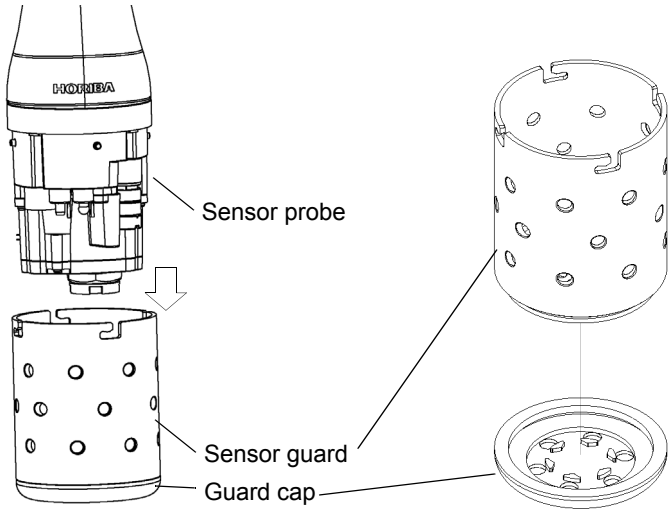


4.2 Every 2 months maintenance

● Dissolved oxygen (DO) sensor

Note

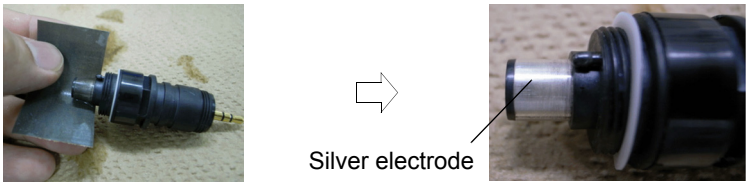
- **The DO sensor's internal solution is potassium chloride (KCl). Although KCl is harmless, protective equipment such as gloves and goggles should be worn when working with it.**
- **Internal solution can be disposed of down a sink.**

- Replace the membrane cap.
- Polish the gold and silver electrodes when replacing the membrane cap.
  The gold electrode does not need to be polished if it is not dirty.

FOR BIDDING PURPOSES ONLY

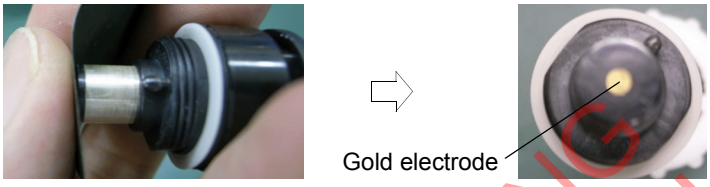
● **Silver electrode**

Polish a silver electrode part with sandpaper (#500) and then wash metal electrode parts with water.



● **Gold electrode**

Polish a gold electrode part with sandpaper (#8000) and then wash metal electrode parts with water.



Replace a membrane cap after clean metal electrodes parts.
Refer to “ 4.5 Replacing the membrane cap ” (page 87).

● **Reference electrode**

Note

- **The pH reference internal solution is potassium chloride (KCl). Although KCl is harmless, protective equipment such as gloves and goggles should be worn when working with it.**
- **Internal solution can be disposed of down a sink.**

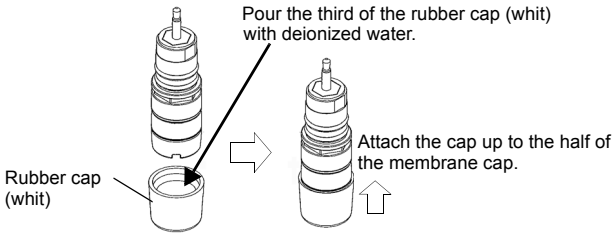
1. **Remove the rubber liquid junction plug from the reference electrode and dispose of the internal solution.**
2. **To prevent air entering, fill the reference electrode to the brim with its internal solution (No. 330).**
3. **Put the rubber liquid junction plug back in place.**
   If the rubber liquid junction plug is dirty, replace the liquid junctions (set of two; No. 9037005100). The reference electrode's internal solution will spill when replacing the liquid junctions. Rinse parts with tap water and dry them with a soft cloth.

FOR BIDDING PURPOSES ONLY

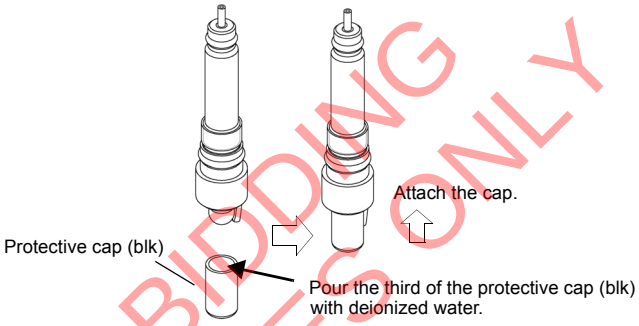
4.3 Storage

● Short-term (under 2 months) storage

- Before storing the DO sensor, pour the third of the rubber cap (whit) provided with deionized water and cover the DO sensor with them.



- Before storing the pH sensor, pour the third of the protective cap (blk) provided with deionized water and cover the pH sensor with them.



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Note

Before measuerment, remove the rubber cap (whit) and the protective cap (blk).

● Long-term (2 months or more) storage

- Remove a membrane cap from DO sensor, and wash the gold electrode and silver electrode parts with water. Wipe off the moisture before storing DO sensor in the pack.
- Prevent internal solution seeping out of the reference chip by taping over the point of seepage with electrical tape.
- Before storing the system, remove the control unit's batteries to prevent battery leakage.

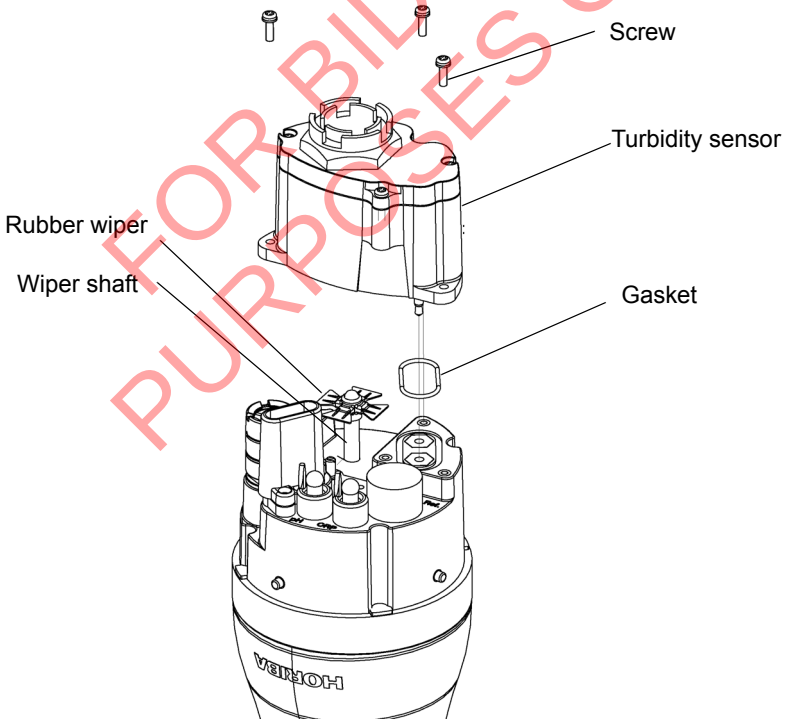
4.4 Replacing the turbidity sensor

1. **Press and hold down the control unit's POWER key for about 3 seconds to turn the power OFF.**

Note

The operation keys are designed to operate using the pad of a finger, sharp objects can tear the control unit cover damaging the operation keys.

2. **Remove the sensor guard, and clean the sensor probe with tap water.**
3. **Use dry air to blow away and dry off any moisture.**
4. **Remove the three screws holding the turbidity sensor by using No. 2 Phillips head screwdriver.**
5. **Pull out the turbidity sensor horizontally.**
6. **Remove the rubber wiper and gasket, and use a soft cloth to wipe off any dirt from the wiper shaft and turbidity sensor attachment. If parts are very dirty, use a soft cloth soaked in neutral detergent or alcohol.**
7. **Replace the rubber wiper and gasket with new ones. Coat the gasket with a thin layer of grease (No. 3014017718).**
8. **Attach the new turbidity sensor and fasten it in place with the three screws.**
9. **Perform four-point calibration before using the sensor.**



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4.5 Replacing the membrane cap

● Replacement procedure

1. **Prepare the DO sensor.**

- Take a DO sensor out of pack (newly purchasing).
- Remove a DO sensor from the sensor probe (after use).



Newly purchasing



Undo a DO sensor from the sensor probe

- Twist a membrane cap from DO sensor.
- Wash the gold electrode and silver electrode parts with water.

2. **Replace the silicone gasket with a new one.**



3. **Pour internal solution into a membrane cap with a dropper.**

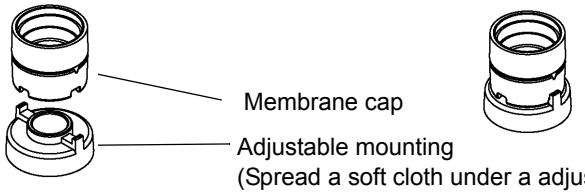


- Check air bubbles in a membrane cap.



Pick a Cap up and drop it down, if there is air bubbles in internal solution of it.

4. **Set up a membrane cap on a adjustable mounting.**



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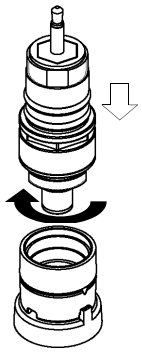
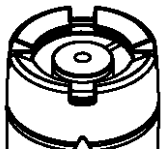
5. Attach a membrane cap to DO sensor



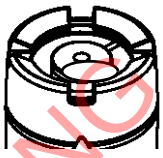
Twist a DO sensor
with holding a membrane cap tight.

6. Check for membrane surface

Check air bubbles in a membrane cap.



Good: Limited air bubbles



NG: Air bubbles of more than 5 mm in diameter

- NG → Replace a membrane cap again.
- Check that span calibration can be performed.

If the membrane cap is not attached correctly, sensitivity may be lost or response speed may decrease.

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4.6 Troubleshooting

Note

If the sensor probe is removed while the control unit is indicating an error, errors cannot be canceled by using the ESC key. Either reconnect the sensor probe or restart the control unit.

4.6.1 Error displays

Error	Cause	Solution
Probe ADC error	Internal IC failure	Contact your nearest sales outlet to have the sensor probe repaired.
Probe EEPROM error/Factory	Internal IC failure	Turn the power OFF, then restart the system. If the error persists, initialize the system from the "System" menu. If the error still persists, contact your nearest sales outlet to have the sensor probe repaired.
Probe EEPROM error/User	Internal IC failure	Turn the power OFF, then restart the system. If the error persists, initialize the system from the "System" menu. If the error still persists, contact your nearest sales outlet to have the sensor probe repaired.
Turbidity sensor light source error	Turbidity sensor light source failure	Turn the power OFF, wipe off any water droplets on the probe, then remove the turbidity sensor. Check there are no water droplets around the turbidity sensor connector, then mount the sensor again. If the error persists, replace the turbidity sensor.
Turbidity sensor wiper motor error	The turbidity sensor wiper is not operating.	Press the ESC key. Check there are no obstacles near the wiper, then perform the measurement again. If the error persists, the motor will need to be replaced. Contact your nearest sales outlet to have the sensor probe repaired.
Probe capacitor error	Low battery voltage or internal IC failure	Turn the power OFF. Replace the display's batteries. If the error persists, contact your nearest sales outlet to have the sensor probe repaired.
Probe EEPROM error	Internal IC failure	Press the ESC key, then redo the operation. If the error persists, turn the power OFF, then restart the system (the current data will not be saved). If the error still persists, contact your nearest sales outlet to have the display repaired.
Probe board error	Probe board failure	Turn the power OFF. Contact your nearest sales outlet to have the sensor probe repaired.

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Error	Cause	Solution
Zero-point calibration error	pH sensor 1. The pH standard solution is contaminated. 2. The pH-responsive membrane is dirty. 3. The concentration of the reference electrode's internal solution has changed. 4. The pH-responsive membrane is torn.	pH sensor 1. Replace the standard solution with new solution. 2. Clean the pH-responsive membrane. 3. Refil the reference electrode's internal solution. 4. Replace the sensor.
	COND sensor 1. There is moisture on the sensor. 2. The sensor is dirty. 3. The COND sensor is broken.	COND sensor 1. Blow-dry the moisture off the sensor. 2. Clean the sensor. 3. Contact your nearest sales outlet.
	TURB sensor 1. There are air bubbles on the cell. 2. The cell window is dirty. 3. The sensor is being affected by ambient light. 4. The solution is dirty. 5. The TURB sensor has failed.	TURB sensor 1. Shake the sensor probe vigorously. 2. Clean the cell window. 3. Calibrate using the calibration cup provided. 4. Replace the solution with new solution. 5. Replace the TURB sensor.
	DO sensor 1. There are air bubbles in the internal solution. 2. The DO sensor has failed.	DO sensor 1. Replace the diaphragm with a new one, and fill the DO sensor with new internal solution. 2. Replace the DO sensor.
	Water depth sensor 1. The water depth sensor is dirty. 2. The water depth sensor has failed.	Water depth sensor 1. Clean the water depth sensor. 2. Contact your nearest sales outlet.

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Error	Cause	Solution
Span calibration error	pH sensor 1. The pH standard solution is contaminated. 2. The pH-responsive membrane is dirty. 3. The concentration of the reference electrode's internal solution has changed. 4. The pH-responsive membrane is torn.	pH sensor 1. Replace the standard solution with new solution. 2. Clean the pH-responsive membrane. 3. Refil the reference electrode's internal solution. 4. Replace the sensor.
	ORP sensor 1. The ORP standard solution is contaminated. 2. The ORP electrode is dirty. 3. The concentration of the reference electrode's internal solution has changed. 4. The ORP electrode has failed.	ORP sensor 1. Replace the standard solution with new solution. 2. Clean the ORP electrode. 3. Refil the reference electrode's internal solution. 4. Replace the ORP electrode.
	COND sensor 1. The calibration solution is not correct. 2. The sensor is dirty. 3. The COND sensor has failed.	COND sensor 1. Use the correct calibration solution for calibration. 2. Clean the sensor. 3. Contact your nearest sales outlet.
	TURB sensor 1. There are air bubbles on the cell. 2. The cell window is dirty. 3. The sensor is being affected by ambient light. 4. The solution is dirty. 5. The TURB sensor has failed.	TURB sensor 1. Shake the sensor probe vigorously. 2. Clean the cell window. 3. Calibrate using the calibration cup provided. 4. Replace the solution with new solution. 5. Replace the TURB sensor.
	DO sensor 1. The diaphragm is torn. 2. There are air bubbles in the internal solution. 3. The DO sensor has failed.	DO sensor 1. Replace the diaphragm with a new one, and fill the DO sensor with new internal solution. 2. Replace the diaphragm with a new one, and fill the DO sensor with new internal solution. 3. Replace the DO sensor.
	Temperature sensor The temperature sensor has failed.	Temperature sensor Contact your nearest sales outlet.
Calibration stability error	The calibration value of an individual parameter is not stable. 1. The sensor is dirty. 2. The sensor has not adjusted to the standard solution. 3. The temperature was unstable during calibration.	1. Clean the sensor. 2. Fill the transparent calibration cup with pH 4 standard solution, and wait for at least 20 minutes of conditioning before starting calibration. 3. Start calibration after the temperature has stabilized.
Turbidity calibration error	Error in turbidity measurement sequence	Turbidity calibration failed. Redo calibration after removing the displayed error.
Wet check	The cable connector is submerged.	Turn the power OFF and disconnect the cable connector. Wipe or blow-dry off all the water droplets on the probe. If the error persists, contact your nearest sales outlet to have the display and sensor probe repaired.
Power voltage error	The display's power board has failed.	This error could also be caused by poor cable contact. Turn the power OFF and disconnect the cable connector. Reconnect the connector and turn the power ON. If the error persists, contact your nearest sales outlet to have the display and sensor probe repaired.
Turbidity lamp power voltage error	The remaining battery level is low.	Turn the power OFF and replace the display's batteries with new ones.

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Error	Cause	Solution
Display RTC error	The time display is incorrect.	Replace the coin battery.
Display FROM error	Internal IC failure	Contact your nearest sales outlet to have the control unit repaired.
Display EEPROM error	Internal IC failure	Contact your nearest sales outlet to have the control unit repaired.
Display save error	Insufficient memory space	Move data from the display, use the data operations screen to delete data, then redo the measurement.
Measurement sequence error	● When the measurement item is turbidity 1. The battery power is low. 2. The wiper is not operating normally. 3. The light source lamp is not lit. ● If items other than turbidity are also displayed 4. Board failure	1. Replace the batteries with new ones. 2. Check there are no obstacles near the wiper, then redo the measurement. If the error persists, the motor will need to be replaced. Contact your nearest sales outlet to have the sensor probe repaired. 3. Wipe off any water droplets on the probe, then remove the turbidity sensor. Check there are no water droplets around the turbidity sensor connector, then mount the sensor again. If the error persists, replace the turbidity sensor. 4. Contact your nearest sales outlet to have the sensor probe repaired.
Out of measurement range	The attempted measurement is outside the measurement range supported for that item.	The system must be used within its supported measurement ranges.
Last zero-point calibration invalid	pH sensor 1. The pH standard solution is contaminated. 2. The pH-responsive membrane is dirty. 3. The concentration of the reference electrode's internal solution has changed. 4. The pH-responsive membrane is torn.	pH sensor 1. Replace the standard solution with new solution. 2. Clean the pH-responsive membrane. 3. Refil the reference electrode's internal solution. 4. Replace the sensor.
	COND sensor 1. There is moisture on the sensor. 2. The sensor is dirty. 3. The COND sensor has failed.	COND sensor 1. Blow-dry the moisture off the sensor. 2. Clean the sensor. 3. Contact your nearest sales outlet.
	TURB sensor 1. There are air bubbles on the cell. 2. The cell window is dirty. 3. The sensor is being affected by ambient light. 4. The solution is dirty. 5. The TURB sensor has failed.	TURB sensor 1. Shake the sensor probe vigorously. 2. Clean the cell window. 3. Calibrate using the calibration cup provided. 4. Replace the solution with new solution. 5. Replace the TURB sensor.
	DO sensor 1. There are air bubbles in the internal solution. 2. The DO sensor has failed.	DO sensor 1. Replace the diaphragm with a new one, and fill the DO sensor with new internal solution. 2. Replace the DO sensor.
	Water depth sensor 1. The water depth sensor is dirty. 2. The water depth sensor has failed.	Water depth sensor 1. Clean the water depth sensor. 2. Contact your nearest sales outlet.
Out of measurement range	[See above.]	[See above.]
Last zero-point calibration invalid		

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Error	Cause	Solution
Last span calibration invalid	pH sensor 1. The pH standard solution is contaminated. 2. The pH-responsive membrane is dirty. 3. The concentration of the reference electrode's internal solution has changed. 4. The pH-responsive membrane is torn.	pH sensor 1. Replace the standard solution with new solution. 2. Clean the pH-responsive membrane. 3. Refil the reference electrode's internal solution. 4. Replace the sensor.
	ORP sensor 1. The ORP standard solution is contaminated. 2. The ORP electrode is dirty. 3. The concentration of the reference electrode's internal solution has changed. 4. The ORP sensor glass is broken.	ORP sensor 1. Replace the standard solution with new solution. 2. Clean the ORP electrode. 3. Refil the reference electrode's internal solution. 4. Replace the sensor.
	COND sensor 1. The calibration solution is not correct. 2. The sensor is dirty. 3. The COND sensor has failed.	COND sensor 1. Use the correct calibration solution for calibration. 2. Clean the sensor. 3. Contact your nearest sales outlet.
	TURB sensor 1. There are air bubbles on the cell. 2. The cell window is dirty. 3. The sensor is being affected by ambient light. 4. The solution is dirty. 5. The TURB sensor has failed.	TURB sensor 1. Shake the sensor probe vigorously. 2. Clean the cell window. 3. Calibrate using the calibration cup provided. 4. Replace the solution with new solution. 5. Replace the TURB sensor.
	DO sensor 1. The diaphragm is torn. 2. There are air bubbles in the internal solution. 3. The DO sensor has failed.	DO sensor 1. Replace the diaphragm with a new one, and fill the DO sensor with new internal solution. 2. Replace the diaphragm with a new one, and fill the DO sensor with new internal solution. 3. Replace the DO sensor.
	Temperature sensor ● The temperature sensor has failed.	Temperature sensor ● Contact your nearest sales outlet.
Out of measurement range Last zero-point calibration invalid	[See above.]	[See above.]
Last span calibration invalid	The calibration value of an individual parameter is not stable. 1. The sensor is dirty. 2. The sensor has not adjusted to the standard solution. 3. The temperature was unstable during calibration.	1. Clean the sensors. 2. Fill the transparent calibration cup with pH 4 standard solution, and wait for at least 20 minutes of conditioning before starting calibration. 3. Start calibration after the temperature has stabilized.
Out of measurement range Last zero-point calibration invalid	[See above.]	[See above.]
Calibration value is factory default value.	Internal IC failure	Turn the power OFF, then restart the system. If the error persists, initialize the system from the "System" menu. If the error still persists, contact your nearest sales outlet to have the sensor probe repaired.

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Error	Cause	Solution
Sample is unstable.	1. The concentration of the sample is unstable. 2. External light disturbance has affected the sensor. 3. Water has entered the turbidity sensor's connector.	1. Use a stirrer to agitate the sample during measurement. 2. Perform measurement away from direct sunlight. 3. Turn the power OFF, wipe off any water droplets on the probe, then remove the turbidity sensor. Check there are no water droplets around the turbidity sensor connector, then mount the sensor again. If the error persists, replace the turbidity sensor.

4.6.2 Error displays in sensor information

Error display	Cause	Solution
Measurement sequence error	Measurement sequence error	Turn the power OFF, then restart the system. If the error persists, have the probe repaired.
Out of measurement range	The measurement value is outside the measurement range.	Samples for measurement must be within the measurement range.
Last calibration invalid	The last calibration failed.	Redo calibration.
Calibration invalid	The calibration value is the factory default value.	Redo calibration.
Background unstable	The U-53 turbidity sensor is exposed to direct light.	Mount the guard cap and sensor guard and perform measurement away from direct sunlight.
	The turbidity value changed rapidly during measurement.	Measure a sample that has stable turbidity.

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5 Specifications

Specification		Basic value	Model				
			U-51	U-52	U-52G	U-53	U-53G
Sensor probe	Measurement temperature range	−10°C to 55°C	✓	✓	✓	✓	✓
	Maximum sensor outer diameter	Approx. 96 mm					
	Sensor length	Approx. 340 mm					
	Cable length	2 m (standard) 10 m/30 m (options)					
	Mass	Approx. 1800 g					
	Auto calibration function	Uses pH 4 standard solution.					
	Measurement depth	30 m max.	✓	✓	✓	✓	✓
	Wet-part materials*3	PPS, glass, SUS316L, SUS304, FKM, PEEK, Q, titanium, FEP membrane, POM					
	Waterproofing standard	IP-68					
Control unit	Outer dimensions (W × D × H)	115 × 66 × 283 mm	✓	✓	–	✓	–
		115 × 66 × 335 mm	–	–	✓	–	✓
	Mass	Approx. 800 g	✓	✓	✓	✓	✓
	LCD	320 × 240 mm graphic LCD (monochrome) with backlight	✓	✓	✓	✓	✓
	Memory data items	10000	✓	✓	✓	✓	✓
	Communication interface	USB peripheral	✓	✓	✓	✓	✓
	Batteries	C-size dry cells (×4)	✓	✓	✓	✓	✓
	Waterproofing standard	IP-67	✓	✓	✓	✓	✓
	GPS unit	● Reception method (12 channel parallel) ● Measurement precision [With PDOP (high precision): 30 m or less (2 drms)]	–	–	✓	–	✓
	Estimated battery life*1	–	70 hours (no backlight)			500 measurements (no backlight)	
	Storage temperature range	−10°C to 60°C	✓	✓	✓	✓	✓
	Ambient temperature range	−5°C to 45°C					

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Specification		Basic value	Model				
			U-51	U-52	U-52G	U-53	U-53G
pH measurement Two calibration	Measurement method	Glass electrode method	✓	✓	✓	✓	✓
	Range	pH 0 to 14					
	Resolution	0.01 pH					
	Precision*2	±0.1 pH					
Dissolved oxygen measurement ● Salinity conversion (0 to 70 PPT, automatic) ● Automatic temperature compensation	Measurement method	Polarographic method	✓	✓	✓	✓	✓
	Film thickness	25 μm					
	Range	0 mg/L to 50.0 mg/L					
	Resolution	0.01 mg/L					
	Precision*2	0 mg/L to 20 mg/L: ±0.2 mg/L 20 mg/L to 50 mg/L: ±0.5 mg/L					
Electrical conductivity measurement ● Auto range ● Automatic temperature conversion (25°C)	Measurement method	Four-AC-electrode method	✓	✓	✓	✓	✓
	Range	0 S/m to 10 S/m (0 mS/cm to 100 mS/cm)					
	Resolution	0.000 mS/cm to 0.999 mS/cm: 0.001 1.00 mS/cm to 9.99 mS/cm: 0.01 10.0 mS/cm to 99.9 mS/cm: 0.1 0.0 mS/m to 99.9 mS/m: 0.1 0.100 S/m to 0.999 S/m: 0.001 1.00 S/m to 9.99 S/m: 0.01					
	Precision*2	1% of full-scale (midpoint of two calibration points)					
Salinity measurement	Measurement method	Electrical conductivity conversion	✓	✓	✓	✓	✓
	Range	0 PPT to 70 PPT (parts per thousand)					
	Resolution	0.1 PPT					
	Precision	±3 PPT					
TDS (total dissolved solid) measurement ● Conversion coefficient setting	Measurement method	Electrical conductivity conversion	✓	✓	✓	✓	✓
	Range	0 g/L to 100 g/L					
	Resolution	0.1% of full-scale					
	Repeatability	±2 g/L					
	Precision	±5 g/L					
Seawater specific gravity measurement ● σt, σ0, σ15 display	Measurement method	Electrical conductivity conversion	✓	✓	✓	✓	✓
	Range	0 σt to 50 σt					
	Resolution	0.1 σt					
	Precision	±5 σt					

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Specification		Basic value	Model				
			U-51	U-52	U-52G	U-53	U-53G
Temperature measurement	Measurement method	Platinum temperature sensor	✓	✓	✓	✓	✓
	Range	−10°C to 55°C					
	Resolution	0.01°C					
	Sensor	Platinum temperature sensor, JIS Class B (0.3 + 0.005 |t|)					
Turbidity measurement	Measurement method		–	LED forward 30° transmission/ scattering method		Tungsten lamp 90° transmission scattering method	
	Range			0 NTU to 800 NTU		0 NTU to 1000 NTU	
	Resolution			0.1 NTU		0.01 NTU	
	Precision*2			±5%of readout or ±1 NTU, whichever is larger		● ±0.5NTU (for 0 NTU to 10 NTU measurement range) ● 3% of readout or 1 NTU, whichever is larger (for 10 NTU to 1000 NTU measurement range)	
	Turbidity sensor wiper			–		✓	
Water depth measurement	Measurement method	Pressure method	–	–	✓	✓	✓
	Range	0 m to 30 m					
	Resolution	0.05 m					
	Precision*2	±0.3 m					
ORP (oxidation reduction potential) measurement	Measurement method	Platinum electrode method	✓	✓	✓	✓	✓
	Range	−2000 ～ +2000 mV					
	Resolution	1 mV					
	Precision*2	±15 mV					

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*1: Battery life is estimated under following conditions.
- Continuous operation
- Using batteries: C-size alkaline dry cells
- Ambient temperature of the control unit: 20°C or more
- Backlight off

*2: The precision is defined by measuring the standard solution in the following cases.
- Turbidity and conductivity: after four point calibration
- pH and DO: after two point calibration
- Water depth and ORP: after one point calibration

*3: Metallic parts are made of stainless steel. Immersing in seawater may erode metallic parts.

6 Reference

6.1 Consumable parts

● Sensor

Name	Model	No.	Description
pH sensor	#7112	3014057312	Standard type pH sensor
pH sensor ToupH	#7113	3200170923	Tough glass type pH sensor
ORP sensor	#7313	3200170920	
DO sensor	#7543	3200170924	
Reference electrode	#7210	3200043582	
R bush unit	—	3200043587	Reference electrode liquid junction
TURB cell U-52	#7800	3200172803	For U-52/U-52G
TURB cell U-53	#7801	3200172800	For U-53/U-53G
Membrane cap	—	3200170194	For DO sensor

● Standard solution and inner solution

Name	Model	No.	Description
pH 4 (For automatic calibration) 500 mL	#100-4	3200043638	Standard solution for auto calibration. Also used for manual pH span calibration.
pH 4 (For automatic calibration) 4 L	#140-4	3200174430	
pH 7 500 mL	#100-7	3200043637	Standard solution for pH zero-point calibration.
pH 9 500 mL	#100-9	3200043636	Standard solution for pH manual span calibration.
Powder for ORP standard solution 10 packs	#160-51	3200043618	For ORP calibration.
Powder for ORP standard solution 10 packs	#160-22	3200043617	
Inner solution for DO sensor, 50 mL	#306	3200170938	Internal solution for DO sensor.
Internal solution for pH, 250 mL	#330	3200043641	Supplementary internal solution for pH reference electrode.

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● Others

Name	Model	No.	Description
Silicone grease	—	3014017718	Silicone grease for coating sensor O-ring.
Sponge brush unit	—	3200169531	Brush for cleaning sensor probe.
O-ring set for reference electrode	—	3200169376	O-rings for reference electrode.
O-ring set for DO sensor	—	3200169426	O-rings for DO sensor.
Rubber cap set for sensor guard	—	3200169428	Rubber caps used between sensor guard and sensor probe.
O-ring set for pH and ORP sensor	—	3200169520	O-rings for pH and ORP sensors.
Wiper unit	—	3200169789	Rubber wiper for U-53/U-53G turbidity sensors.
Protective cap (blk) for pH sensor	—	3200175019	Cap attached to tip of pH sensor for sensor probe storage.
Rubber cap (whit) for DO sensor	—	3200175020	Cap attached to tip of DO sensor for sensor probe storage.

6.2 Options sold separately

Name	Model	No.	Description
Bag	U-5030	3200174772	Storage bag for sensor probes and flow cell. Can be carried in one hand.
Flow cell assy	—	3200156570	Used when collecting measurement samples by pump.
Probe guard	—	3200167002	Used for taking measurements in locations where there is a current or where there is a thick layer of sludge.
Communication cable	—	3200174823	A PC connection cable. Comes with data collection software.

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6.3 pH measurement

6.3.1 Principle of pH measurement

U-50 series use the glass electrode method for pH measurements. The glass electrode method measures a potential difference between the glass film for pH and the reference electrode. For more information, refer to “JIS Z 8802 pH measurement method”.

6.3.2 Temperature compensation

The electromotive force generated by the glass electrode changes depending on the temperature of the solution.

Temperature compensation is used to compensate for the change in electromotive force caused by temperature.

This function does not compensate the change in pH caused by the temperature of the solution. When pH is to be measured, the temperature of the solution must be recorded along with that pH value, even if a pH meter has automatic temperature compensation function. If the solution temperature is not recorded, the results of the pH measurement may be meaningless.

6.3.3 Standard solutions

When measuring pH, the pH meter must be calibrated using standard solution. There are five kinds of standard solutions specified in “JIS Z 8802 pH measurement”. For normal measurement, two of standard solutions with pH of 4, 7, and 9 are sufficient to accurately calibrate the meter.

For standard solutions, refer to “JIS Z 8802 pH measurement”.

pH 4 standard solution: (Phthalate) 0.05 mol/L potassium hydrogen phthalate aqueous solution

pH 7 standard solutio: (Neutral phosphate) 0.025 mol/L potassium dihydrogenphosphate, 0.025 mol/L disodium hydrogenphosphate aqueous solution

pH 9 standard solution: (Borate) 0.01 mol/L sodium tetraborate aqueous solution

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Table 2 pH values of pH standard solutions at various temperatures settings

Temp. (℃)	pH 4 standard solution Phthalate	pH 7 standard solution Neutral phosphate	pH 9 standard solution Borate
0	4.01	6.98	9.46
5	4.01	6.95	9.39
10	4.00	6.92	9.33
15	4.00	6.90	9.27
20	4.00	6.88	9.22
25	4.01	6.86	9.18
30	4.01	6.85	9.14
35	4.02	6.84	9.10
40	4.03	6.84	9.07
45	4.04	6.84	9.04

6.4 DO measurement

6.4.1 Principle of DO measurement

Dissolved oxygen (DO) refers to the amount of oxygen that is contained in water.

The concentration of dissolved oxygen is generally given as mg/L or as a percentage value (the dissolved oxygen saturation ratio).

Dissolved oxygen is essential for maintaining the self-purifying ability of rivers and seas and also for fish to live. The concentration of dissolved oxygen acts as an indicator of water quality. It is often measured when processing waste water and managing water quality. Fig. 1 provides an overview of the principles behind dissolved oxygen sensor measurement.

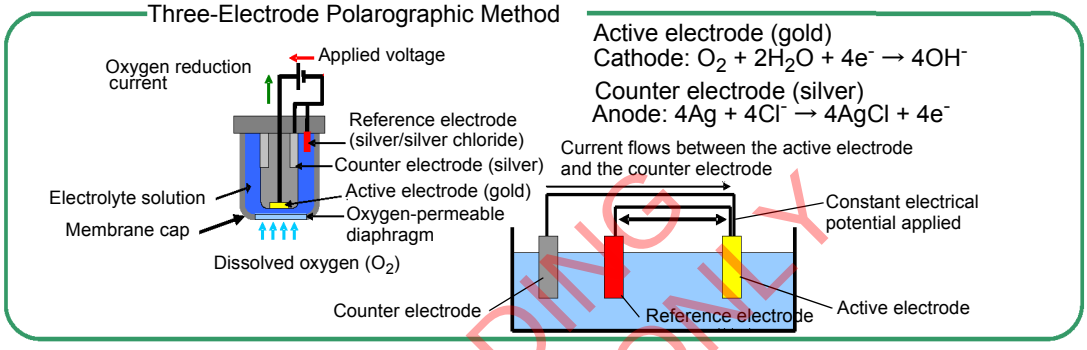

Fig. 1 Overview of principles behind dissolved oxygen sensor

The polarographic oxygen sensor is an enclosed sensor wherein voltage is applied to a cathode made of a precious metal (such as gold or platinum) and an anode also made of a precious metal (such as silver) via an external circuit, and a cap with an oxygen permeable diaphragm (membrane) is filled with electrolyte solution. As indicated in Fig. 1, the concentration of dissolved oxygen can be measured by measuring the current proportional to the amount of reduced oxygen when oxygen that has dispersed through the oxygen permeable diaphragm produces a reductive reaction on the surface of the active electrode (gold). The method of measuring dissolved oxygen based on the above principle is called the Membrane Electrode Method. Compared to the Chemical Analysis Method, which requires complicated pre-processing to alleviate the effect of reduced materials and oxidizing materials, this method allows dissolved oxygen to be measured very easily. It is also easy to remove undesired buildup from the silver electrode by polishing and cleaning if an insulator forms on it due to oxidation, making the method reusable.

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6.4.2 Salinity calibration

When the solution and air come into contact and form an equilibrium (i.e. saturation), the relationship between the concentration of dissolved oxygen in the solution, C, [mol/L], and the partial pressure of oxygen in the air, Ps, [MPa/(mg/L)], can be represented by the following formula:

$$C = Ps/H$$

Where H [MPa/(mg/L)] is the Henry constant, a value that changes according to the composition of the solution. As H typically becomes larger as the salinity of the water increases, C becomes smaller.

The DO sensor detects the partial pressure of oxygen (Ps) in the above formula. Accordingly, if the DO sensor is immersed in deionized water saturated with air, or in an aqueous solution containing salt, the output current does not change, resulting in an erroneous measurement. For example, when salt is added to a sample, the amount of oxygen that can be dissolved in the solution decreases, but because the partial pressure of oxygen does not change, the value displayed by the control unit stays the same regardless of salt content. This concept is indicated in graph form below. (Fig. 2)

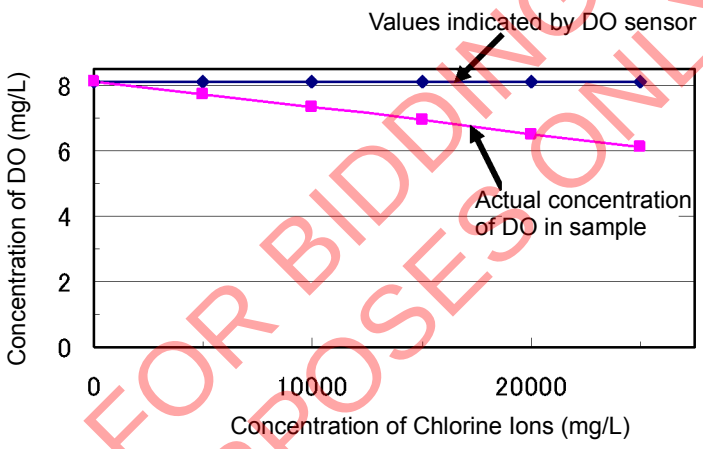

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Fig. 2 Relationship between chlorine ion concentration and dissolved oxygen concentration

In samples with a high salt concentration, the solubility of oxygen is lower, but as the partial pressure of oxygen does not change, the value actually indicated on the control unit is higher than the actual value. In order to obtain a measurement of the concentration of dissolved oxygen in an aqueous solution that contains salt, it is therefore necessary to first perform salinity compensation. Conventionally, dissolved oxygen sensors have performed salinity compensation by inputting the salinity of the sample. This is fine as long as the salinity is already known. However, in most cases salinity is unknown, so even if dissolved oxygen sensors contained a salinity compensation function, it was of no practical use.

The U-50 Series can calculate and measure salinity in samples from electrical conductivity values, and can thus be used to automatically compensate for salinity.

6.5 Conductivity (COND) measurement

6.5.1 Four-AC-electrode method

Conductivity is an index of the flow of electrical current in a substance.

Salts dissolved in water are separated into cations and anions. Such solution is called electrolytic solution.

Electrolytic solution has the property of allowing the flow of current according to Ohm's law. This property is referred

to as ionic conductivity, since current flow is caused by ion movement in electrolytic solution.

Metals, on the other hand, allow the flow of current by means of electrons. This property is called electronic conductivity,

which is distinguished from ionic conductivity.

A cube with 1 m on each side, as shown in Fig. 3, is used to demonstrate an electrolytic solution. Two electrode plates are placed on opposite sides, and the cube is filled with solution. If the resistance between these two electrode plates is represented by r(Ω), the conductivity of the solution L($S \cdot m^{-1}$) is represented as L=1/r. S stands for Siemens, a unit of measurement of conductance.

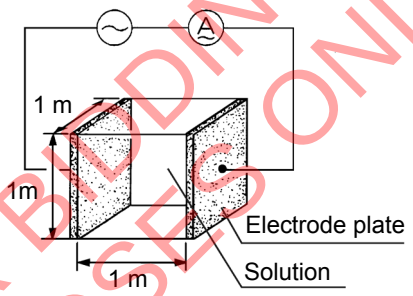

Fig. 3 Definition of conductivity

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The most general method for measuring conductivity is based on the above principle, and is called the 2-electrode method.

In the 2-electrode method the influence of polarization cannot be ignored for solutions with high conductivity and conductivity cannot be measure accurately. In addition, contamination on the surface of the electrode increases apparent resistance, resulting in inaccurate measurement of conductivity.

The U-50 series has adopted the 4-electrode method to overcome these disadvantages of the the 2-electrode method.

As shown in Fig. 4, the U-50 series uses two voltage-detecting electrodes and two voltage-applying electrodes, for a total of four electrodes. The voltage-detecting electrodes are for detecting AC voltage, and the voltage-applying electrodes are for applying AC voltage.

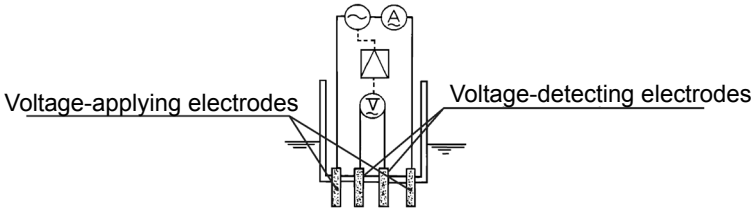

Fig. 4 Principle of the 4-electrode method

Let us assume that the current, I(A), flows in a sample of conductivity L – under automatic control of the voltage-applying electrodes – so that the voltage at the voltage-detecting-electrodes, E(V), remains constant at all times.
Then, the resistance of the sample, R(Ω), across the voltage-detecting electrodes is represented as R=E/I. The resistance, R, of the sample is inversely proportional to its conductivity, L. Accordingly, a measurement of current, Is,
of a standard solution of known conductivity, Ls, enables calculation of conductivity of a sample according to the formula L = Ls (I/Is) from the ratio L : Ls = I : Is.
Even in the 4-electrode method, polarization occurs, since AC current flows in the voltage-applying electrodes. The voltage-detecting electrodes are, however, free from the effects of polarization, since they are separated from the voltage-applying electrodes, and furthermore, current flow is negligible. Therefore, the 4-electrode method is an excellent method to enable measurement of conductivity covering a very high range.

6.5.2 SI units

New measurement units, called SI units, have been in use from 1996. Accordingly, the U-50 series also uses SI units. The following conversion table is provided for people who use the conventional kind of conductivity meter.
Note that along with the change in unit systems, the measurement values and cell counts have also changed.

	Former units	→	SI unit
Measurement value	0.1 mS/cm	→	0.01 S/m
	1 mS/cm	→	0.1 S/m
	100 mS/cm	→	10 S/m

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6.5.3 Temperature coefficient

In general, the conductivity of a solution varies largely with its temperature.
The conductivity of a solution depends on the ionic conductivity, described earlier. As the temperature rises, conductivity becomes higher since the movement of the ions becomes more active.
The temperature coefficient shows the change in % of conductivity per °C, with a certain temperature taken as the reference temperature. This is expressed in units of %/°C. The temperature coefficient assumes the premise that the conductivity of a sample changes linearly according to temperature.
Strictly speaking, with actual samples, however, conductivity changes along a curve. Furthermore, the cuve varies with the type of sample. In the ranges of smaller temperature changes, however, samples are said to have the temperature coefficient of 2%/°C (at reference temperature 25°C); this holds for most samples, except in certain special cases.
(The temperature coefficients for various types of solutions are listed on the next page.)
The U-50 series uses an automatic temperature conversion function to calculate conductivity at 25°C at a temperature
coefficient of 2 %/°C based on the measured value of the temperature. Results are displayed on the readout.
The U-50 series's temperature conversion function is based on the following formula.

$L_{25} = L_t / \{ 1 + K (t - 25) \}$

L_{25} : Conductivity of solution converted to 25°C
t : Temperature of solution at time of measurement (°C)
L_t : Conductivity of solution at t (°C)
K : Temperature coefficient (%/°C)

● Conductivity and temperature coefficient for various solutions

Conductivity and related temperature coefficients of representative substances (at 25°C) are shown in the table below.

Substance	Temp. (ºC)	Conc. (wt%)	Cond. (S/m)	Temp.coef. (%/°C)	Substance	Temp. (ºC)	Conc. (wt%)	Cond. (S/m)	Temp.coef. (%/°C)
NaOH	15	5	19.69	2.01	NaCl	18	5	6.72	2.17
		10	31.24	2.17			10	12.11	2.14
		15	34.63	2.49			15	16.42	2.12
		20	32.70	2.99			20	19.57	2.16
		30	20.22	4.50			25	21.35	2.27
		40	11.64	6.48	Na_2SO_4	18	5	4.09	2.36
KOH	15	25.2	54.03	2.09			10	6.87	2.49
		29.4	54.34	2.21			15	8.86	2.56
		33.6	52.21	2.36	Na_2CO_3	18	5	4.56	2.52
		42	42.12	2.83			10	7.05	2.71
NH_3	15	0.1	0.0251	2.46			15	8.36	2.94
		1.6	0.0867	2.38	KCl	18	5	6.90	2.01
		4.01	0.1095	2.50			10	13.59	1.88
		8.03	0.1038	2.62			15	20.20	1.79
		16.15	0.0632	3.01			20	26.77	1.68
HF	18	1.5	1.98	7.20			21	28.10	1.66
		4.8	5.93	6.66	KBr	15	5	4.65	2.06
		24.5	28.32	5.83			10	9.28	1.94
HCl	18	5	39.48	1.58			20	19.07	1.77
		10	63.02	1.56	KCN	15	3.25	5.07	2.07
		20	76.15	1.54			6.5	10.26	1.93
		30	66.20	1.52			—	—	—
H_2S0_4	18	5	20.85	1.21	NH_4Cl	18	5	9.18	1.98
		10	39.15	1.28			10	17.76	1.86
		20	65.27	1.45			15	25.86	1.71
		40	68.00	1.78			20	33.65	1.61
		50	54.05	1.93			25	40.25	1.54
		60	37.26	2.13	NH_4NO_3	15	5	5.90	2.03
		80	11.05	3.49			10	11.17	1.94
		100.14	1.87	0.30			30	28.41	1.68
		—	—	—			50	36.22	1.56
HNO_3	18	6.2	31.23	1.47	$CuSO_4$	18	2.5	10.90	2.13
		12.4	54.18	1.42			5	18.90	2.16
		31	78.19	1.39			10	32.00	2.18
		49.6	63.41	1.57			15	42.10	2.31
		62	49.64	1.57	CH_3COOH	18	10	15.26	1.69
H_3PO_4	15	10	5.66	1.04			15	16.19	1.74
		20	11.29	1.14			20	16.05	1.79
		40	20.70	1.50			30	14.01	1.86
		45	20.87	1.61			40	10.81	1.96
		50	20.73	1.74			60	4.56	2.06

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6.6 Salinity (SAL) conversion

The U-50 series is designed to calculate salinity as well as the other parameters.
Note that the “salinity” here is the salinity of sea water. There is a constant relation between conductivity and salinity at certain temperatures.
Therefore, if data on the conductivity and temperature are available, the corresponding salinity can be known. In other words, the salinity measurement of the U-50 series is based on the principle of calculating the salt content, making use of the measured values of conductivity and temperature.
Note therefore, that measured results of all substances whose conductivity is detected are displayed as salinity. For example, the measured result is displayed as NaCl concentration, even if in fact the sample component is, hydrochloric acid (HCl).

6.7 TDS conversion

TDS is short for Total Dissolved Solids and means the total dissolved solid amount.
The conductivity of a solution is affected by the amount of salinity, minerals, and dissolved gases. That is, conductivity is an index that shows the total amount of all substances in the solution. Of these substances, TDS indicates only the amount of dissolved solids.
TDS can be used for a comparison of the state of substances composed of a single component such as NaCl. However, the use of TDS for the comparison of solutions of different types causes serious errors.
Conductivity and TDS are expressed by the following formulas.
Conductivity in SI units (S/m) ..... TDS(g/L) = L (S/m) × K × 10
TDS(g/L) = L (mS/m) × K ÷ 100
Conductivity in the old units (mS/cm) ..... TDS(g/L) = L (mS/cm)× K
K = TDS coefficient
Initial settings use the values listed in the table (Page 80) that generally uses TDS coefficients.
For accurate TDS comparisons, find the TDS coefficient from measured conductivity values. Then set the value thus obtained and make measurements.

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6.8 σt conversion

- **Specific gravity of seawater**

The density and specific gravity of seawater are equal numerically and generally are not distinguished strictly. Since seawater density ρ is between 1.000 and 1.031, 1 is subtracted from ρ and σ is obtained by multiplying the value by 1000.
The resultant value is used as the specific gravity of seawater.
$\sigma = (\rho - 1) \times 1000$
The density of seawater ρ is expressed by function of temperature, hydraulic pressure, and salinity. The density of seawater under the atmospheric pressure is expressed as σ_t. The density of seawater under the atmospheric pressure is determined by temperature and salinity.
The U-50 Series models make salinity measurement through temperature measurements and conductivity conversion and find σ_t through calculations.
In Japan σ_{15} at 15°C is called a standard specific gravity and widely used while in foreign countries σ_0 at 0°C is employed. σ_{15} and σ_0 are determined by the function of salinity.
In ocean surveys, in particular, these values σ_t, σ_{15}, and σ_0 are more widely used than conductivity and salinity and, in the U-50 Series models, newly added as measurement components.

6.9 Turbidity (TURB) measurement

6.9.1 Principle of turbidity measurement

U-52 and U-53 sensors measure turbidity using the Transmitting and Scattering Method shown in Fig. 5. U-52 sensors use a pulse light LED (infra-red emitting diode) as a light source, and detect scattered light from a 30° angle off center. U-53 sensors use a tungsten lamp as a light source and detect scattered light from a 90° angle. Both models display turbidity as a ratio of scattered light to transmitted light to reduce the affect of the color of the sample. The U-53 method conforms to EPA Method 180.1, and employs wipers to reduce the affect of air bubbles.

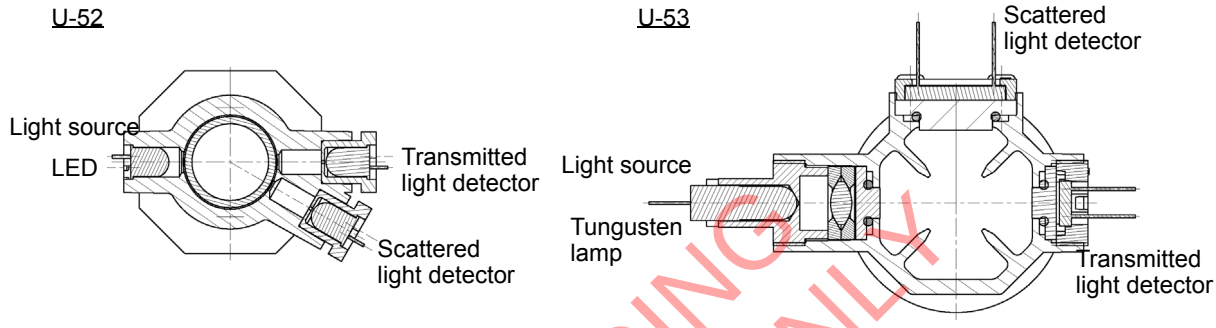

Fig. 5 Turbidity cell

6.9.2 Standard solution

U-50 series can perform calibration using formazin (NTU) or kaolin standard solutions as a turbidity standard solution. However, units for the solution used for calibration should be displayed in measurements. Do not use more than 400 mg/L of kaolin standard solution because it increases precipitation speed, resulting in measurement error.

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6.10 Depth (DEPTH) measurement

6.10.1 Principle of depth measurement

For the W-22XD and W-23XD models, depth measurement can be made through use of a pressure gauge. The principle of the depth measurement uses the relation between depth and pressure.

Although the measurement with the depth sensor is affected by atmospheric pressure, the depth sensor, however, makes zero-point adjustments through the automatic calibration before measurements.

6.10.2 Influence of temperature and calibration

The depth sensor depends greatly on temperature. For a wide difference between the temperature at which the sensor has been automatically calibrated and the temperature of the measurement sample, the sensor can make depth measurements with a higher accuracy by the following method:

1. **Immerse the depth sensor of the sensor probe in the sample.**
2. **Keep the sensor immersed in the sample for about 30 minutes until the temperatures of the sensor and the sample are the same.**
3. **Then make the zero calibration of the sensor manually.**

6.11 Oxidation reduction potential (ORP) measurement

6.11.1 Principle of ORP measurement

ORP is an abbreviation for oxidation-reduction potential. ORP is the energy level (potential) determined according to the state of equilibrium between the oxidants (M^{Z+}) and reductants $M^{(Z-N)+}$ that coexist within a solution.

$$M^{Z+} + ne^- \Leftrightarrow M^{(Z-N)+} \quad \cdots (1)$$

If only the solution, forming the ORP measuring system shown in Fig. 6. The difference of potential between two electrodes is generally expressed by the following equation.

$$E = E_0 - \frac{RT}{nF} \ln \frac{a_M{}^{(z-n)+}}{a_M{}^{z+}} \quad \cdots (2)$$

E: Electric potential E_0 : Constant R: Gas constant T : Absolute temperature
n: Electron count F : Faraday constant a : Activity

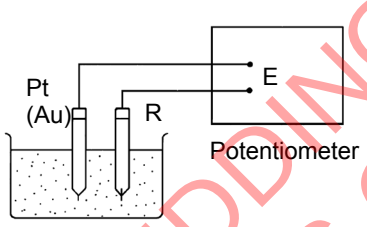

Fig. 6 Measuring mV

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For example, for a solution in which trivalent iron ions coexist with bivalent iron ions, equations 1 and 2 would be as follows.

$$Fe^{3+} + e^- \Leftrightarrow Fe^{2+} \quad \cdots (1)$$

$$E = E_0 - \frac{RT}{F} \ln \frac{a_{Fe}{}^{2+}}{a_{Fe}{}^{3+}} \quad \cdots (2)$$

When only one type of state of equilibrium uniquely by equation (Fe^{3+}) and the reductant (Fe^{2+}) (using the equation $a_{Fe}{}^{2+}/ a_{Fe}{}^{3+}$). Actually, however many kinds of states of equilibrium exist simultaneously between various kinds of ions, in most solutions. This means that under actual circumstances, ORP cannot be expressed using the simple equation shown above and that the physical and chemical significance with respect to the solution is not very clear.
In this respect, the value of ORP must be understood to be only one indicator of the property of a solution. The measurement of ORP is widely used, however, as an important index in the analysis of solutions (potentiometric titration) and in the waste water treatment.

6.11.2 Standard electrode (reference electrode) types and ORP

The ORP is obtained comparing with corresponding reference electrode employed.
If different kinds of reference electrodes are used for measurement, the ORP value of the same solution may appear to be different. HORIBA's reference electrode uses Ag/AgCl with 3.33 mol/L KCl as inner solution. According to general technical literature, normal hydrogen electrodes (N.H.E.) are often used as the standard electrode.
The relationship between N.H.E. and the ORP that is measured using an Ag/AgCl with 3.33 mol/L KCl electrode is expressed by the following equation.
$E_{N.H.E.} = E + 206 - 0.7(t - 25)$ mV t = 0 - 60°C
$E_{N.H.E.}$: Measured ORP value using N.H.E. as the reference electrode

E: Measured ORP value using Ag/AgCl with 3.33 mol/L KCl as the reference electrode
Potential sign
Standard ORP is expressed in the following way, in literature related to electrochemistry and analytical chemistry.

A $Li^+ + e^- \rightarrow Li$
$E_0 = -3.024$ V VS N.H.E.

However, in some literature, the "+" and "-" signs are reversed.

B $Li \rightarrow Li^+ + e^-$
$E_0 = +3.024$ V VS N.H.E.

In expressions like B, above, the reaction is just reversed and there is no essential difference. But this kind of expression does invite confusion. The majority of the world, today, is consistent in its use of the signs as they are used in A, above.
For this reason, HORIBA, too, uses signs concerning ORP that are consistent with A, above.

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INSTRUCTION MANUAL

pHTestr 10, 20, 30, 10BNC, Spear

Large Screen
Waterproof pH / Temperature Testr
Double Junction

Introduction

Thank you for selecting our waterproof pH Testr. This manual serves the following (5) models:

- **pHTestr 10 (Eutech PHTEST10 / 01X366901 / Oakton 35634-10)**
- **pHTestr 20 (Eutech PHTEST20 / 01X366902 / Oakton 35634-20)**
- **pHTestr 30 (Eutech PHTEST30 / 01X366903 / Oakton 35634-30)**
- **pHTestr 10BNC (Eutech PHTEST10BNC 01X366904 / Oakton 35634-14)**
- **pH Spear (Eutech PPHSPEAR 01X366920 / Oakton 35634-40)**

This manual provides a step-by-step guide to operate the Testrs.

Before you begin:

Condition your pHTestr 10, 20, 30 electrodes by immersing it in electrode storage solution or tap water for at least 30 minutes before use. DO NOT use de-ionized water.

Ensure that your pHSpear electrode is always soaked in the electrode storage solution or tap water via its protective cap.

Note: For pHTestr10BNC, please refer to the pH electrode's instruction manual.

pH Buffer Set Selection

Your Testr features USA (pH 4.01, pH 7.00 and pH 10.01) or NIST (pH 4.01, pH 6.86, and pH 9.18) standards. Select either one to suit your requirements.

1. While pressing the HOLD/ENT button, switch on the Testr by pressing the ON/OFF button.
2. Release the HOLD/ENT button. The display will flash either USA or NIST.
3. Press CAL button to toggle between the two buffer set standards.
4. Press the HOLD/ENT button to confirm the selection of the buffer set.



Figure 1: Buffer Selection Sequence

pH Calibration

Calibration should be done regularly, preferably once a week. You can calibrate up to three points using either the USA or the NIST buffer set standards.

1. Press ON/OFF button to switch unit on.
2. Dip electrode about 2 to 3 cm into the pH standard buffer solution.
3. Press the CAL button to enter calibration mode. The 'CAL' indicator will be shown. The upper display will show the measured reading based on the last calibration while the lower display will indicate the pH standard buffer solution.

Note: All Testrs have dual display during calibration mode
Note: To abort calibration, press the 'CAL' button.

4. Allow about 2 minutes for the Testr reading to stabilize before pressing the HOLD/ENT button to confirm the first calibration point. The upper display will be calibrated to the pH standard buffer solution and the lower display will then be toggling in between readings of the next pH standard buffer solution.
5. Repeat with other buffers if necessary. Rinse electrode in tap water before dipping into next buffer.

Note: The calibration mode allows you to perform up to three calibration points before returning to the measurement mode automatically. However, if you opted to have only one or two calibration points, simply skip the remaining calibration points by exiting to the measurement mode by pressing the CAL button.

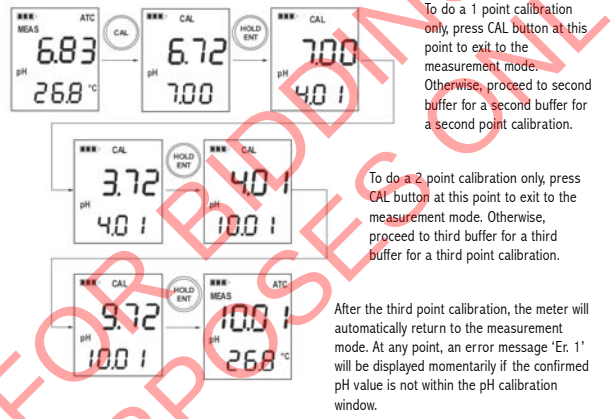

Figure 2: Example of pH Calibration Sequence

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pH Measurement

1. Press the ON/OFF button to switch the Testr on.
2. Dip the electrode about 2 to 3 cm into the test solution. Stir and let the reading stabilize. For semi-solid samples using pHSpear, rotation is ideal for sample contact. CAUTION: Testing dry samples is not accurate and can lead to sensor damage or breakage. Soils must be wet and free of particulates that may scratch the glass sensor. Excessive force into dry samples can cause glass breakage.
3. Note the pH value or press HOLD/ENT button to freeze the reading. To release the reading, press HOLD/ENT again.
4. Press ON/OFF to turn off Testr. If you do not press a button for 8.5 minutes, the Testr will automatically shut off to conserve batteries.

HOLD Function

This feature lets you freeze the display for a delayed observation

1. Press HOLD/ENT button to freeze the measurement. A 'HOLD' indicator will be displayed and the measurement will be frozen.
2. Press HOLD/ENT again to release the measurement. The 'HOLD' indicator will not be displayed anymore indicating the held measurement is released.



Figure 4: Example of HOLD Function

User Reset

You can reset the pH calibration to the factory default by using the user reset function. Buffer set selection and temperature user calibration (pHTestr30) are not affected by the user reset function.

1. Switch off the Testr.
2. While pressing the 'CAL' button, press and release the ON/OFF button to enter the 'User Reset' selection menu. The screen will display 'rSt' on the bottom display with a flashing 'nO' selection.
3. Use the 'CAL' button to toggle between 'nO' and 'YES' selection.
   - nO deactivates reset selection
   - YES activates the reset selection
4. Press the HOLD/ENT button to confirm the selection made.
5. If you have selected 'YES', the unit will show 'CO' momentarily and proceed to the measurement mode with the calibration reset back to factory default value.
6. If 'nO' is selected, the unit will proceed to the measurement mode without any calibration reset performed.

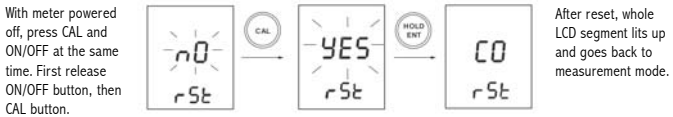


Figure 5: User Reset Sequence

ATC - Automatic Temperature Compensation (Only for pHTestr 10, pHTestr 20 and pHTestr 30)

Through its in-built temperature sensor, the measurement error due to the changes in electrode sensitivity due to changes in temperature is compensated to give the actual pH reading of the sample measured.

MTC - Manual Temperature Compensation (Only for pHTestr 10BNC, pH Spear)

The MTC range is 0 to 50.0 °C (32.0 to122.0 °F). User reset will set temperature to default value 25°C or 77°F.

While in the measurement mode,

1. Press the HOLD/ENT button to bring the Testr to the 'HOLD' mode.
2. Press the CAL button continuously to switch to the °C or °F mode setting selection screen.
3. Release the CAL button to confirm your mode selection and the display will go to the manual temperature calibration mode with the upper display flashing. The upper display shows the adjustable temperature value and the lower display shows the last set temperature offset.
4. Press the HOLD/ENT button to set the upper display to the temperature value of your sample.
5. Once the setting is reached, release the HOLD/ENT button. The new value is automatically confirmed and returns to the measurement mode if no button is pressed after 5 seconds.

Notes: To exit this program without confirming the calibration, press the CAL button before the automatic confirmation takes place.

Temperature Calibration (Only for pHTestr 30)

From the measurement mode,

1. Press the HOLD/ENT button to bring the Testr to the 'HOLD' mode.
2. Press the CAL button for 3 seconds to switch to the °C or °F mode setting selection screen. Pressing the CAL button continuously for 3 seconds allows you to toggle in between the °C and °F mode setting selection screen.
3. Release the CAL button to confirm your mode selection and the display will go to the temperature calibration mode with the upper display flashing. The upper display shows the current measured temperature reading based on the last set offset and the lower display shows the current measured temperature reading based on factory default calibration.
4. Dip the Testr into a solution of known temperature and allow time for the in built temperature sensor to stabilize.
5. Press the HOLD/ENT button to set the upper display to the temperature value of the solution.
6. Once the new temperature setting is reached, the new value is automatically confirmed and returns to the measurement mode if no button is pressed after 5 seconds.

Notes: To exit this program without confirming the calibration, press the CAL button before the automatic confirmation takes place.

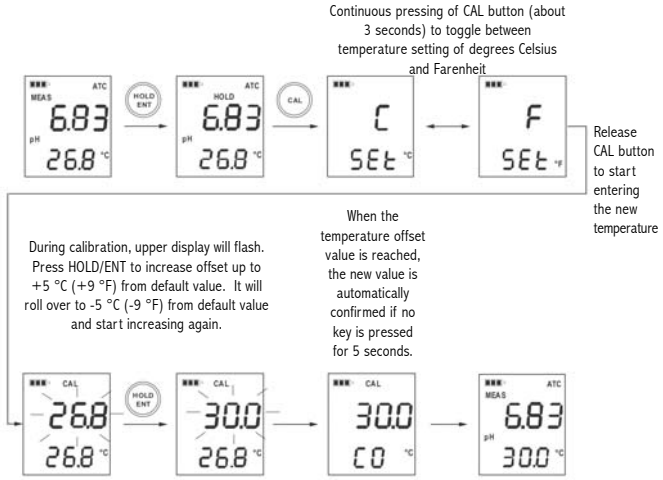


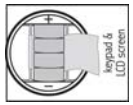
Figure 6: Temperature Calibration Sequence (Only for pHTestr 30DI)

Electrode Maintenance

1. Before measuring soil pH with the pHSpear, wet your soil sample with distilled water and ensure that the soil is free of particulates. Even though the pHSpear is ruggedized, hard surfaces such as stones and pebbles can still cause breakage.
2. Rinse the electrode with tap water or electrode storage solution after each measurement. Care has to be taken not to damage the sensor's glass electrode especially while rinsing the pHSpear penetrating tip electrode.
3. In aggressive chemicals, dirty or viscous solutions, and solutions with heavy metals or proteins, take readings quickly and rinse electrode immediately afterward. For the pHSpear, the remnants of the semi solid samples on the penetrating electrode can be removed by rubbing it with some table salt and then rinsing. Mild detergent can be used to wash the penetrating electrode clean.
4. If possible, keep a small piece of paper or sponge in the electrode cap – moistened with clean water or electrode storage solution (NOT de-ionized water) – and close the cap over the electrode. For pHSpear, ensure that the electrode is kept soaked in electrode storage solution or tap water via its protective cap.

Changing Batteries

1. Open battery compartment lid (with attached lanyard loop).
2. Remove old batteries; replace with fresh ones. Note polarity



Self-Diagnostic Messages

Low battery indicator		3 Bars indicates Battery is full (100%)
		2 Bars indicates 50% of the battery life is left
		1 Bar indicates 25% of the battery life is left
		Blinking battery casing indicates the need to replace batteries with fresh ones as specified by manufacturer
Over range / Under range signal	**Or / Ur** (Still)	Electrode is not in contact with solution or electrode is failing.
		Replacement sensor is not connected properly to the tester during sensor replacement
		Measured pH value or temperature value (pHTestr30) exceeds its specified maximum or minimum value
	ATC / Or / Ur (Blinking)	Blinking 'ATC', 'Or' or 'Ur' indicates that there is a short or open circuit at the built in temperature sensor
Error Message	**Er.0**	Temperature calibration error of attempting to calibrate tester to a value which is out of range or under range
	Er.1	pH calibration error of attempting to confirm a calibration value which is not within the specified calibration window

Electrode Replacement

You can replace the electrode module at the fraction of the cost of a new Testr. When the tester fails to calibrate or gives fluctuating readings in calibration standards, you need to change the electrode.

1. With dry hands, grip the ribbed Testr collar with electrode facing you. Twist the collar counter clockwise (see picture A). Save the ribbed tester collar and O-ring for later use.
2. Pull the old electrode module away from the Testr.
3. Align the four tabs on the new module so that they match the four slots on the Testr (see picture B).
4. Gently push the module onto the slots to sit it in position. Push the smaller O-ring fully onto the new electrode module. Push the collar over the module and thread it into place by firmly twisting clockwise.

Note: It is necessary that you recalibrate your Testr prior to measurement after an electrode replacement.

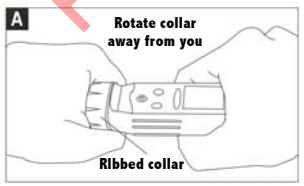


Figure 7: Removal of collar from tester

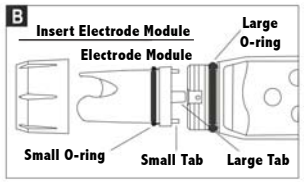


Figure 8: Example of electrode module fitting alignment

Applications

Water quality testing • pools • spas • aquariums • aquaculture • hydroponics • ecology studies • water and wastewater treatment • boilers • steam generators • car washes • sanitation plants • labs • food sectors and more!

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Warranty

The waterproof Testrs are warranted to be free from manufacturing defects for 1 year and electrode module for 6 months, unless otherwise specified. If repair, adjustment or replacement is necessary and has not been the result of abuse or misuse within the time period specified, please contact your local distributor for assistance.

Return of Items

Authorization must be obtained from your distributor before returning items for any reason. When applying for authorization, please include information regarding the reason the item(s) are to be returned.

Note: We reserve the right to make improvements in design, construction and appearance of products without notice. Prices are subject to change without notice.

Accessories

Item	Eutech Instruments Order Code	Oakton Instruments Order Code
pHTestr 10,20,30 replacement sensor	PHSENSOR03DJ	35624-38
pHSpear replacement sensor	PHSENSOR04	35634-50
Carrying Pouch pH Testr 10, 20, 30	ECPOUCH01	35624-45

Tester Specifications

Large Screen Testrs	pHTestr10	pHTestr20	pHTestr30	pHTestr 10BNC	pHSpear
pH Range	-1.0 to 15.0 pH	-1.00 to 15.00 pH			
Resolution	0.1 pH	0.01 pH			
Relative Accuracy	0.1 pH	0.01 pH			
Calibration Points	Up to 3 points	Up to 3 points			
Buffer Set Standard Selection	USA - 4.0/7.0/10.0 NIST - 4.0/6.9/9.2	USA - 4.01/7.00/10.01 NIST - 4.01/6.86/9.18			
Calibration Window (USA Buffer Set Standard)	+/-1.0 pH (pH 4.0 & pH 10.0), +/-1.5 pH (pH 7.0)	+/-1.00 pH (pH 4.01 & pH 10.01), +/-1.50 pH (pH 7.00)			
Calibration Window (NIST Buffer Set Standard)	+/-1.0 pH (pH 4.0 & pH 9.2), +/-1.2 pH (pH 6.9)	+/-1.00 pH (pH 4.01 & pH 9.18), +/-1.25 pH (pH 6.86)			
Temperature	No Display		0-50.0°C or 32.0-122.0°F		
Temperature Compensation	ATC			MTC	
Temperature Resolution	No		0.1 °C / °F		
Temperature Accuracy	No		0.5 °C / 0.9 °F	No	
Temperature Calibration Window	No		+/- (5°C /9 °F) from default value	0-50.0°C or 32.0-122.0°F (MTC)	
Auto Off	After 8.5 minutes from last key press				
User reset	Yes				
Non Volatile Memory Backup	Yes				
LCD Display	Dual				
Power Requirement	4 x 1.5V "A 76" micro Alkaline Batteries				
Battery life	More than 500 hrs				
Operating Temperature	0 – 50 °C				
Tester Dimensions	6.5 "L x 1.5"dia. (165 x 38 mm)				9.75 "L x 1.5"dia. (247 x 38 mm)
Weight	3.25 oz (90 gm)				
Penetrating electrode total length	Not applicable				91 mm
Shaft length	Not applicable				31 mm
Penetrating electrode upper diameter	Not applicable				12 mm
Shaft diameter	Not applicable				7 mm

Instruction Manual

TN-100/T-100

Portable Turbidimeter



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68X357701 Rev. 4 Apr 06

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Certificate of Compliance

This is to certify that the TN100 Portable Turbidimeter complies with the specifications established by the ISO 7027 International Standard for Water Quality - Determination of Turbidity, Section 3: Quantitative Methods using Optical Turbidimeters.



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Preface

This manual functions in two ways: first as a step by step guide to help you operate the waterproof TN-100/ T-100 turbidimeter; second, it serves as a handy reference guide.

It contains basic instructions that you must follow during the operation, care and maintenance of the instrument. The safety protection provided by this equipment may be impaired if it is used in a manner not described in this manual. It is recommended that all operators should read this manual prior to working with this instrument.

Eutech Instruments/ Oakton Instruments cannot accept any responsibility for damage or malfunction to the meter caused by improper use of the instrument.

The information presented in this manual is subject to change without notice as improvements are made, and does not represent a commitment on the part of Eutech Instruments Pte Ltd/ Oakton Instruments.

Note: Eutech Instruments Pte Ltd/ Oakton Instruments reserves the right to make improvements in design, construction, and appearance of products without notice.

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Eutech Instruments Pte Ltd

Oakton Instruments

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1. Overview

Thank you for selecting the waterproof portable TN-100/ T-100 turbidimeter. The TN-100/ T-100 allows you to measure turbidity of an aqueous sample in the field. This instrument operates on the nephelometric principle of turbidity measurement and is designed to meet the criteria specified in ISO 7027 and DIN 27027 standards (see Measurement Principle on page 19).

1.1 Unpacking TN-100/ T-100 Meter and Accessories

The table below indicates the items that you should find in your turbidimeter shipment.

Item	Quantity
1. Portable TN-100/ T-100 Turbidimeter with 4 “AAA” batteries	1
2. Instruction Manual	1
3. Instrument Carrying Case	1
4. Light Shield Cap	1
5. Calibration Set (0.02, 20.0,100, 800 NTU Standards)	1
6. Empty Vials	3
7. Plastic bottle (empty – for collecting sample)	1
8. Silicone Oil	1
9. Lint free cloth	1

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Remove TN-100/ T-100 turbidimeter from the packing carton. Carefully inspect all items to ensure that no visible damage has occurred during shipment. If the items you received do not match your order, please contact your nearest distributor immediately.

> ***WARNING**: Extra care should be taken when unpacking, opening, and handling the calibration standards and sample vials. Surface scratches or finger smudges on the vial surface may cause measurement errors. Handle these items by their caps only.*

Batteries provided with the meter package are to be installed prior to use. See Section 1.4 - Battery Installation on page 4.

Figure 1 depicts the meter. The three main components of the instrument are the sample well, the display, and the keypad. The following sections describe the functionality of the display and the keypad. The proper use of the instrument and the sample well are discussed in later sections.

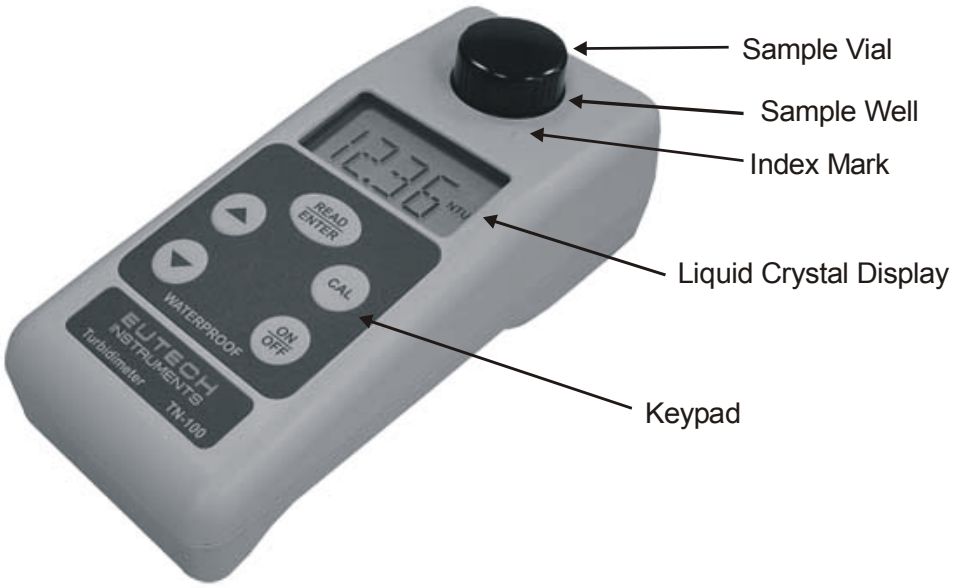

Figure 1: Parts of TN-100/T-100 Turbidimeter

1.2 Display

All the LCD segments and annunciators that can appear on the display are shown in Figure 2. The display is used for reporting the turbidity reading and to provide guidance for the operation of the instrument. In addition, the display has several other annunciators that are used to communicate error messages and provide user guidance.

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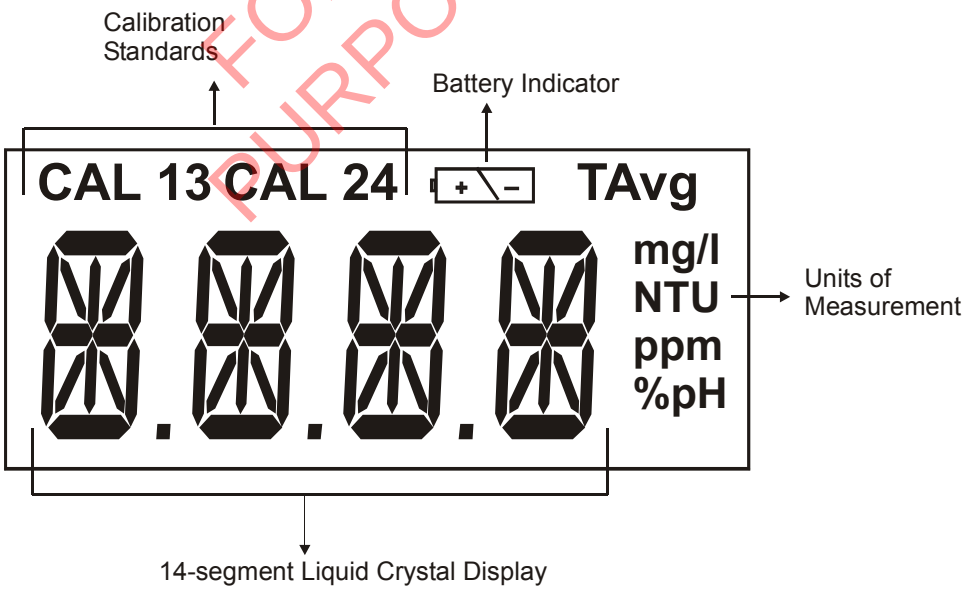

Figure 2: Customized LCD with all annunciators

1.3 Keys and Functions

The keypad has five keys: ON/OFF, CAL, ▲, ▼, and READ/ENTER.

Key	Functions
ON/OFF	Powers on and shuts off the meter. With the auto switch-off feature the meter automatically shuts off 20 minutes after last key press.
CAL	Initiates the calibration mode of the meter. When pressed, the meter is set to accept the first calibration standard. It is also used to exit the calibration mode if the user does not want to follow the complete calibration procedure.
READ/ENTER	When in measurement mode, the READ/ENTER key is used to perform a measurement. *Single-shot measurements*: When the key is pressed and released immediately (a quick key stroke of less than 0.3 seconds), the display will blink [-Rd-] for 10 times and then display the measured value. *Continuous measurements*: If the READ/ENTER key is pressed and held, the instrument will perform a continuous measurement during which the display is updated every 2 seconds. This can be used for indexing vials. (This function is not available in calibration mode). After the READ/ENTER key is released, the instrument will automatically perform a single-shot measurement.
▲ ▼	Active only during calibration mode. These keys are used to select the calibration point in an incremental/ decremental manner. *NOTE: This meter is fitted with an auto incrementing feature, i.e. after the successful calibration of one point it auto selects the next calibration point, or automatically exits the calibration mode after the fourth calibration point.*

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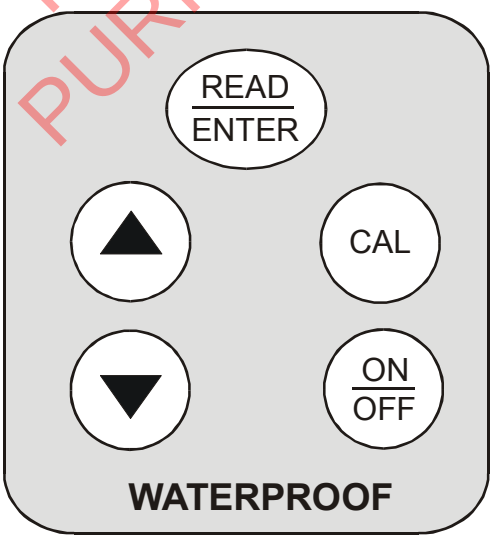

Figure 3: Keypad

1.4 Battery Installation

Four AAA-sized batteries are included in the packaging:

1. Use a Philips screwdriver to remove the two screws holding the battery cover. See Figure 4.
2. Remove the battery cover.
3. Insert the batteries. Follow the diagram inside the cover for correct polarity.
4. Replace the battery cover onto its original position using the two screws removed earlier.
5. The meter is now ready to operate.

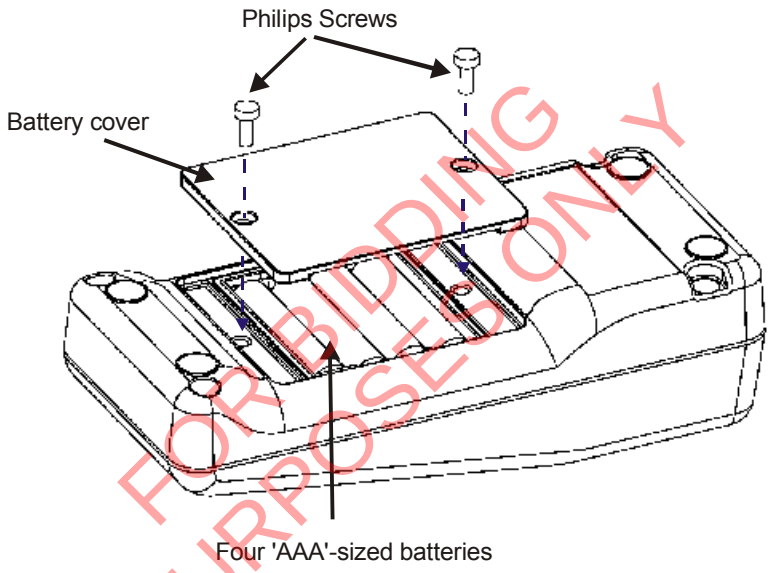

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Figure 4: Battery Installation

NOTE: *Dispose used batteries in accordance with your local regulations.*

2. Turbidity Calibration

The TN-100/ T-100 turbidimeter was calibrated and tested prior to leaving the factory. Therefore, it is possible to use the instrument directly out of the box. However, re-calibration of the instrument is recommended to help you become familiar with the operation of the instrument and the calibration procedures. In addition, re-calibration is recommended at least once every month for optimum accuracy.

It is recommended that you perform a full calibration using all 4 standards provided to ensure full-range accuracy. However, the TN-100/ T-100 turbidimeter provides flexibility for you to calibrate at selected ranges suitable for your application.

In addition, the instrument comes with a light shield cap to shield off stray light during calibration and measurements.

2.1 Calibration Standards

We recommend that you use the following materials during calibration to achieve the accuracy stated in this manual:

- **CAL 1**: 800 NTU Calibration Standard
- **CAL 2**: 100 NTU Calibration Standard
- **CAL 3**: 20.0 NTU Calibration Standard
- **CAL 4**: 0.02 NTU Calibration Standard

It is well known that diluted Formazin is unstable. If you choose to use Formazin to calibrate the instrument, ensure that you are using a fresh stock suspension of Formazin to achieve the accuracy quoted for the instrument. Calibration standards offered are more stable than Formazin and have a limited shelf life of 12 months. If you use the supplied calibration standards to calibrate the instrument, review the expiration date (indicated on cap label) to ensure that the standards have not expired.

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It is important that the calibration standards are not violently shaken or agitated because air entrapment in the fluid introduces an error factor during calibration which subsequently will lead to an inaccurate measurement. Also, do not store in freezing temperatures which causes irreversible shrinkage of the standards' particles thus resulting to inaccurate calibration and measurement.

2.2 Indexing

Due to the high quality of the glass vials provided, indexing is not required. You only need to align the mark on the vial with the mark on the meter. However, in order to achieve a better accuracy of the measurement, you can proceed with indexing of the vials. See Section 8.5 - Indexing a Vial on page 20 for more information.

2.3 Calibration Procedure

1. Place TN-100/ T-100 turbidimeter on a flat and level surface.
2. Insert the CAL 1 standard (800 NTU) into the sample well, aligning the mark on the vial with the mark on the meter. See **Figure 10** on page 12.
3. Press down vial until it snaps fully into the instrument.
4. Cover the vial using the light shield cap.
5. Press **ON/OFF** key to switch the on the meter. The meter goes to measurement mode after the power-up sequence.
6. Select the calibration function of the instrument by pressing the **CAL** key once. The "CAL" annunciator blinks momentarily and the meter prompt for the first calibration standard "CAL 1 800 NTU".
7. Press **READ/ENTER** key.
8. The "CAL 1 800 NTU" annunciator blinks for about 12 seconds while the instrument performs calibration of CAL 1 point. When the instrument has completed calibration for this point, it prompts you to insert the next calibration standard into the sample well "CAL 2 100 NTU".
9. Repeat the calibration for CAL 2, CAL 3 & CAL 4 calibration standards.
10. After you successfully calibrate the CAL 4 standard (0.02 NTU), the display shows "STbY".
11. The meter is now ready for measurement.

Figure 5 shows the complete calibration sequence.

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NOTES:

1. *If you wish to exit the calibration mode you may do so at the end of any step by pressing the **CAL** key. The meter accepts only the values calibrated prior to exiting.*
2. *You can skip a calibration point by pressing ▲ or ▼ keys and move on to the next calibration point.*
3. *After a successful calibration of one point, the meter automatically selects the next calibration point. The meter automatically exits calibration mode after the fourth calibration point.*
4. *If an error occurs during calibration, the display shows an error message. The meter aborts calibration and returns to the measurement mode without saving the last calibration value.*
5. *For a list of error messages, refer to Section 4: Troubleshooting Guide on page 15.*

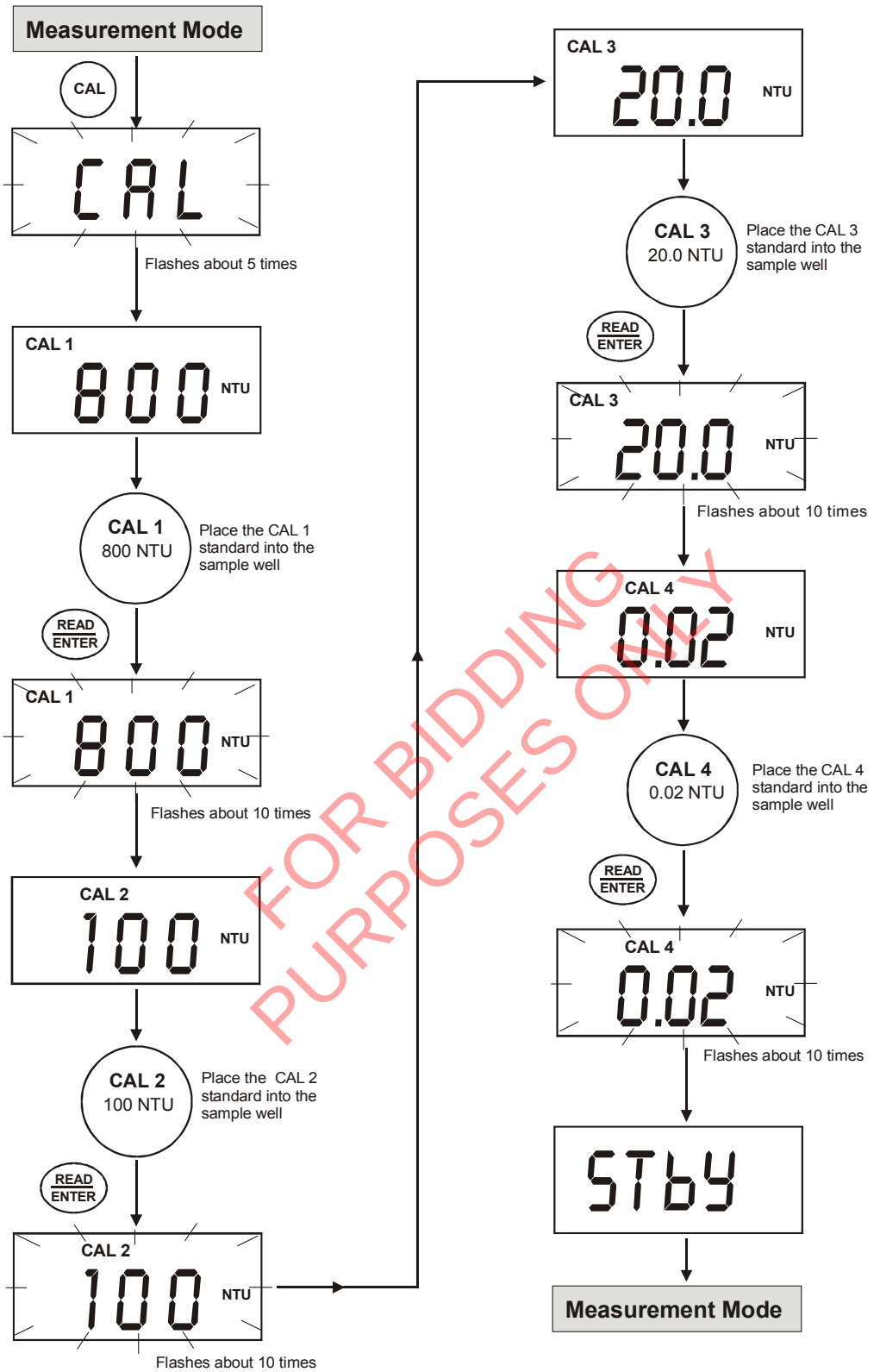

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Figure 5: Calibration Sequence

2.4 Restoring Factory Calibration

The TN-100/ T-100 turbidimeter allows you to reset the meter back to the factory default calibration values. This feature is extremely useful when there are errors in calibration or when you have new calibration standards.

1. With the meter switched off, press and hold ▲ key.
2. Switch on the meter using **ON/OFF**. Release ▲ key when “URST” (User-Reset) appears in the display.
3. The display shows “URST” for about 2 seconds and then shows “No”.
4. Use ▲ or ▼ key to select between “YES” or “No”.
    - **YES** = To restore meter back to factory calibration values
    - **No** = To retain last calibrated values
5. Press **READ/ENTER** key to confirm your selection. The meter performs the reset if “YES” is selected.
6. The display flashes “--Rd—“about 10 times indicating that the meter goes to measurement mode.

Figure 6 shows the sequence for restoring factory calibration values.

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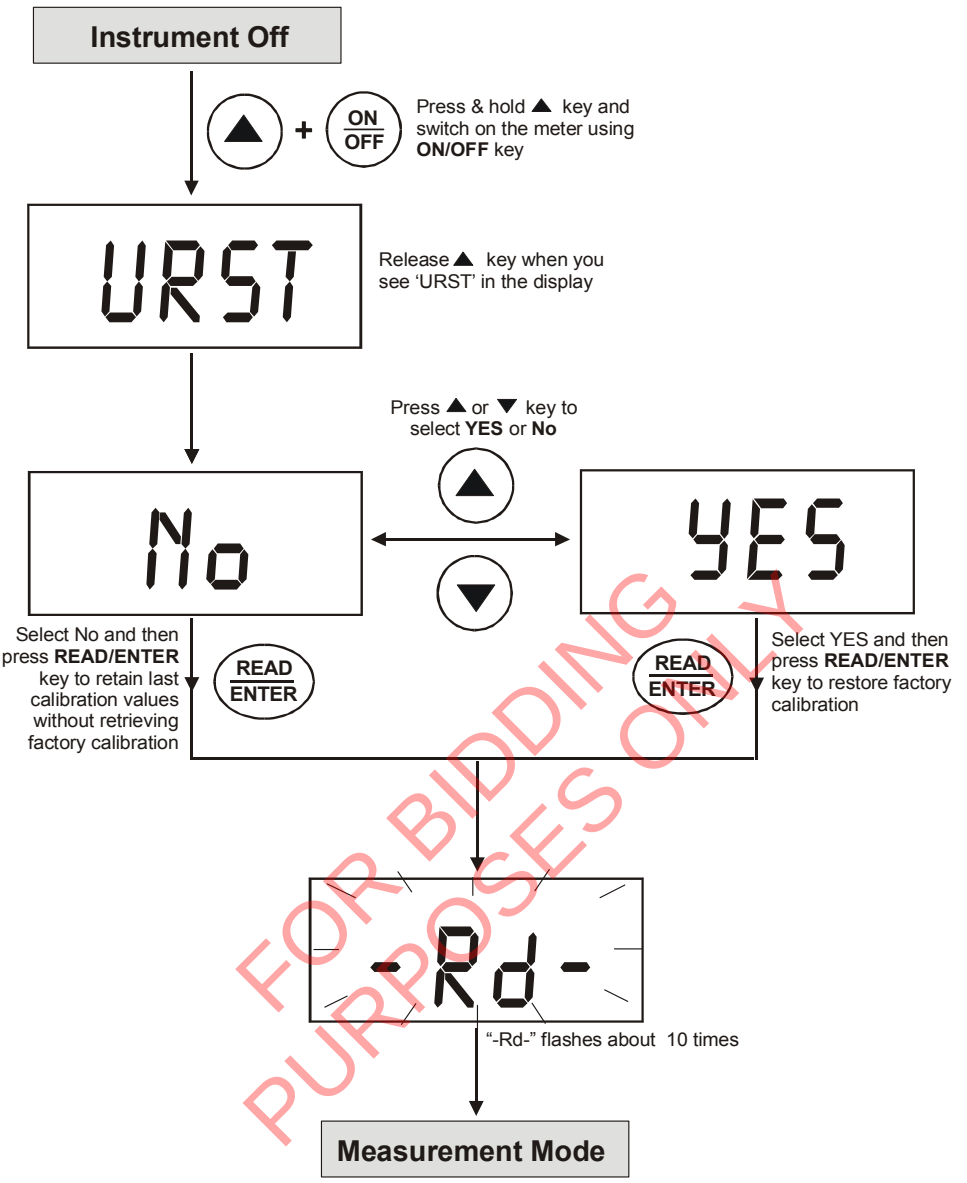

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Figure 6: Restoring Factory Calibration

3. Turbidity Measurement

3.1 General Information

The waterproof TN-100/ T-100 turbidimeter allows you to measure the turbidity of a grab sample. The turbidity is reported in Nephelometric Turbidity Units (NTU). Readings above 1000 NTU are outside the range of this instrument.

> ***NOTE:*** *Before switching on the TN-100/ T-100 turbidimeter, a sample vial MUST be placed in the sample well. You can use any of the calibration standards for this purpose.*
>
> *The light shield cap provided could be used to cover the vial during measurements.*

When the **ON/FF** key is pressed to switch on the meter, it goes through the power-up sequence as shown in Figure 7 below.

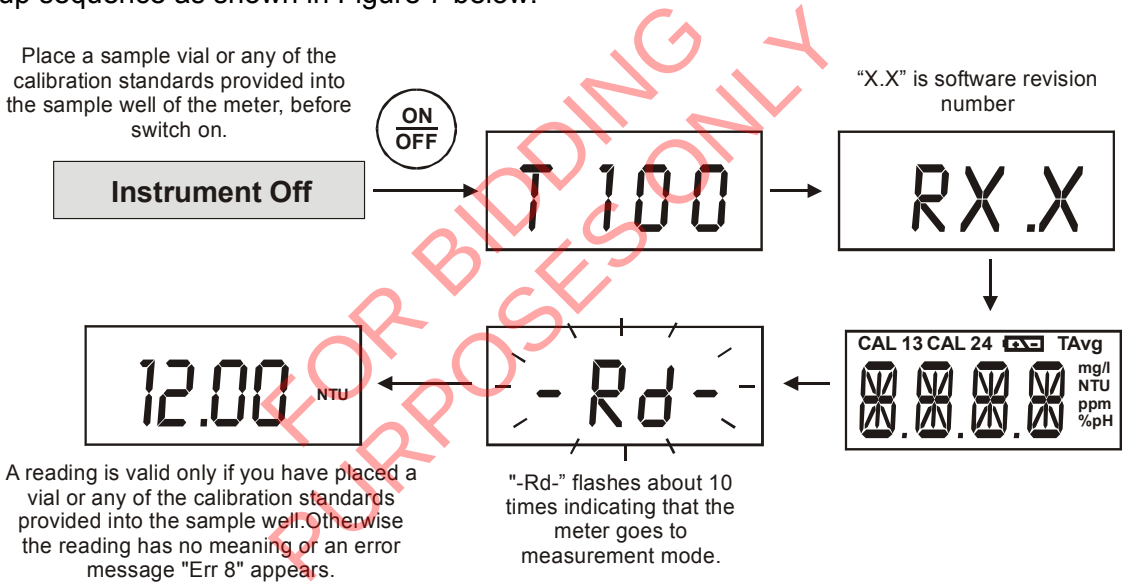

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Figure 7: Power-up Sequence

3.2 Turbidity Measurement Procedure

An accurate turbidity measurement depends on good measurement techniques. Factors such as clean sample vials, positioning of vial in the sample well, covering the vial with the light shield cap, meter calibration, handling of meter, and others, have to be taken into consideration. Please see the following sections for more information.

Section 5.1: Vials – Handling, Cleaning and Care (page 16)

Section 9: Addendum 2:
Guide to Good Measurement Technique (page 21)

Preparation of Sample Vial

1. Obtain a clean and dry sample vial
2. Take care to handle the sample vial by the top.
3. Rinse the vial with approximately 10 ml of the sample water, capping the vial with the black screw cap and gently inverting it several times. Discard the used sample and repeat the rinsing procedure two more times.
4. Fill the rinsed vial with the remaining portion (approximately 10 ml) of the grab sample up to the mark indicated in the vial. Cap the vial with the supplied black screw cap.
5. Wipe the vial with the soft, lint-free cloth supplied. Ensure that the outside of the vial is dry, clean and free from smudges.

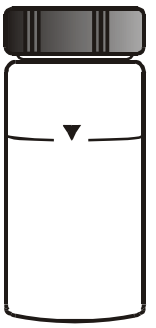

Figure 8: Sample Vial

6. Apply a thin film of silicone oil (supplied) on the sample vial (see Figure 9).
7. Wipe with a soft cloth to obtain an even distribution over the entire vial's surface.

NOTES:

1. *The purpose of oiling the vial is to fill small scratches and to mask the imperfection in the glass.*
2. *Do not apply large quantity of oil as this may collect dirt and dust*

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8. The sample vial is now ready to be inserted into the sample well of the meter for measurement.

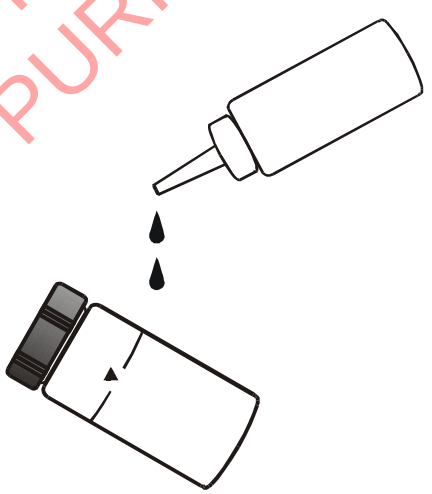

Figure 9: Apply a thin film of silicon oil

Measurement Procedure

1. Place TN-100/ T-100 turbidimeter on a flat and level surface.
2. Place the sample vial inside the sample well and align the vial's index mark with the meter's index mark. See **Figure 10**.

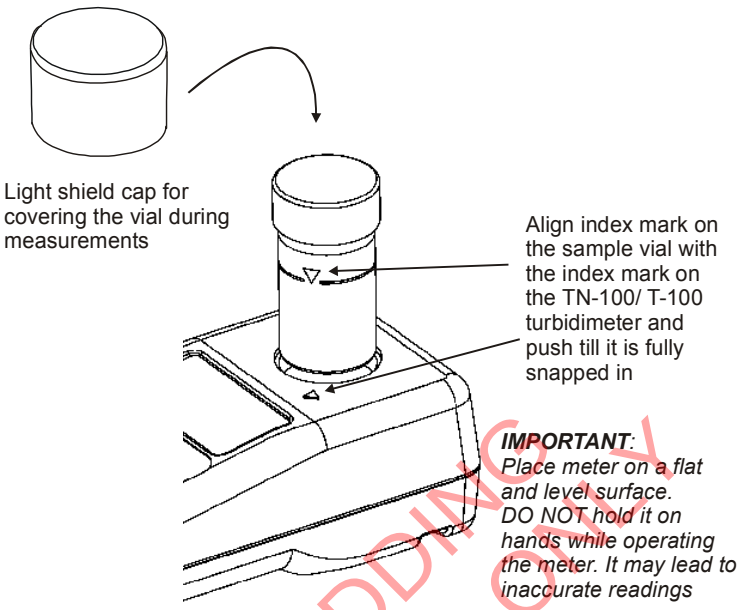

Figure 10: Align sample vial's index mark with meter's index mark

3. Push the vial until it is fully snapped in.
4. Cover the vial with the light shield cap.
5. Turn on the meter by pressing the **ON/OFF** key.
6. After the power-up sequence, the meter goes to measurement mode and the display blinks "--Rd--" for about 10 times. See Figure 11.
7. The measured reading appears in the display.
8. If necessary, place the second sample vial into the sample well. Remember to align the vial's mark with the meter's index mark.
9. Press **READ/ENTER** key. The display blinks "--Rd--" for several times and measured reading appears.
10. Repeat steps 2 through 9 for all of your samples.

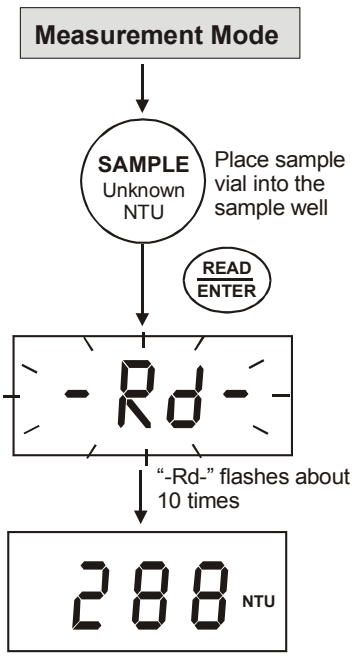

Figure 11: Reading Turbidity Value

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NOTES:

1. *NEVER pour liquid directly into the sample well of the instrument. Always use a vial. The instrument will only accurately measure the turbidity of a sample when vials sealed with the black caps are used. The black cap serves as both seal and a light shield.*

2. *NEVER attempt to clean the sample well. The optics may be damaged.*

3. *For battery conservation, the instrument automatically powers off 20 minutes after the last key pressed.*

3.3 Single-Shot or Continuous Measurement

You can use TN-100/ T-100 turbidimeter to take a single reading or perform continuous measurement. The latter is only used for indexing the vials. See **Section 8.5** - Indexing a Vial on page 20 for more information.

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For Single-shot Measurement:

1. Make sure the meter is sitting on a flat and level surface and is in measurement mode. The display shows the last measured value or “STbY” after exiting calibration mode.
2. Place sample vial in the sample well.
3. Cover the vial with the light shield cap.
4. Press **READ/ENTER** key and release immediately (<0.3 seconds). See Figure 12.
5. The display blinks “--Rd--“ for about 10 times and then display the measured value.

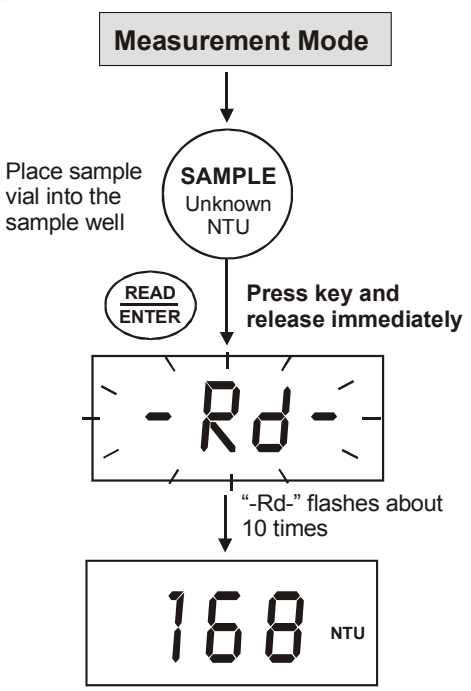

Figure 12: Single-shot Measurement

For Continuous Measurement:

1. Make sure the meter is sitting on a flat and level surface and is in measurement mode. The display shows the last measured value or “STbY”
2. Place the sample vial in the sample well.
3. Press **READ/ENTER** key and hold. See Figure 13
4. Wait for the reading to stabilize before rotating the sample vial.

NOTE: *During continuous measurement, the display is updated every 2 seconds. The displayed reading may not be the actual turbidity value. For accurate measurement, use single-shot measurement.*

You can rotate the sample vial for indexing purpose. See **Section 8.5** - Indexing a Vial on page 20 for more information.

5. Once you release **READ/ENTER** key, the meter automatically performs a single-shot measurement.

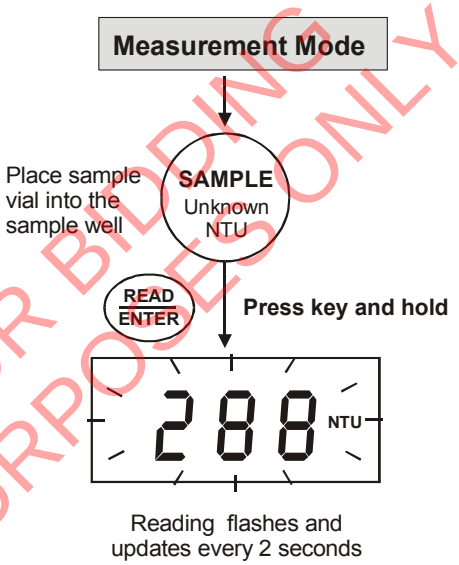

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Figure 13: Continuous Measurement

NOTES:

1. *After a measurement is completed and the display is updated, a 4-second recovery time occurs before the meter can perform another function. If any key is pressed during the recovery time, the meter will perform the corresponding action at the end of the recovery period.*

2. *When performing a measurement, if the meter detects stray light exceeding the amount equivalent to 0.02 NTU in the low range, the measurement is immediately aborted and an error message [ERR 8] is displayed. Ensure the vial sits properly into the sample well. Press the ENTER/READ key to re-do the measurement.*

4. Troubleshooting Guide

The TN-100/ T-100 turbidimeter routinely performs self-diagnostics, and will automatically generate messages to provide you with specific diagnostic information. These messages are for your use and do not indicate a reduction in the performance of the instrument or a failure of any component in the instrument, unless otherwise stated in this list.

LCD Message	Description	Corrective Actions
ERR 1	Calibration Error. The meter is unable to recognize the 800 NTU Calibration Standard.	Ensure to use the correct 800 NTU calibration standard. *
ERR 2	Calibration Error. The meter is unable to recognize the 100 NTU Calibration Standard.	Ensure to use the correct 100 NTU calibration standard. *
ERR 3	Calibration Error. The meter is unable to recognize the 20.0 NTU Calibration Standard.	Ensure to use the correct 20.0 NTU calibration standard. *
ERR 4	Calibration Error. The meter is unable to recognize the 0.02 NTU Calibration Standard.	Ensure to use the correct 0.02 NTU calibration standard. *
ERR 5	Calibration Error. There is not sufficient signal to achieve the appropriate resolution in the 0-1000NTU range.	Re-do calibration with all 4 standards provided. *
ERR 6	General Calibration Failure. There is not sufficient signal to achieve the appropriate resolution in the 0-100NTU range.	Re-do calibration with all 4 standards provided. *
ERR 7	General Calibration Failure. There is not sufficient signal to achieve the appropriate resolution in the 0-20 NTU range.	Re-do calibration with all 4 standards provided. *
ERR 8	Excessive stray light detected.	Ensure the vial is fully snapped in the sample well.
	Attempting a measurement when low battery indicator is on.	Replace batteries.
ERR 9	Lamp Failure.	Return unit.
Or	When Turbidity value is above the measurement range(>1000NTU)	Dilute sample. See Section 9.7 on page 23.
	Low battery indication. The batteries need to be replaced.	Replace batteries.

* If an error message appears, take the appropriate corrective action and re-do the desired procedure. If the problem persists, contact Eutech Instruments or your dealer. See Sections on Warranty and Return of Items on page 24.



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5. Routine Maintenance

The supplied carrying case is optimal for protecting the instrument. If you do not plan on leaving the instrument in the supplied carrying case, when not in use, ensure that the instrument has been turned off and that a clean sample vial fitted with a black cap has been placed in the sample well. This will ensure that a minimal amount of dust and/or debris will be able to settle on the optics of the instrument.

5.1 Vials – Handling, Cleaning and Care

Proper measurement of the turbidity of a sample requires the use of a vial that is free of marks, smudges, scratches and any bacterial growth.

Therefore, sample vials must be handled with absolute care to avoid contamination or damage, which might change the optical characteristics of the glass. Scratches, fingerprints, and water droplets on the sample vial or inside the sample well can cause stray light interference leading to inaccurate readings.

Cleaning the vial is accomplished by washing the interior and exterior of the vial in a detergent solution. Once cleaned, the vial should be rinsed thoroughly 8 to 10 times with clean distilled water to eliminate the possibility of detergent buildup and streaking.

Vials can also be acid washed periodically and coated with a special silicone oil to fill small scratches and mask the imperfections in the glass. Since the silicone oil required for this application should have the same refractive characteristics as glass, it is recommended that the oil be obtained from us. Care should be taken not to apply excessive oil that could attract dirt or contaminate the sample well of the meter. Once the oil has been applied to the vial, the excess oil should be removed with a lint-free cloth. The result should be a sample vial surface with a dry appearance, but with all imperfections filled with oil.

Sample vials should always be handled from the top or by the cap to avoid fingerprints or smudges. After a vial has been filled with a sample and capped, the outside surface should be wiped with a clean, lint-free absorbent cloth until it is dry. Cleaned and dried vials should be stored with the black caps on. The vials can be stored in the carrying case. During normal operation you may use any typical glass cleaner along with a lint free cloth or tissue (Kimwipes®), to clean the outside of the vials.

Condensation may appear on the vial when your sample is very cold and the relative air humidity is high. When this happens, the turbidity that you read may be higher than the actual turbidity due to the light scattered by the condensate on the vial. If you find yourself in this circumstance, you can alleviate the problem by either coating the vial with an anti-fogging agent, or by running warm water over the vial for a short period of time to warm the sample prior to measurement.

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6. Accessories

The items shown below are recommended accessories and replacement parts for the instrument.

Item Description	Eutech Instruments Order Code	Oakton Instruments Order Code
Waterproof TN-100/ T-100 portable turbidimeter with set of 4 calibration standards (800, 100, 20.0 & 0.02 NTU), set of 3 sample vials, lint-free cloth, silicone oil, batteries – all in a rugged carrying case.	EC-TN100	35635-00
Calibration Set for normal operation (includes 800, 100, 20.0 & 0.02 NTU Standards)	ECTN100CALKT	35635-50
Sample Vials – pack of 3 vials	ECTN100CUVKT	35653-55
Silicone Oil – 10ml	ECSILICONEOIL	~

To order any accessory or replacement part, please contact the nearest distributor or Eutech Instruments/ Oakton Instruments.

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7. Specifications

Parameter	Specification
Measurement Method	ISO 7027 compliant nephelometric method (90°)
Measurement Range	0 to 1000 NTU
Automatic Range Selection	0.01 – 19.99 NTU 20.0 – 99.9 NTU 100 – 1000 NTU
Resolution	0.01 NTU (0 – 19.99 NTU) 0.1 NTU (20 – 99.9 NTU) 1 NTU (100 – 1000 NU)
Accuracy	±2% of reading ± 1 LSD for 0 to 500 NTU; ±3% of reading ± 1 LSD for 501 to 1000 NTU.
Repeatability	± 0.01 NTU or ± 1% of reading, whichever is greater with gel samples
Response Time	< 6 seconds for full step change
Calibration Standards	0.02 NTU; 20 NTU; 100 NTU; 800 NTU
Standardization	EPA-approved polymer-based primary standards
Light Source	Infrared-emitting diode (850 nm wavelength)
Light Source Life	> 1,000,000 tests
Detector	Silicon photovoltaic
Stray Light	< 0.02 NTU
Display	4-digit 14-segments customized liquid crystal display with annunciators
Sample Cells (Vials)	Borosilicate glass with screw caps, fill line and indexing mark. 51 (H) x 25 (Dia) mm (2 x 1 in)
Sample Volume Required	10 ml (0.33 oz)
Operating Temperature Range	0°C to 50°C (32°F to 122°F)
Sample Temperature Range	0°C to 50°C (32°F to 122°F)
Operating Humidity Range	0-90% RH, non-condensing at 30°C (86°F)
Power Supply	4 x “AAA” Alkaline Batteries
Battery Life	> 1200 readings
Enclosure Type & Rating:	ABS Plastic / IP67 rated
Insulation Rating	Pollution Degree 2
Weight:	Meter: 200 g (7 oz) Meter with case: 1.25 kg (2.75 lb)
Dimensions	Meter: 6.8 (W) x 15.5 (L) x 4.6 (H) cm; (2.7 x 6.1 x 1.8 in) Meter with Case: 16 (W) x 35 (L) x 12 (H) cm; (6.3 x 13.8 x 4.7 in)

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8. Addendum 1: Turbidity

8.1 Definition

Turbidity is defined as an "*expression of the optical property that causes light to be scattered and absorbed rather than transmitted in straight lines through the sample.*"[1] That is, turbidity is the measure of relative sample clarity, not colour.

Water with cloudy or opaque appearance will have high turbidity, while water that is clear or translucent will have low turbidity. High turbidity value is caused by particles such as slit, clay, microorganisms, and organic matter. By definition, turbidity is not a direct measure of these particles but rather a measure of how these particles scatter light.

8.2 Why Is It Important?

For drinking water application, a turbidity value may give an indication of presence of bacteria, pathogens, or particles that can shelter harmful organisms from disinfection process. Therefore, turbidity measurement is particularly useful for water treatment plants to ensure cleanliness.

In industrial processes, turbidity can be part of quality control measure to ensure efficiency in treatment or manufacturing process.

8.3 Measurement Principle

There are two internationally accepted standard specifications for turbidity measurement. These are the international standard ISO 7027 and the US EPA method 180.1.

Basically the ISO 7027 is a more stringent standard and requires the use of a monochromatic light source. It also governs the design of a turbidimeter in the following areas: (1) Light source's wavelength; (2) Light sources' spectral bandwidth; (3) Measuring angle; (4) Aperture angle in water sample; (5) Distance traversed by incident light and scattered light within the sample; (6) Calibration standard.

The TN-100/ T-100 turbidimeter follows the ISO 7027 standard whose specification allows for greater reproducibility of the measured values and greater agreement between other measuring instruments.

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[1] Provided by "Standard Methods for the Examination of Water and Wastewater, APHA, AWWA and WPCF, 16th Edition, 1985.

Figure 14 shows the waterproof TN-100/ T-100 turbidimeter basic optical system. It includes a light source and a detector to monitor the light scattered at 90° with respect to the incident beam.

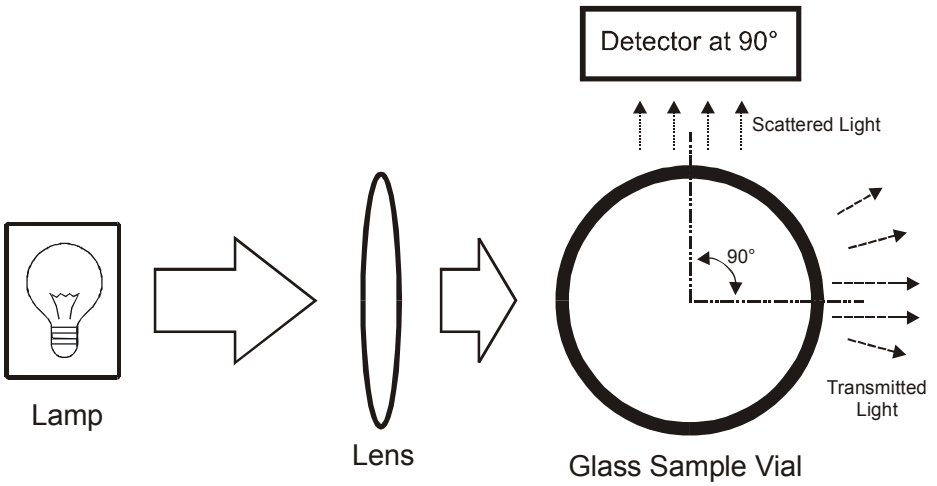

Figure 14: Basic Nephelometric arrangement for turbidity measurement

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8.4 Nephelometric Turbidity Units (NTU)

Nephelometric Turbidity Units (NTU): Unit of measure used when relating the light scattered by a liquid media to the light scattered by a known concentration of a standard solution. This unit of measure is recognized as a measure of the optical clarity of an aqueous sample. NTU is the accepted unit of measurement for turbidity.

Another unit commonly used to measure turbidity is Formazin Turbidity Unit (FTU). The two units of measure of turbidity are equivalent: 1 NTU = 1 FTU.

8.5 Indexing a Vial

The United States Environmental Protection Agency (US EPA) recommends that vials used for turbidimeter calibration or sample measurement be indexed.

To index a sample vial, slowly rotate the vial throughout one complete revolution (360°). While rotating the sample vial, observe the display and locate the position that the vial is in which provides the lowest turbidity reading. This position is the indexed position of the vial.

Mark this position on the vial (not on the cap) against the mark on the meter.

After indexing a vial, make sure the vial will always be placed inside the sample well in the indexed position.

9. Addendum 2: Guide to Good Measurement Technique

Turbidity is a very complex analytical measurement which can be affected by many factors. Some are inherent in the instrument's design such as angle of detection, light beam aperture, incident beam wavelength and color sensitivity of the photocell.

However, there are other factors such as stray light, air bubbles and care of vial, which can be prevented through proper care of equipment and accessories, and in the operating procedure for measurement. Here are some points you may want to note:

9.1 Maintain sample vials in good condition

Sample vials must be meticulously clean and free from significant scratches. It should be treated on the outside with a thin coat of silicone oil. This is to mask minor imperfections and scratches that may contribute to stray light. Sample vials should be handled only by the top to avoid dirt accumulation (or deposits) and fingerprints that might interfere with the light path.

More information is found in Section 5.1 - Vials – Handling, Cleaning and Care on page 16.

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9.2 Match Sample Vials

Best accuracy and repeatability of turbidity measurement are achieved using a single, indexed vial. However, for more convenience, different vials can be used for measurement provided their readings with the same solution are matched. That is, the meter gives identical readings or within the specified repeatability and accuracy of the meter.

Select a few vials. After the sample vials are cleaned, fill them with ultra-low turbidity water. Allow the sample vials to stand and for air bubbles to rise. Polish sample vials with silicone oil and take turbidity measurement at several points while rotating it in the sample well. Find the position where turbidity reading is the lowest and index it for each vial. Whenever these sample vials are used, use the indexed mark to position each vial into the sample well. Choose those vials that match the readings.

NOTE: *Not all vials can be matched because of some manufacturing variations.*

9.3 Degassing

Air or other trapped gases should be removed before measurement. Degassing is recommended even if no bubbles are visible. There are three methods commonly used for degassing:

- Addition of a surfactant: This involves adding a surfactant to the water samples to lower the surface tension of the water, thereby releasing trapped gasses.
- Application of a partial vacuum: Partial vacuum can be created by using simple syringe or vacuum pump. (This is only recommended for ultra-low turbidity measurement).
- Use of an ultrasonic bath: This may be effective in severe conditions or in viscous samples, but not recommended for ultra-low measurements.

Each of the method above has its own advantages and disadvantages. For instance, under certain sample conditions, the use of vacuum pump or ultrasonic bath may actually increase the presence of gas bubbles.

9.4 Timeliness of Sample

Samples should be measured immediately to prevent changes in particle characteristics due to temperature and settling. Temperature can affect particles by changing their behavior or creating new particles if precipitates are formed. Dilution water may dissolve particles or change their characteristics. It is recommended to take samples only when the turbidimeter is ready to be operated. Samples should not be drawn and allowed to sit while the instrument warms up or is being readied.

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9.5 Other Important Sampling Techniques

1. Samples should not be violently shaken or agitated as particles can be broken apart or air may be entrapped into the fluid. Gentle agitation such as swirling the sample vial is advisable to reduce particle settling.
2. Sample vials should be used only with the instruments for which they were intended. Do not mix and match.
3. Perform a visual observation of the sample vial every time a measurement is made. Ensure that there are no visible bubbles in the sample and the vial is clean and free of scratches.
4. Samples entering the turbidimeter should be at the same temperature as the process flow samples. Changes in temperature can cause precipitation of soluble compounds and affect readings.
5. Sample vials should be evaluated with a low turbidity water (after cleaning) to determine if cells remain matched. If the evaluation determines that a cell is corrupted, discard the vial. It is recommended to conduct this evaluation weekly.
6. When in doubt or question about whether a sample vial is too scratched or stained, throw it away.

9.6 Calibration

1. Do not open the vials with calibration standards.
2. Check that the standards have not expired.
3. Make sure the calibration vials are free of dust, smudges and scratches before use.
4. Conduct the calibration in the same manner each time. Variations in how calibration is performed could yield inaccurate measurements.
5. It is very important that the user(s) who perform calibration have been trained to do so. Creating a Standard Operating Procedure (SOP) for the user(s) to read, learn, and practice may help to ensure accuracy.

9.7 Dilution

This dilution procedure is necessary only when your turbidity measurement is above 1000 NTU.

1. To measure the turbidity above 1000 NTU, dilute the sample with turbidity-free water.
2. Turbidity-free water can be obtained by filtering deionized water through a < 0.2µm filter membrane with precision-sized pores.
3. Measure the volume of the sample before dilution and record the value in ml (Vs).
4. Take a known volume (Vd) of dilution water and add it to the sample.
5. Pour 10 ml of the diluted sample in a clean vial and measure the turbidity of the diluted sample. Record this value in NTU (Td).
6. Calculate the true turbidity (T) of the original sample - in NTU - using the following formula:

$$T = Td * (Vs + Vd) / Vs$$

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Example:

- Dilute 20 ml of the original sample (whose turbidity is above 1000NTU) with 50 ml of dilution water.
- Measure the turbidity of the diluted sample.
- If the reading is 300 NTU, the turbidity of the original sample is 1050 NTU. (In this case: Td=300NTU, Vs=20ml, Vd=50ml, so T = 300 * (20+50) / 20 = 300*70/20 = 21000/20 = 1050)

10. Warranty

The TN-100/ T-100 meter is supplied with a **2-year** warranty from manufacturing defects and calibration standards for **6 months**.

If repair or adjustment is necessary and has not been the result of abuse or misuse within the designated period, please return – freight pre-paid – and correction will be made without charge. Eutech Instruments/ Oakton Instruments will determine if the product problem is due to deviations or customer misuse.

Out of warranty products will be repaired on a charged basis.

Exclusions

The warranty on your instrument shall not apply to defects resulting from:

- Improper or inadequate maintenance by customer
- Unauthorized modification or misuse
- Operation outside of the environment specifications of the products

Waterproof Seal: Opening the instrument enclosure (excluding the battery compartment) may void the warranty.

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11. Return of Items

Authorization must be obtained from our Customer Service Department or authorized distributor before returning items for any reason. A “Return Goods Authorization” (RGA) form is available through our Authorized Distributor. Please include data regarding the reason the items are to be returned. For your protection, items must be carefully packed to prevent damage in shipment and insured against possible damage or loss. Eutech Instruments/ Oakton Instruments will not be responsible for damage resulting from careless or insufficient packing. A restocking charge will be made on all unauthorized returns.

NOTE: *Eutech Instruments Pte Ltd/ Oakton Instruments reserve the right to make improvements in design, construction, and appearance of products without notice.*

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For more information on Eutech Instruments/ Oakton Instruments' products, contact your nearest distributor or visit our website listed below:

Oakton Instruments P.O Box 5136, Vernon Hills, IL60061, USA Tel: (1) 888-462-5866 Fax: (1) 847-247-2984 E-mail: info@4oakton.com Web-site: www.4oakton.com	**Eutech Instruments Pte Ltd** Blk 55, Ayer Rajah Crescent, #04-16/24 Singapore 139949 Tel: (65) 6778 6876 Fax: (65) 6773 0836 E-mail: marketing@eutechinst.com Web-site: www.eutechinst.com	**Distributed by:**

Appendix Q: Supplemental Information

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Appendix R: Active Treatment System and Passive Treatment Plans

Not applicable

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Appendix S: Construction General Permit

Copies of the Construction Stormwater General Permit may be downloaded from the State Water Board website at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.

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CALIFORNIA STATE WATER RESOURCES CONTROL BOARD
1001 I Street Sacramento, CA 95814
https://www.waterboards.ca.gov

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES (GENERAL PERMIT)

ORDER WQ 2022-0057-DWQ
NPDES NO**. CAS000002**

This Order was adopted by the State Water Resources Control Board on:	September 8, 2022
This Order shall become effective on:	September 1, 2023
The statewide programmatic permitting option per Section III.B.4 of this Order shall become effective on:	December 17, 2022
This Order shall expire on:	August 31, 2028

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IT IS HEREBY ORDERED that this Order supersedes Order 2009-0009-DWQ as amended by Order 2010-0014-DWQ and 2012-0006-DWQ except for: (1) the requirement to submit annual reports by September 1, 2023, (2) enforcement purposes, and (3) as set forth in Section III.C of this Order. The discharger shall comply with the requirements in this Order to meet the provisions contained in Division 7 of the California Water Code (commencing with § 13000) and regulations adopted thereunder, and the provisions of the federal Clean Water Act and regulations and guidelines adopted thereunder.

IT IS ALSO HEREBY ORDERED that on or after December 17, 2022, a discharger deploying Executive Order N-73-20 may obtain regulatory coverage through the statewide programmatic permitting option in Section III.B.4 under Order 2009-0009-DWQ as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ until September 1, 2023.

I, Jeanine Townsend, Clerk to the Board, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the State Water Resources Control Board, on September 8, 2022.

AYE:	Chair E. Joaquin Esquivel
	Board Member Sean Maguire
	Board Member Laurel Firestone
	Board Member Nichole Morgan
NAY:	None
ABSENT:	Vice Chair Dorene D'Adamo
ABSTAIN:	None

Courtney Tyler for
Jeanine Townsend
Clerk to the Board

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Attachment H	**Total Maximum Daily Load Implementation Requirements Applicable to Construction Stormwater Discharges**
Attachment I	**Requirements for Dischargers Granted a California Ocean Plan Exception for Discharges to Areas of Special Biological Significance**
Attachment J	**Dewatering Requirements**

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I. FINDINGS

The State Water Resources Control Board (State Water Board) finds that:

1. The Federal Water Pollution Control Act, also referred to as the Clean Water Act, prohibits certain discharges of stormwater containing pollutants to waters of the United States except in compliance with a National Pollutant Discharge Elimination System (NPDES) permit (Title 33 United States Code (U.S.C.) §§ 1311 and 1342(p); also referred to as Clean Water Act §§ 301 and 402(p)). The United States Environmental Protection Agency (U.S. EPA) promulgates federal regulations to implement the Clean Water Act's mandate to control pollutants in stormwater runoff discharges. (Title 40 Code of Federal Regulations (CFR) Parts 122, 123, and 124). The federal statutes and regulations require discharges to waters of the United States comprised of stormwater associated with construction activity to obtain NPDES permit coverage (except operations that result in disturbance of less than one acre of total land area and that are not part of a larger common plan of development or sale). Construction activity includes, but is not limited to, clearing, demolition, grading, excavation, and other land disturbance activities. The NPDES permit shall require implementation of Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to reduce or eliminate pollutants in stormwater runoff. The NPDES permit shall also include any additional requirements necessary to achieve applicable water quality standards.
2. Consistent with Water Code, § 13374, this NPDES permit also serves as waste discharge requirements for discharges of pollutants in stormwater runoff (stormwater discharges) associated with construction and land disturbance activities and is hereinafter referred to as General Permit.
3. A "discharger" is a person, as defined in Water Code § 13050(c), which includes companies and governmental bodies, subject to this General Permit who is responsible for compliance with this General Permit. The discharger designates the Legally Responsible Person(s) to serve as a primary signatory when required to sign, certify, and submit documents or information for this General Permit. The Legally Responsible Person(s) may also designate a Duly Authorized Representative(s) to sign, certify, and submit documents or information for this General Permit. "Discharger" and the designated "Duly Authorized Representative" are further defined in Attachment B of this General Permit.
4. This General Permit regulates discharges to waters of the United States from stormwater and authorized non-stormwater associated with construction activity from sites that disturb one or more acres of land surface, or that are part of a common plan of development or sale that disturbs more than one acre of land surface.
5. This General Permit regulates discharges to waters of the United States from stormwater and authorized non-stormwater associated with construction activities

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from all linear underground and overhead projects resulting in the disturbance of greater than or equal to one acre (Attachment E).

6. This General Permit does not preempt or supersede the authority of local stormwater management agencies to prohibit, restrict, or control stormwater discharges to municipal separate storm sewer systems or other watercourses within their jurisdictions.

7. This action to adopt a general NPDES permit is exempt from the provisions of Chapter 3 of the California Environmental Quality Act (Public Resources Code § 21100, et seq.), pursuant to § 13389 of the California Water Code.

8. Regional Water Quality Control Boards (Regional Water Boards) establish water quality standards in water quality control plans. The State Water Board establishes water quality standards in various statewide water quality control plans, including the California Ocean Plan and the forthcoming Inland Surface Waters, Enclosed Bays, and Estuaries of California Plan. U.S. EPA establishes water quality standards in the National Toxic Rule and the California Toxic Rule.

9. Pursuant to 40 Code of Federal Regulations § 131.12 and State Water Board Resolution No. 68-16 (antidegradation policy), which incorporates applicable requirements of § 131.12, in high quality waters, discharges may not unreasonably affect beneficial uses, result in water quality less than the quality specified by water quality objectives, or cause a pollution or nuisance, except as allowed under the antidegradation policy. The federal antidegradation policy requires that "existing instream uses and the level of water quality necessary to protect the existing uses" are maintained and protected. If the baseline quality of a waterbody for a given constituent "exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected" through the requirements of this Order unless the State Water Board makes findings that: (1) any lowering of the water quality is "necessary to accommodate important economic or social development in the area in which the waters are located"; (2) "water quality adequate to protect existing uses fully" is assured; and (3) "the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control" are achieved. For high quality waters, Resolution No. 68-16 requires findings that any lowering of water quality is "consistent with the maximum benefit to the people of the State" and "will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies" and further that the discharge is subject to "waste discharge requirements which will result in the best practicable treatment or control of the discharge."

10. The State Water Board finds that the permitted discharges authorized by this Order are consistent with the antidegradation provision of 40 CFR §131.12 and State Water Board Resolution No. 68-16, as set forth in Section I.H.2 in the Fact Sheet.

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11. This General Permit serves as an NPDES permit in compliance with Clean Water Act § 402 and will be effective on September 1, 2023, except for the statewide programmatic permitting option per Section III.B.4 of this Order which will go into effect on December 17, 2022, provided the Regional Administrator of the U.S. EPA has no objection. If the U.S. EPA Regional Administrator objects to its issuance, this General Permit will not become effective until such objection is withdrawn.
12. The Regional Water Boards and the State Water Board, collectively referred to as the Water Boards, shall enforce the provisions herein following adoption and upon the effective date of this General Permit.
13. Stormwater discharges from dredge spoil placement that occur outside of waters of the state (upland sites) and that disturb one or more acres of land surface from construction activity are covered by this General Permit. This General Permit does not cover the discharge of dredged or fill material to waters of the state. Construction projects that include the discharge of dredged or fill material to waters of the state should contact the applicable Regional Water Board to obtain authorization for the discharge of dredged or fill material to waters of the state.
14. The discharge of dredged or fill material to a water of the United States is regulated by the United States Army Corps of Engineers under Clean Water Act § 404, and by the Water Boards under Clean Water Act § 401. The discharge of dredged or fill material to a water outside of federal jurisdiction may be regulated by the Water Boards under the Porter-Cologne Water Quality Control Act. This General Permit does not authorize discharges of fill or dredged material regulated by the U.S. Army Corps of Engineers under CWA § 404 and does not constitute a waiver of water quality certification under CWA § 401.
15. Compliance with requirements contained in this General Permit does not supersede or constitute compliance with other regulatory requirements also applicable to discharges regulated by this General Permit, including waste discharge prohibitions in regional and statewide water quality control plans.
16. The State Water Board heard and considered all comments and testimony in a public hearing on August 4, 2021, as publicly noticed in accordance with state and federal laws and regulations. The State Water Board has prepared written responses to all significant comments.
17. The Homeland Security Act of 2002 (U.S. 116 STAT. 2135 and Title 6 U.S. Code Chapter 1 § 101) requires any information provided to the Water Boards per a regulatory action taken by the Water Boards shall comply with the Homeland Security Act and other federal law that address security in the United States; the discharger should not submit any information that does not comply.
18. The discharger is required to comply with this General Permit's conditions for all discharges associated with stormwater from construction activity and authorized non-stormwater discharges by this General Permit or another NPDES permit

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issued by the State Water Board or a Regional Water Board. All other discharges are prohibited by this General Permit.

19. Unauthorized non-stormwater discharges are prohibited, including improper dumping, spills, or leakage from storage tanks or transfer areas. Non-stormwater discharges may contribute significant pollutant loads to receiving waters.

20. All discharges which contain a hazardous substance in excess of reportable quantities established in 40 Code of Federal Regulations §§ 117.3 and 302.4, are prohibited unless a separate NPDES permit has been issued to regulate those discharges.

21. Stormwater that is exposed to by-products and waste products resulting from demolition activities may transport and discharge pollutants off-site and into receiving waters.

22. In 2008, the State Water Board and the California Stormwater Quality Association (CASQA) led a group of stakeholders in developing and establishing the Construction General Permit Training Team (CGPTT). Subsequently, the CGPTT developed the training program and certification process for Qualified Stormwater Pollution Prevention Plan (SWPPP) Developer (QSD) and the Qualified SWPPP Practitioner (QSP) conducting work required by this General Permit. In 2010, CASQA and the State Water Board entered into a Memorandum of Agreement to document their respective understandings, roles, and responsibilities for the implementation of the QSD/QSP training program. The Memorandum of Agreement notes that the CASQA QSD/QSP Training Program constitutes a State Water Board-approved training course pursuant to the Construction Stormwater General Permit. The Memorandum of Agreement also documents that CASQA will continue to lead the QSD/QSP training program, with guidance from the CGPTT.

23. Per the Memorandum of Agreement, CASQA is responsible for qualifying and overseeing Trainers of Record who deliver the official QSD/QSP training program curricula in a manner consistent with the standards established by the CGPTT.

24. All California professional engineering, land surveying, and geology work is licensed by the Board for Professional Engineers, Land Surveyors, and Geologists.[1] Pursuant to the Professional Engineers Act (Bus. and Prof. Code § 6700, et seq.), all engineering work is required to be performed by a California licensed professional engineer. Pursuant to the Profession Land Surveyor's Act (Bus. and Prof. Code §§ 8700 – 8805), all land surveying work is required to be performed by a California licensed profession land surveyor. Pursuant to the Professional Geologist and Geophysicist's Act (Bus. and Prof. Code §§ 7800 –

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1 Department of Consumer Affairs, California Board for Professional Engineers, Land Surveyors, and Geologists website <https://www.bpelsg.ca.gov/> [as of July 2022]

7887), all geological work is required to be performed by a California licensed professional geologist.

25. Precipitation events can occur at any time of the year in California. On-site stormwater management is necessary throughout the entire year to ensure sites implement adequate erosion and sediment controls prior to the onset of a precipitation event, even if construction is planned only during the typically dry season.

26. Soil particles smaller than 0.02 millimeters (mm) (i.e., finer than medium silt) do not settle easily using conventional measures for sediment control (i.e., sediment basins). Fine particles discharged into surface waters cause downstream impacts to beneficial uses in the receiving water. Actively treating construction stormwater discharges with properly operated and maintained active treatment systems can reduce the turbidity level and sediment concentration in the discharge to levels that comply with receiving water limitations.

27. The State Water Board convened a Blue-Ribbon Panel (Panel) of stormwater experts that submitted a report entitled "The Feasibility of Numeric Effluent Limits Applicable to Discharges of Stormwater Associated with Municipal, Industrial and Construction Activities," dated June 19, 2006. The Panel concluded that numeric effluent limitations or numeric action levels are technically feasible to regulate construction stormwater discharges. The Panel concluded that numeric effluent limitations are feasible for discharges from sites that utilize an active treatment system. The Panel also concluded that numeric action levels are likely to be more commonly feasible. The previous permit (Order 2009-0009-DWQ, as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ) includes numeric action levels for pH and turbidity, and specific numeric effluent limitations for active treatment system discharges. The Panel was not asked to address requirements specific to the implementation of Total Maximum Daily Loads (TMDL) with assigned waste load allocations for construction stormwater sources.

28. The purpose of numeric action levels and associated monitoring requirements is to provide operational information regarding the performance of the site control measures used to minimize the discharge of pollutants and to protect receiving water beneficial uses from the adverse effects of construction-related stormwater and authorized non-stormwater discharges. Upon exceedance of a numeric action level, the discharger must take necessary corrective actions, including but not limited to maintenance, replacement, and/or installation of new best management practices. This General Permit relies on dischargers to implement an iterative process for best management practice to protect water quality. Failure to implement corrective actions in response to a numeric action level exceedance is a violation of this General Permit.

29. This General Permit requires compliance with receiving water limitations based on water quality standards established in regional or statewide water quality control plans. One of the receiving water limitations requires that construction

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stormwater discharges and authorized non-stormwater discharges not cause or contribute to an exceedance of applicable water quality standards. Water quality standards apply to the quality of the receiving water, not the quality of the construction stormwater discharge. Therefore, compliance with the receiving water limitations generally cannot be determined solely by the effluent water quality characteristics. If any discharger's stormwater discharge causes or contributes to an exceedance of water quality standards, that discharger must implement additional BMPs or other control measures in order to attain compliance with the receiving water limitation. Compliance with water quality standards may, in some cases, require dischargers to implement controls that are more protective than controls implemented solely to comply with the technology-based requirements in this General Permit.

30. A Total Maximum Daily Load is the sum of the allowable loads of a single pollutant from all contributing point sources (waste load allocations) and non-point sources (load allocations), plus the contribution from background sources (40 Code of Federal Regulations § 130.2(i)). Discharges of stormwater from construction activities are considered point source discharges, and therefore must comply with NPDES permit requirements translated to be "consistent with the assumptions and requirements of any available waste load allocation for the discharge prepared by the state and approved by U.S. EPA pursuant to 40 Code of Federal Regulations § 130.7" (40 Code of Federal Regulations § 122.44 (d)(1)(vii)). In addition, Water Code § 13263, subdivision (a), requires that waste discharge requirements implement any relevant water quality control plans. Many TMDLs in water quality control plans include implementation requirements that may be translated into General Permit requirements and TMDL-specific numeric action levels and numeric effluent limitations.

31. Areas of Special Biological Significance are defined in the California Ocean Plan as "those areas designated by the State Water Board as ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable." The California Ocean Plan prohibits the discharge of waste to Areas of Special Biological Significance unless identified in a State Water Board-approved exception.

32. The California Ocean Plan authorizes the State Water Board to grant an exception to California Ocean Plan provisions where the State Water Board determines that the exception will not compromise protection of ocean waters for beneficial uses and the public interest will be served.

33. On March 20, 2012, the State Water Board adopted Resolutions 2012-0012 and Resolution 2012-0031, which contain exceptions to the California Ocean Plan for specific discharges of stormwater and non-point sources. This resolution also contains the special protections that are to be implemented for those discharges to Areas of Special Biological Significance.

34. Dischargers are only allowed to discharge to an Area of Special Biological Significance when in compliance with Areas of Special Biological Significance-

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specific requirements in a State Water Board-provided exception to the California Ocean Plan granted to the specific discharger.

35. On August 19, 2014, the U.S. EPA adopted regulations requiring all NPDES permits to include requirements to implement sufficiently sensitive test methods. This General Permit requires all laboratory analyses to be sufficiently sensitive and conducted according to test procedures under 40 Code of Federal Regulations Part 136. All analytical results less than the minimum level (reporting limit), as reported by the laboratory, will be assigned a value of zero (0) for any calculations required by this permit (e.g., numeric action level and numeric effluent limitation exceedance determinations), so long as a sufficiently sensitive test method was used as evidenced by the reported method detection limit and minimum level.

36. Specific types of passive treatment used in combination with other best management practices (BMPs) can prevent or reduce the discharge of fine particles from certain construction activities when implemented correctly.

37. Passive treatment is the application of natural or synthetic chemicals and products to reduce turbidity in discharges through coagulation and flocculation. Passive treatment does not rely on computerized, enclosed systems with pumps, filters, and real-time controls. Passive treatment may include pumps where they are necessary to move water around the site. The discharge of chemicals used in passive treatment can potentially cause or contribute to acute and chronic toxicity to aquatic life in receiving waters, potentially resulting in an exceedance of narrative or numeric water quality objectives in regional or statewide water quality control plans.

38. State Water Board Resolution 2005-0006, "Resolution Adopting the Concept of Sustainability as a Core Value for State Water Board Programs and Directing its Incorporation," and Resolution No. 2008-0030, “Requiring Sustainable Water Resources Management,” include performance standards for post-construction BMPs. The standards include the use of permanent post-construction BMPs that manage stormwater runoff rates to match pre-construction project site hydrology, and to sustain and ensure the physical structure and biological integrity of aquatic ecosystems in the receiving waters. This “runoff reduction” approach is analogous in principle to low impact development and is proven to protect watersheds and waterbodies from hydrologic-based adverse changes and pollution impacts associated with the post-construction landscape.

39. Linear underground and overhead projects are not subject to post-construction requirements due to the nature of their construction to return project sites to pre-construction conditions.

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IT IS HEREBY ORDERED that all dischargers subject to this General Permit shall comply with the following conditions and requirements (including all conditions and requirements as set forth in the Attachments of this Order)[2]: State Water Board Order 2009-009-DWQ as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ (previous permit) is superseded as of the effective date of this General Permit except for enforcement purposes, the Annual Report required to be submitted by September 1, 2023, and as set forth in Section III.C.

II. SCOPE OF GENERAL PERMIT COVERAGE

II.A. Traditional Construction Activities Subject to this General Permit

This General Permit covers construction projects that include construction or land disturbance activities that result in a disturbance of one or more acres, or less than one acre but are part of a larger common plan of development or sale that totals one or more acres of land disturbance, such as the following:

1. Construction activity that includes, but is not limited to, clearing, grading, excavation, stockpiling, and demolition activities that expose or disturb soil.
2. Construction activity related to residential, commercial, or industrial development on lands currently used for agriculture including, but not limited to, the construction of buildings related to agriculture that are considered industrial pursuant to U.S. EPA regulations, such as dairy barns or food processing facilities.
3. Construction activity associated with oil and gas exploration, production, processing, or treatment operations or transmission facilities pursuant to 40 Code of Federal Regulations § 122.26(c)(1)(iii), which:
    a. Had a discharge of stormwater resulting in the discharge of a reportable quantity for which notification is or was required pursuant to 40 Code of Federal Regulations §§ 117.21 or 302.6 at any time since November 16, 1987;
    b. Had a discharge of stormwater resulting in the discharge of a reportable quantity for which notification is or was required pursuant to Code of Federal Regulations § 110.6 at any time since November 16, 1987; or
    c. Contributes to a violation of a water quality standard.

II.B. Traditional Construction Activities Not Subject to this General Permit

This General Permit does not apply to the following construction activity:

1. Routine maintenance. Routine maintenance is defined as activities intended to maintain the original line and grade, hydraulic capacity and/or purpose of

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2 The attachments are part of this General Permit; the attachments are not separate orders or documents that will be updated independently by the State Water Board.

the facility. This General Permit further defines routine maintenance for road and highway projects as the replacement of the structural section, but not when the activity exposes the underlying soil or erodible subgrade. The road surface and base are not part of the subgrade. As such, those portions of a project that remove the paved road surface and base down to the erodible subgrade and/or underlying soil would not be considered routine maintenance.

2. Disturbances to land surfaces solely related to growing crops or agricultural operations such as disking, harrowing, terracing, and leveling, and soil preparation.
3. Discharges of stormwater from areas on tribal lands; construction on tribal lands is regulated by a federal permit.
4. Discharges of stormwater within the Lake Tahoe Hydrologic Unit. The Lahontan Regional Water Board has adopted its own permit to regulate stormwater discharges from construction activity in the Lake Tahoe Hydrologic Unit. Owners of construction sites in this watershed must apply for the Lahontan Regional Water Board permit rather than the statewide Construction Stormwater General Permit. Construction sites within the Lahontan region must also comply with the Lahontan Region Project Guideline for Erosion Control (R6T-2016-0010).[3]
5. Construction activity that disturbs less than one acre of land surface, unless part of a larger common plan of development or the sale of one or more acres of disturbed land surface.
6. Construction activity covered by an individual NPDES Permit for stormwater discharges.
7. Construction activity that is subject to the Industrial Stormwater General Permit:
    a. Landfill operations as described by Standard Industrial Classification (SIC) code 4953. Landfill operators typically enroll under the Construction Stormwater General Permit for initial construction and final closure of the landfill.
    b. Concrete manufacturers of prefabricated products, ready-mix concrete, or slurries that are delivered to construction sites require enrollment in the Industrial Stormwater General Permit. Examples of this industrial activity are those facilities primarily engaged in manufacturing concrete building blocks and bricks, other concrete products not building blocks and bricks,

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3 Lahontan Regional Water Quality Control Board, Order R6T-2016-0010 (March 10, 2016), https://www.waterboards.ca.gov/lahontan/water_issues/programs/storm_water/docs/r6t_2016_0010_cgp_combined.pdf> [as of May 20, 2021]

or ready-mix concrete as categorized by Standard Industrial Classification (SIC) codes 3531, 3271, 3272, or 3273. Concrete manufacturing of prefabricated products, ready-mixed concrete, or slurries that are transported from construction sites where mixing occurs and delivered to a separate site require enrollment in the Industrial Stormwater General Permit.

8. Construction activity that discharges to combined sewer systems.
9. Discharges of stormwater identified in Clean Water Act § 402(l)(2), 33 USC § 1342(l)(2) (stormwater runoff from oil, gas, and mining operations) unless the discharge meets the conditions of 40 Code of Federal Regulations § 122.26(c)(1)(iii) as described in this General Permit.
10. Discharges of dredged or fill material to waters of the state. Those portions of the construction project that are located outside of waters of the state or waters of the United States are subject to this General Permit if the non-water portions disturb one or more acres of land.

II.C. Linear Underground and Overhead Projects Subject to this General Permit

1. Linear underground and overhead projects include, but are not limited to conveyance facilities, culverts, pipelines, or other linear corridors for:
   a. The transportation of any gaseous, liquid, liquescent, and slurry material;
   b. Cable line or wire for the transmission of:
      i. Electrical energy; or
      ii. Communications, including internet, telephone, telegraph, radio, or television messages.
   c. Ancillary facilities and substructures such as new access roads, helicopter landing zones, laydown yards, staging areas, substations, valve stations, etc. that primarily function as support for linear underground and overhead project construction activities.[4]
2. Construction support activities associated with linear underground and overhead projects include, but are not limited to:
   a. Activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment, vegetative management, and associated ancillary facilities); and

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4 Regional Water Board staff may require, in writing, that the discharger obtain coverage through a traditional construction notice of intent when the construction of ancillary facilities more closely resembles traditional construction activities.

b. Activities including underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavating, boring and drilling, access road and pole/tower pad and cable/wire pull station, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and pavement repair or replacement, and stockpile/borrow locations.

II.D. Linear Underground and Overhead Projects Not Subject to this General Permit

This General Permit does not apply to the following linear underground and overhead project construction activity:

1. Routine maintenance projects. Routine maintenance projects are projects associated with operations and maintenance activities that are conducted on existing lines and facilities and within existing right-of-way, easements, franchise agreements, or other legally binding agreements of the discharger granting access to land. Routine maintenance projects include, but are not limited to projects that are conducted to:
   a. Maintain the original purpose of the facility or hydraulic capacity;
   b. Update existing lines[5] and facilities to comply with applicable codes, standards, and regulations regardless of if such projects result in increased capacity; and/or
   c. Repair leaks.
2. Routine maintenance does not include construction of new lines or facilities resulting from compliance with applicable codes, standards, and regulations.
3. Routine maintenance projects do not include those areas of maintenance projects that are outside of an existing right-of-way, franchise, easements, or agreements. When a project must secure new areas, those areas may be subject to this General Permit based on the area of disturbed land outside the original right-of-way, easement, or agreement.
4. Linear underground and overhead project construction activity does not include field activities associated with the planning and design of a project (e.g., activities associated with route selection).
5. Tie-ins conducted immediately adjacent to “energized” or “pressurized” facilities by the discharger are not considered construction activities where all other linear underground and overhead project construction activities associated with the tie-in are covered by a Notice of Intent and SWPPP of a third party or municipal agency.

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5 Update existing lines includes replacing existing lines with new materials or pipes.

III. OBTAINING, REVISING, AND TERMINATING PERMIT COVERAGE

III.A. Obtaining Permit Coverage for Traditional Construction Projects

III.A.1. The Discharger shall obtain a Waste Discharge Identification (WDID) number prior to the commencement of construction activity by electronically certifying and submitting the following Permit Registration Documents through the State Water Board Stormwater Multiple Application and Report Tracking System (SMARTS)[6]:

a. Notice of Intent, including Risk Level determination as described in Attachment D.1;

b. Site Drawings and Maps;

c. Stormwater Pollution Prevention Plan (SWPPP) (see Section IV.O, below);

d. Applicable plans, calculations, and other supporting documentation for compliance with existing permitted Phase I or Phase II municipal separate storm sewer system post-construction requirements or the post-construction standards of this General Permit;

e. Annual fee per the current 23 California Code of Regulations Chapter 9 fee schedule for NPDES stormwater permits; and

f. All applicable additional Permit Registration Document information as required in Attachment D.2 of this General Permit.

III.A.2. An applicant is considered to have General Permit regulatory coverage and can commence construction activity upon receipt of a WDID number generated by SMARTS. Dischargers shall post their site-specific WDID number in a site location that is viewable to the public or readily available upon request if unable to post publicly.

III.A.3. In the case of a public emergency that requires immediate construction activities involving one acre or more of land disturbance, a discharger shall submit a brief description of the emergency construction activity to the applicable Regional Water Board within five calendar days of the onset of site construction. The discharger shall then submit the required Permit Registration Documents through SMARTS within 30 calendar days of commencing site activity.

III.A.4. Failure to obtain General Permit coverage for stormwater and non-stormwater discharges covered by this General Permit to waters of the United States is a violation of the Clean Water Act and the California Water Code.

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6 Dischargers are required to have a signed original Electronic Authorization Form on file with the State Water Board for each organization in SMARTS.

III.B. Obtaining Permit Coverage for Linear Underground and Overhead Projects

The discharger for a linear underground and overhead project shall designate a Legally Responsible Person for each of its WDIDs numbers. The discharger is responsible for enrollment under and compliance with this General Permit. The Legally Responsible Person, as defined in Attachment B of this General Permit, shall fulfill the electronic signature and certification requirements to obtain General Permit coverage (see Section VI.H, Electronic Signature and Certification Requirements.)

III.B.1. A discharger for a linear underground and overhead project shall obtain General Permit coverage under one or more applications submitted through SMARTS, per the requirements in Attachment E of this General Permit.

III.B.2. The Legally Responsible Person shall electronically certify and submit the following applicable Permit Registration Documents through SMARTS[7] and obtain a WDID number prior to the commencement of any construction activities.

a. Notice of Intent, including linear underground and overhead project type determination as described in Attachment E.1;

b. Site-specific Stormwater Pollution Prevention Plan (SWPPP), Drawings, and Maps (see Section IV.O, below);

c. Annual fee per the current 23 California Code of Regulations Chapter 9 fee schedule for NPDES stormwater permits; and

d. All applicable additional Permit Registration Document information as required in Attachment E.2 of this General Permit.

III.B.3. Regulatory Coverage for linear underground and overhead project segments

III.B.3.a. The discharger may separate a contiguous linear underground and overhead project into separately regulated segments. Linear underground and overhead project segments may consist of different risk types.

III.B.3.b. The discharger shall include a clear description in the Permit Registration Documents regarding how each segment relates to the overall linear underground and overhead project by identifying one or more of the following descriptions:

i. The segments are managed by separate contractors;

ii. The segments are constructed during distinct project phases; or

iii. The segments are located in different topography, watersheds, or jurisdictional boundaries.

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7 Dischargers are required to have a signed original Electronic Authorization Form on file with the State Water Board for each organization in SMARTS.

III.B.3.c. Dischargers with corresponding linear underground and overhead project segments that cross Regional Water Board(s) boundaries (e.g., different segments of same project located within different Regional Water Board jurisdictions) must file separate Permit Registration Documents.

III.B.4. Programmatic Permitting Regulatory Coverage for linear underground and overhead projects

III.B.4.a. A discharger may submit one Notice of Intent requesting regional programmatic General Permit coverage for multiple non-contiguous linear underground and overhead projects, if the projects:

i. Are located within one Regional Water Board jurisdiction;

ii. Are a group of projects of similar scopes with common construction activities; and

iii. Have the same Legally Responsible Person.

III.B.4.b. Effective December 17, 2022, a discharger deploying Executive Order N-73-20, per the requirements and due dates of the executive order, or amendments therein, may submit one Notice of Intent requesting statewide programmatic General Permit coverage for multiple non-contiguous linear underground and overhead broadband projects, where the installation of the utilities is outside of a construction project that is otherwise regulated under this General Permit.

III.B.4.b.i. A discharger deploying Executive Order N-73-20 may apply for a statewide programmatic permit for regulatory coverage under Order 2009-0009-DWQ (as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ), from December 17, 2022 until September 1, 2023, by submitting the information required by Attachment E.2.

III.B.4.c. Linear underground and overhead project dischargers with programmatic permitting coverage shall submit, prior to the commencement of any construction activities for each non-contiguous site, a:

i. Common SWPPP with the Notice of Intent covering all the activities common to the projects; and

ii. Linear Construction Activity Notification for each site describing site-specific information in accordance with Attachment E.2, Section II.A.2.

III.B.5. An applicant is considered to have General Permit regulatory coverage and may commence construction activity upon receipt of a WDID number generated by SMARTS Dischargers shall post the project-specific WDID number in a site location that is visible to the public or readily available upon request if unable to post publicly.

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III.C. Regulatory Coverage under the Previous Permit

III.C.1. Dischargers that obtain coverage under State Water Board Order 2009-0009-DWQ, as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ, (previous permit) prior to the effective date of this permit, may continue coverage under the previous permit until its regulated project(s) receive an approved Notice of Termination from the Regional Water Board, up to two years after the effective date of this General Permit. Two years after September 1, 2023, all existing Notices of Intent subject to the previous permit will be administratively terminated.

III.C.1.a. A discharger continuing regulatory coverage under the previous permit cannot increase a project's disturbed acreage through the Change of Information process, on or after the effective date of this General Permit; the discharger must submit a Notice of Intent for coverage under this General Permit for the increase in disturbed acreage.

III.C.2. Dischargers with the previous permit's Small Construction Rainfall Erosivity waiver may continue to operate under a project's active waiver until it expires. Waivers granted under the previous permit cannot be modified or extended.

III.C.3. Dischargers that submit a Notice of Termination for previous permit termination up to two years after the effective date of this General Permit and receive Notice of Termination approval from the Regional Water Board are not subject to this General Permit (unless the discharger subsequently submits new Permit Registration Documents).

III.C.4. Dischargers with coverage under the previous permit that need regulatory coverage after September 1, 2025 under this General Permit, shall submit, in SMARTS, the following items by August 31, 2025:

a. A certification of the discharger's intent to obtain regulatory coverage under this General Permit;

b. A revised Notice of Intent and other Permit Registration Documents, revised to address new or changed requirements per this General Permit, as applicable; and

c. The applicable fee.

III.D. Small Construction Rainfall Erosivity Waiver

III.D.1. Dischargers are eligible for the Small Construction Rainfall Erosivity waiver (waiver) if:

a. The site is between one and five acres; and

b. The construction activity will take place during a period when the calculated rainfall erosivity factor is less than five.

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III.D.2. Dischargers with small sites that are part of a larger common plan of development, or dischargers that have programmatic permit coverage, do not qualify for a waiver unless the entire project qualifies for a waiver.

III.D.3. To request a waiver, the Legally Responsible Person shall submit a waiver application through SMARTS, and pay the appropriate fee to the State Water Board. If approved by the State Water Board, SMARTS will electronically provide the discharger with the waiver and a unique waiver identification number. The waiver is effective on the date the waiver identification number is issued and valid between the construction start and end dates, as entered in the waiver application.

III.D.4. A discharger qualifying for a waiver shall obtain a waiver identification number prior to starting any construction activities regulated by this General Permit.

III.D.5. A waiver is valid only if the correct start and end dates of construction activities are entered (and updated if necessary) through the Change of Information process in SMARTS.

III.D.6. The discharger may revise an original construction start date though the Change of Information process in SMARTS and shall provide documentation demonstrating the project had not started on the date originally submitted through SMARTS.

III.D.7. The discharger shall update the project end date through the Change of Information process in SMARTS prior to expiration of the waiver if the project completion date is anticipated to extend past the waiver expiration date. If the updated project end date results in a rainfall erosivity factor of five or greater, the discharger shall obtain coverage under this General Permit. If the discharger fails to update the project end date prior to expiration of waiver, they shall immediately obtain coverage under this General Permit.

III.D.8 The discharger shall post the unique waiver identification number in a site location that is visible to the public or readily available upon request if unable to post publicly.

III.D.9. A waiver does not provide General Permit coverage. Dischargers with a waiver are not required to comply with post-construction, sampling, monitoring, or other SWPPP requirements in this General Permit.

III.D.10. Regional Water Board staff may terminate a waiver if the Regional Water Board staff determines the discharge of stormwater runoff causes or contributes to an exceedance of a water quality standard or violates a prohibition in an applicable regional or statewide water quality control plan. The Regional Water Board Executive Officer or their delegate may require the discharger to obtain regulatory coverage under this General Permit or an NPDES permit issued by the Regional Water Board.

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III.E. Notice of Non-Applicability

III.E.1. A discharger claiming "No Discharge" through a Notice of Non-applicability (NONA) as set forth in Water Code § 13399.30 shall meet the following eligibility requirement:

a. The site's physical location is not hydrologically connected to waters of the United States.

III.E.2. When claiming the "No Discharge" option, the discharger shall submit and certify via SMARTS both the NONA and a No Discharge Technical Report. The No Discharge Technical Report shall identify the site by address or parcel number and demonstrate that the site meets the eligibility requirement described above in Section III.E.1.a.

III.E.3. The No Discharge Technical Report shall be signed (wet signature and license number) by a California licensed professional engineer or geologist with hydrological expertise.

III.E.4. The Regional Water Board may require the No Discharge Technical Report to be reassessed if it determines that there are errors in the No Discharge Technical Report or if the site is hydrologically connected to waters of the United States.

III.F. Revising Permit Coverage Information

The discharger shall revise permit coverage information, as appropriate, to:

III.F.1. Update Construction Start and End Dates

III.F.1.a. The discharger shall electronically certify and submit a revised Notice of Intent through a Change of Information in SMARTS, when the construction start or end date changes, recalculating sediment risk and revising the SWPPP as appropriate. The Change of Information shall be submitted at least 14 days prior to the date that was modified, unless infeasible due to unforeseen circumstances.

III.F.1.b. If the discharger is revising the construction start date to a later date than previously submitted, the Change of Information shall contain time-stamped photo documentation depicting that construction activities have not commenced for the entirety of the site.

III.F.2. Reduce Acreage

III.F.2.a. When a portion of the site meets conditions for termination of coverage (Section III.H) or is sold/transferred to a new owner, the discharger may reduce the disturbed acreage covered under the General Permit. The discharger reducing disturbed acreage shall electronically certify and submit the following Permit Registration Document revisions in SMARTS, through a Change of Information, within 30 days of the reduction in acreage:

i. A revised Notice of Intent indicating the new site size;

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ii. Photos demonstrating final stabilization, if applicable;

iii. Revised site map(s) showing (as applicable) acreage currently under construction; acreage sold/transferred, and/or added; and acreage currently stabilized in accordance with the Conditions for Termination of Coverage in Section III.H below; and

iv. A revised SWPPP to match the change in acreage.

III.F.2.b. For a larger common plan of development for residential use, the discharger may, through the Change of Information process, remove residential lots from permit coverage once the lot meets the following criteria:

i. The residential lot has been sold to the individual homeowner(s) for residential use;

ii. A certificate of occupancy or equivalent document, is maintained on-site and can be made available during inspections;

iii. The lot is less than one acre of disturbance;

iv. All construction activity conducted on the lot by the discharger is complete; and

v. The discharger has temporarily stabilized any unfinished yard and landscaping areas with BMPs.

III.F.2.c. The discharger shall upload, as an attachment in SMARTS, documentation of a contract (e.g., Covenants, Conditions, and Restrictions) requiring the individual homeowner to stabilize the yard and landscaping within one year and to maintain the temporary BMPs until the yard and landscaping are stabilized.

III.F.2.d. The discharger shall maintain General Permit coverage for any site, parcel, or individual lot that has not received Change of Information or Notice of Termination approval from the Regional Water Board or obtained coverage under the new owner's Notice of Intent.

III.F.3. Termination of Programmatic Permit Coverage for Linear Underground and Overhead Projects

III.F.3.a. Upon completion of construction activities for a specific site with linear underground and overhead project programmatic permit coverage, the discharger shall submit a Linear Construction Termination Notification for each completed linear segment.

III.F.3.b. The site must meet the termination conditions in Section III.H.3 below.

III.F.3.c. The Linear Construction Termination Notification must include photos demonstrating final stabilization.

III.F.3.d. Regional Water Board approval of the Linear Construction Termination Notification terminates coverage for the specific site.

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III.F.4. Increase Acreage

III.F.4.a. If the disturbed acreage of the site will increase, the discharger shall certify and submit the following Permit Registration Documents revisions in SMARTS, through a Change of Information, prior to the increase in disturbed acreage:

i. A revised Notice of Intent indicating the new site size;

ii. A revised site map(s) showing (as applicable) acreage currently under construction; acreage sold, transferred, and/or added; and acreage currently stabilized in accordance with the conditions for terminating coverage in Section III.H below; and

iii. A revised SWPPP to match current site size.

III.F.4.b. The discharger shall submit the applicable fees, in accordance with the revised fee notification, within 14 calendar days of the notification date. The Change of Information will be returned if these fees are not received by the State Water Board within 14 calendar days of the notification date.

III.F.4.c. Regulatory coverage under this General Permit for the added acreage is not approved until the Regional Water Board approves the Change of Information.

III.F.4.d. If the increased acreage is greater than one-fourth mile from the existing site boundary and is an acre or larger, the discharger is required to submit a separate Notice of Intent.

III.F.5. Change in Ownership

III.F.5.a. Prior to a sale/transfer of a site, parcel, or individual lot (change of ownership), the existing discharger shall submit a Notice of Termination for change of ownership and a certification that the new owner has been notified of applicable requirements to obtain new General Permit for the qualifying activities. The existing discharger certification shall include the name, address, telephone number, and email address of the proposed new owner in the Notice of Termination submitted through SMARTS.[8]

III.F.5.b. General Permit coverage is not transferable to a new owner. The new discharger will need to submit their own Permit Registration Documents to obtain a new WDID number prior to continuing construction activities and/or installing final landscaping (including meeting conditions for termination of coverage). The new discharger shall enter the original project start date (initial date of disturbance) from the previous discharger(s).

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8 Dischargers that are submitting a Notice of Termination for a change of ownership, where the new owner will obtain permit coverage to complete construction, are not required to comply with the requirements in Order Section III.H.

III.G. Inactive Projects

III.G.1. Dischargers with projects where all construction activities (including passive treatment, active treatment systems, and/or active equipment) will be suspended for 30 days or more may submit a Change of Information through SMARTS to revise the SWPPP. The Change of Information shall include:

a. Revised site map depicting the current status of construction; and

b. Photographs showing the temporary stabilization BMPs that were implemented.

III.G.2. Upon Regional Water Board approval of the Change of Information, sampling may be suspended, and monitoring and inspections may be reduced as follows:

III.G.2.a. A QSD shall visit the inactive project within 14 days of Regional Water Board approval of the Change of Information to verify that the SWPPP is being implemented accordingly. If necessary, the QSD shall amend the SWPPP to address all new conditions not previously considered through a Change of Information in SMARTS.

III.G.2.b. A QSP or trained delegate shall visually inspect the inactive project at least once every calendar month and prior to any weather pattern that is forecasted to have a 50 percent or greater chance of 0.5 inches or more in a 24-hour period. Please refer to Attachments D and E Section III.C for information pertaining to visual inspection requirements.

i. The QSP or trained delegate shall verify BMPs are functioning in accordance with the SWPPP and implement corrective actions where necessary.

III.G.2.c. The above inspections are not required during dangerous weather conditions or when access to the site is infeasible (e.g., due to snow accumulation) or unsafe.

III.G.3. Dischargers wishing to resume construction activities or the use of passive treatment, active treatment systems, and/or active equipment shall submit a Change of Information through SMARTS requesting to resume the project along with a revised site map based on current site conditions. Upon Regional Water Board approval of the Change of Information, the discharger is required to comply with all applicable requirements of this General Permit to resume construction activities at the site.

III.H. Terminating Permit Coverage

III.H.1. To terminate General Permit coverage, the discharger shall electronically certify and submit the required documentation (Section III.H.2 below) to demonstrate compliance with all General Permit coverage termination requirements, including applicable post-construction BMPs and/or low impact development features.

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III.H.2. The discharger shall electronically certify and submit the following through SMARTS to be considered for General Permit coverage termination:

a. A complete Notice of Termination;

b. QSP-prepared final Notice of Termination inspection with the QSP name and valid QSP certificate number;

c. A final site map; and

d. Photos demonstrating final stabilization and the implementation of applicable post-construction BMPs and/or low impact development.

III.H.3. The discharger shall certify and submit a final site map, as part of the Notice of Termination documents through SMARTS. The Notice of Termination final site map shall, at minimum, include the following:

a. Project boundaries and adjacent lands with labeled key features, such as roadways and waterbodies;

b. Developed drainage basin boundaries and discharge location points;

c. Site entrances and exits, lot boundaries, roads, structures, and features related to the project that may be used as a reference;

d. Specific permanent erosion control BMPs, post-construction BMPs, and low impact development features;

e. Individual erosion control BMPs (including final landscaping) identified using hatch patterns, symbols, or shading unique to each BMP;

f. Location and orientation of all photos used to document final site conditions and demonstrate compliance with post-construction requirements of this General Permit; and

g. If applicable, areas of the site being transferred to new ownership, and the name and contact information of the owner.

III.H.4. The Regional Water Board will consider a site, parcel, or individual lot complete only when all portions of the site comply with all the following conditions:

a. The discharger has completed all construction activity;

b. There is no greater potential for construction-related stormwater pollutants to be discharged into site runoff than prior to the construction activity;

c. Construction-related equipment and temporary BMPs have been removed from the site, except as set forth in Section III.F.2.b above;

d. Construction materials and wastes have been disposed of properly;

e. Soils disturbed by construction activities have been permanently stabilized (final stabilization), except as set forth in Section III.F.2.b above, using materials that:

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i. Have a product life that support the full and continued stabilization of the site;

ii. Achieve stabilization without becoming trash or debris; and

iii. Minimize the risk of wildlife entrapment;

f. The discharger has ensured the QSP completed on-site visual inspections and verified the site complies with all Notice of Termination requirements, including installation of post-construction stormwater runoff BMPs and/or low impact development features;

g. The Legally Responsible Person has submitted the information in the Notice of Termination and has certified and submitted through SMARTS; and

h. The discharger has demonstrated that the site complies with all Notice of Termination conditions above (Section III.H) and all final stabilization conditions by one of the following methods:

i. **70 percent final cover method**. No computational proof required. Requires permanent vegetative cover to be evenly established over 70 percent of all disturbed and exposed areas of soil (non-paved or non-built). In areas that naturally have low vegetative coverage (e.g., deserts), 70 percent of natural conditions of local undisturbed areas is acceptable. Photos of all site areas are required to verify compliance with the 70 percent final cover requirement;

OR

ii. **Revised Universal Soil Loss Equation (RUSLE or RUSLE2) method.** Computational proof required. Site conditions shall match values used in method computation. Photos of all site areas are required to verify pre-construction and post-construction conditions used in the computations;

OR

iii. **Custom method.** The discharger may request approval from the Regional Water Board to use a method or analytical model other than Section III.H.4.h.i and 4.h.ii above to demonstrate that the site complies with the “final stabilization” requirements. Photos of all site areas are required to verify the custom method used.

III.H.5. The Notice of Termination photo documentation for General Permit compliance verification shall include photos of the site’s final site conditions; post-construction BMPs and/or low impact development features; a description of the corresponding location, and orientation of photos as indicated on the final site map.

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III.H.6. The Notice of Termination shall include a long-term maintenance plan[9] for the post-construction stormwater runoff BMPs and/or low impact development features being implemented.

III.H.7. The Notice of Termination will be automatically approved 30 calendar days after the date of Notice of Termination is submitted, unless, within the 30 calendar days the Regional Water Board notifies the discharger through SMARTS that the Notice of Termination has been denied, returned, or accepted for review.

III.H.8. All General Permit requirements remain in effect until the Notice of Termination is approved. The Legally Responsible Person will be notified through SMARTS communication when the discharger's General Permit coverage and corresponding WDID number are terminated.

IV. PERMIT REQUIREMENTS

IV.A. Authorized Non-Stormwater Discharges

IV.A.1. Non-stormwater discharges from the following de-chlorinated potable and non-potable water sources are authorized if they comply with the requirements in Section IV.A.2 of this General Permit:

a. Fire-fighting activity;

b. Fire hydrant system flushing;

c. Irrigation of vegetative erosion control measures;

d. De-chlorinated potable water, including uncontaminated water line flushing;

e. Hydrostatic pipe flushing and testing water;

f. Air conditioning or compressor condensate;

g. Uncontaminated groundwater or spring water from construction dewatering activities in compliance with Attachment J; and

h. Water to control dust.

IV.A.2. The above non-stormwater discharges are authorized under the following conditions:

a. The discharge is not routed through site areas with exposed soil, except for water used for dust control or to vegetation irrigation to stabilize areas;

b. The discharge does not cause or contribute to an exceedance of water quality standards in the receiving water;

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9 For the purposes of this requirement, a long-term maintenance plan shall be designed for a minimum of five years, and describe the responsible party(ies), schedule, and procedures needed to ensure that post-construction features are adequately maintained and functional.

c. The discharge complies with other applicable requirements of this General Permit including applicable action levels, effluent limitations, and monitoring and reporting requirements;

d. The discharge is not prohibited by an applicable regional or statewide water quality control plan;

e. The discharge is in accordance with other applicable State and Regional Water Board permits; and

f. The discharge does not contain toxic constituents in toxic amounts and does not cause toxicity in the receiving water body.

IV.B. Discharge Prohibitions

IV.B.1. Dischargers shall not violate any discharge prohibitions contained in applicable water quality control plans.

IV.B.2. Discharges to Areas of Special Biological Significance (ASBS) are prohibited by the California Ocean Plan, unless granted an exception issued by the State Water Board.

IV.B.3. All discharges are prohibited except for the stormwater and non-stormwater discharges specifically authorized by this General Permit or another NPDES permit. The discharger shall notify the Regional Water Board of existing or anticipated non-stormwater discharges not authorized by this General Permit, within 24 hours of the discharge, to determine if regulatory coverage is necessary through a separate NPDES permit.

IV.B.4. All of the following discharges are prohibited:

a. Debris and trash, in accordance with State Water Board Resolution 2015-0019, the Trash Provisions of the Water Quality Control Plan for Ocean Waters of California and the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California, as applicable to construction stormwater discharges.

i. To comply with the Trash Provisions, dischargers shall implement, operate, and maintain trash management, treatment, and institutional controls to eliminate debris and trash from all stormwater discharges and authorized non-stormwater dischargers consistent with the prohibition of the discharge of debris and trash regulated by this General Permit. If the discharger is unable to comply with the prohibition of the discharge of debris and trash, the discharger must submit, for Regional Water Board Executive Office or designee approval, an amended Stormwater Pollution Prevention Plan addressing:

1. A demonstration that the discharger is unable to comply with this outright prohibition of the discharge of debris and trash; and

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2. A demonstration that the discharger's chosen combination of trash management, treatment, and institutional controls achieves full capture system equivalency.

b. Treatment chemicals except as authorized in Attachment F and G;

c. Wastewater from washout or cleanout of areas, structures or equipment with concrete, grout, stucco, paint or other construction materials;

d. Form-release oils and curing compounds;

e. Fuels, oils, fluids, or other materials used in vehicle and equipment operation and maintenance;

f. Soaps, solvents, or detergents (e.g., used in vehicle equipment washing or external building wash down); and

g. Toxic or hazardous substances (e.g., asbestos, lead, mercury, or PCBs).

IV.C. Effluent Limitations and Action Levels

IV.C.1. Narrative Effluent Limitations

IV.C.1.a. Stormwater discharges and authorized non-stormwater discharges regulated by this General Permit shall not contain a hazardous substance equal to or in excess of reportable quantities established in 40 Code of Federal Regulations §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

IV.C.1.b. Dischargers shall minimize or prevent pollutants in stormwater discharges and authorized non-stormwater discharges through the use of controls, structures, and management practices set forth in the order and attachments of this General Permit that achieve best available technology (BAT) for toxic and non-conventional pollutants and best conventional technology (BCT) for conventional pollutants.

IV.C.2. Numeric Effluent Limitations[10]

IV.C.2.a. All dischargers implementing active treatment systems are subject to the numeric effluent limitations required in Attachment F.

IV.C.2.b. All dischargers that are Responsible Dischargers for a TMDL with a waste load allocation that was translated into a TMDL-related numeric effluent limitation, are subject to the numeric effluent limitations as indicated by Table H-2 in Attachment H.

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10 Refer to Attachment B of this General Permit for the definitions of numeric effluent limitations and numeric effluent limitation exceedances.

IV.C.3. Numeric Action Levels[11]

IV.C.3.a. All dischargers that are Responsible Dischargers for a TMDL with a waste load allocation that was translated into a TMDL-related numeric action level, are subject to the numeric action level as indicated by Table H-2 in Attachment H.

IV.C.3.b. Dischargers with dewatering activities not subject to a separate NPDES permit are subject to the numeric action levels required in Attachment J.

IV.C.3.c. For Risk Level 2 and 3 sites, refer to Attachment D, Section III.G. For Type 2 and 3 linear underground and overhead projects, refer to Attachment E, Section III.G. For stormwater and authorized non-stormwater discharges, the numeric action level for pH is provided as a range where the lower value is 6.5 pH standard units and the upper value is 8.5 pH standard units. The discharger shall report the field reading to two decimal places. A numeric action level exceedance for pH occurs when the reading, obtained per each discharge location per day of each qualifying precipitation event, is below the lower value or above the upper value, as shown in Table 1 of this Section.

IV.C.3.d. Risk Level 2 and 3 sites, refer to Attachment D, Section III.G. For Type 2 and 3 linear underground and overhead projects, refer to Attachment E, Section III.G. For stormwater and authorized non-stormwater discharges the numeric action level for turbidity is 250 Nephelometric Turbidity Units (NTU). An exceedance of the turbidity numeric action level occurs when the field reading, obtained per each discharge location per day of each qualifying event, is over 250 NTU, as shown in Table 1 of this Section.

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11 Refer to Attachment B of this General permit for the definitions of numeric action levels and numeric action level exceedances.

Table 1. Numeric Action Levels, Test Methods, Detection Limits, and Reporting Units

Parameter	Test Method	Discharger Type	Method Detection Limit	Units	Numeric Action Level
TMDL-Related Pollutant	U.S. EPA-approved test method for specific pollutant parameter	Responsible Dischargers	Depends on the test method	mg/L	Refer to Table H-2 in Attachment H
pH	Field test with calibrated portable instrument using EPA approved procedures	Risk Level 2 and 3 Risk Type 2 and 3	0.2	pH Units	Lower Value= 6.5 Upper Value= 8.5
Turbidity	EPA 0180.1 and/or field test with calibrated portable instrument	Risk Level 2 and 3 Risk Type 2 and 3	1	NTU	250

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IV.D. Receiving Water Limitations

IV.D.1. The discharger shall ensure that stormwater discharges and authorized non-stormwater discharges to any surface or ground water will not adversely affect human health or the environment.

IV.D.2. The discharger shall ensure that stormwater discharges and authorized non-stormwater discharges will not contain pollutants in quantities that threaten to cause pollution or a public nuisance.

IV.D.3. The discharger shall ensure that stormwater discharges and authorized non-stormwater discharges will not contain pollutants that cause or contribute to an exceedance of any applicable water quality objectives or water quality standards contained in an applicable water quality control plan.

IV.D.4. Responsible Dischargers shall comply with the applicable TMDL implementation requirements in Attachment H of this General Permit, including TMDL-specific additional BMPs and site pollutant modeling, numeric action levels, and/or numeric effluent limitations.

IV.E. Linear Underground and Overhead Project Requirements

Dischargers with linear underground and/or overhead projects shall comply with the requirements included in Attachments E, E.1, and E.2 of this General Permit.

IV.F. Risk Level 1 Requirements

Risk Level 1 dischargers shall comply with the requirements included in Attachment D, D.1, and D.2 of this General Permit.

IV.G. Risk Level 2 Requirements

Risk Level 2 dischargers shall comply with the requirements included in Attachment D, D.1, and D.2 of this General Permit.

IV.H. Risk Level 3 Requirements

Risk Level 3 dischargers shall comply with the requirements included in Attachment D, D.1, and D.2 of this General Permit.

IV.I. Active Treatment System Requirements

Dischargers implementing an active treatment system shall comply with all of the requirements in Attachment F of this General Permit.

IV.J. Passive Treatment Requirements

Dischargers implementing passive treatment on-site shall comply with all the requirements in Attachment G of this General Permit.

IV.K. Total Maximum Daily Load Implementation Requirements

IV.K.1. Responsible Dischargers are dischargers who:

a. Discharge stormwater and authorized non-stormwater directly, or through a municipal separate sewer system or other conveyance, to impaired water bodies or watersheds identified in a U.S. EPA approved total maximum daily load (TMDL) with a waste load allocation assigned to construction stormwater sources; and

b. Have one or more TMDL-specific pollutant sources present on-site with the potential to enter construction stormwater discharge, which are required to be identified in the pollutant source assessment (refer to Section IV.O.2.i below).

IV.K.2. Responsible Dischargers shall comply with the applicable requirements in Attachment H of this General Permit.

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IV.L. Discharges Subject to the California Ocean Plan

IV.L.1. Discharges to Ocean Waters

IV.L.1.a. Dischargers that discharge directly into ocean waters that are subject to the model monitoring provisions of the California Ocean Plan shall be deemed in compliance with applicable California Ocean Plan model monitoring provisions when in compliance with monitoring requirements of this General Permit.

IV.L.1.b. The Regional Water Boards may require a discharger that discharges directly into ocean waters who has demonstrated non-compliance with this General Permit's monitoring requirements to develop and implement a monitoring plan in compliance with additional effluent and ocean monitoring provisions established pursuant to Water Code § 13383.

IV.L.2. Discharges Granted an Exception for Areas of Special Biological Significance (ASBS)

IV.L.2.a. Dischargers who were granted an exception to the California Ocean Plan prohibition of discharges of waste directly to an ASBS pursuant to Resolution 2012-0012 amended by Resolution 2012-0031 shall comply with the conditions and requirements set forth in Attachment I of this General Permit. Any discharger that applies for and is granted an exception to the California Ocean Plan prohibition after September 1, 2013, shall comply with the conditions and requirements set forth in the granted exception.

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IV.M. Dewatering Requirements

IV.M.1. Dischargers with dewatering activities subject to a separate NPDES permit (e.g., de minimis and low threat discharges) are not subject to comply with the dewatering requirements of this General Permit as found in Attachment J and shall obtain coverage as required by the State or Regional Water Boards.

IV.M.2. Dischargers with dewatering activities not subject to a separate NPDES permit (e.g., de minimis and low threat discharges) shall comply with the dewatering requirements in Attachment J.

IV.N. Post-Construction Requirements

IV.N.1. All dischargers, other than linear underground and overhead project dischargers, shall implement BMPs to reduce runoff and pollutants in stormwater discharges that are reasonably foreseeable after all construction phases have been completed at the site (post-construction BMPs).

IV.N.2. Dischargers subject to the post-construction requirements of an existing NPDES Phase I or Phase II municipal separate storm sewer system permit are not subject to the post-construction requirements in Section IV.N.3 below, and shall submit the following items with their Permit Registration Documents through SMARTS:

a. An attachment or web-source containing the applicable NPDES Phase I or Phase II municipal separate storm sewer system permittee's post-construction requirements; and

b. The post-construction plans and calculations submitted to, or approved by, the applicable NPDES Phase I or Phase II municipal separate storm sewer system permittee. If the discharger submitted preliminary post-construction plans and calculations as a Permit Registration Document, the discharger shall submit the approved plans and calculations within 14 days of approval by the municipal stormwater permittee, through a Change of Information in SMARTS. The discharger shall submit a Change of Information in SMARTS for any revisions to post-construction plans and calculations prior to submitting the Notice of Termination.

IV.N.3. All dischargers, other than linear underground and overhead project dischargers or dischargers subject to the post-construction requirements of an existing NPDES Phase I or Phase II municipal separate storm sewer system permit, shall comply with the following post-construction runoff reduction requirements. The discharger shall comply with this General Permit's post-construction requirements if the Permit Registration Documents were submitted prior to the effective date of applicable post-construction requirements of the corresponding NPDES Phase I or Phase II municipal stormwater permit.

IV.N.4. The discharger shall use non-structural and/or structural measures to replicate the pre-construction water balance (for this General Permit, defined as the volume of rainfall that ends up as runoff) for the smallest storms up to and including the 85th percentile, 24-hour precipitation event (or the smallest precipitation event that generates runoff, whichever is larger).

IV.N.5. For sites with disturbed area exceeding two acres, the discharger shall preserve the pre-construction drainage density (miles of stream length per square mile of drainage area) for all drainage areas within the area serving a first order stream[12] or larger stream and ensure that post-project runoff time of concentration is equal to or greater than pre-project time of concentration.

IV.N.6. The discharger shall certify and submit post-construction plans, calculations, and other supporting documentation as a Permit Registration Document in SMARTS. The discharger shall submit a Change of Information in SMARTS for

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12 A first order stream is defined as a stream with no tributaries.

any revisions to post-construction plans and calculations prior to submitting the Notice of Termination.

IV.N.7. Regional Water Board staff may review post-construction plans, calculations, and other supporting documentation to verify that the post-construction water balance is accurate; and may request that the discharger make revisions if necessary.

IV.N.8. The discharger may use the contact information found online or in Attachment C to request Regional Water Board staff review post-construction plans, calculations, and other supporting documentation prior to and during construction.

IV.O. Stormwater Pollution Prevention Plan Requirements

IV.O.1. The discharger shall ensure the site's SWPPP complies with the below conditions:

a. A site-specific SWPPP is developed, and amended as necessary, by a QSD. The discharger is responsible for keeping the SWPPP and associated documents updated in SMARTS to reflect current site conditions and construction activities.

b. Trained personnel and BMP materials are available at the site as required by this General Permit.

c. The SWPPP includes the implementation of BMPs that comply with BAT, BCT, and ensure compliance with water quality standards; additional BMPs based on input from the QSP to address numeric action level and numeric effluent limitation exceedances; and additional training needed for the QSP, Legally Responsible Person, or designated persons on-site.

d. The SWPPP is available at the site and made available upon request by a federal, State, or municipal inspector. A current copy of the site-specific SWPPP and any site inspection reports required by this General Permit may be kept in electronic format at the site so long as the information requested by a federal, State, or municipal inspector can be made available during an inspection. All maps are legible and available in hard copy at the site.

IV.O.2. The SWPPP shall include:

a. Identification of all pollutants, their sources, and control mechanisms, including sources of sediment associated with all construction activities (e.g., sediment, paint, cement, stucco, cleaners, site erosion);

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b. Pollutant source assessments, including a list of potential pollutant sources and identification of site areas where additional BMPs are necessary to reduce or prevent pollutants in stormwater and authorized non-stormwater discharges, per the following minimum requirements when developing the pollutant source assessment:

   i. Consider all potential sources of pollutants, including non-visible pollutants which are known, or should be known to occur on-site including those that:

      1. Are used in construction activities;

      2. Are stored on-site;

      3. Were spilled or released during construction activities or past land use activities and not cleaned up; and

      4. Were applied to land as part of past land use activities.

   ii. Consider all potential sources of pollutants associated with applicable TMDLs listed in Attachment H, and state whether or not sources of those pollutants are present on-site;

   iii. Consider the quantity, physical characteristics (e.g., liquid, powder, solid), and locations of each potential pollutant exposed, source handled, produced, stored, recycled, or disposed of on-site;

   iv. Consider the degree to which pollutants associated with those materials may be exposed to and mobilized by contact with stormwater; and

   v. Consider the direct and indirect pathways that pollutants may be exposed to stormwater or authorized non-stormwater discharges. This shall include an assessment of past spills or leaks, non-stormwater discharges, and discharges from adjoining areas.

c. Description of site-specific BMPs implemented to reduce or eliminate stormwater pollution, including the following, if applicable:

   i. Minimum sediment and erosion control BMPs as outlined in Attachments D and E of this General Permit;

   ii. Active treatment systems as included in an Active Treatment System Plan (as required in Section E.1 of Attachment F);

   iii. Passive treatment technologies as included in a Passive Treatment Plan (as required in Section D.2 of Attachment G);

   iv. BMPs implemented to address applicable TMDL implementation requirements (as required by Attachment H); and

   v. Dewatering systems (as required by Attachment J).

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d. Site-specific BMPs initialized immediately to temporarily stabilize an area disturbed by construction where construction activities will not be resumed within 14 days;

e. Identification, elimination, control, or treatment information for all non-stormwater discharges from the site not regulated by this or another NPDES permit;

f. Description of efforts and BMPs used to minimize and control pollutants discharged from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be captured and properly disposed of and/or treated to mitigate impacts to water quality;

g. Description of efforts and BMPs used to minimize exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on the site to precipitation and to stormwater;

h. Description of spill and leak prevention and response plan including:

   i. Procedures that effectively address hazardous and non-hazardous spills in accordance with law;

   ii. Spill and leak response equipment and materials to be available on-site, cleaned up immediately, and disposed of properly; and

   iii. Personnel are assigned and trained for spill and leak prevention and response.

i. Construction Site Monitoring Program that describes methods and procedures for monitoring discharges in accordance with the applicable Attachment D or E that includes the following:

   i. Visual inspection locations, inspection procedures, and follow-up tracking procedures.

   ii. Applicable sampling locations, collection, and handling procedures shall include detailed procedures for field analysis, sample collection, storage, preservation, and shipping to the laboratory to ensure consistent quality assurance and control is maintained.

   iii. A copy of the Chain of Custody form used when handling and shipping samples.

   iv. Identification of the analytical methods and related method detection limits (if applicable) for each parameter.

   v. Watershed Monitoring Option:

      1. If the discharger is part of a qualified regional watershed-based monitoring program approved by the Regional Water Board Executive Officer or their delegate, the discharger may be eligible for relief from the monitoring requirements in the applicable

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Attachment D or E. The Regional Water Board may approve proposals to substitute a qualified watershed-based monitoring program if it determines the program will provide information to determine each discharger's compliance with the requirements of this General Permit.

j. Title Sheet(s) with:
   i. Project name;
   ii. Project location (vicinity map);
   iii. Preliminary schedule of activities;
   iv. Site operating hours (hours when construction activities are occurring);
   v. Index of attachments;
   vi. Contact information for QSD(s), QSP(s), and trained delegates (name, phone numbers, license or certification number); and
   vii. Signature of the QSD(s) who prepared the SWPPP.

k. Pre-Earthwork Drawing with:
   i. Site and project boundaries;
   ii. Areas disturbed during geotechnical or other preconstruction investigation work;
   iii. Existing roads and trails;
   iv. Drainage areas;
   v. Discharge locations;
   vi. Existing storm drain system if applicable; and
   vii. Proposed locations of storage areas for waste, construction materials, project staging areas, stockpiles, vehicles, equipment and vehicle maintenance, loading/unloading of materials, site access (entrance/exits), fueling, water storage, water transfer for dust control, demolition, and areas of other construction support activities.

l. Construction and Earthwork Drawing(s) with:
   i. Site layout (grading plans) including roads;
   ii. Site and project boundaries;
   iii. Drainage areas;
   iv. Discharge locations;
   v. Sampling locations;
   vi. Areas of soil disturbance (temporary or permanent);
   vii. Proposed active areas of soil disturbance (cut or fill);

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vii. Proposed locations of erosion control BMPs;

ix. Proposed locations of sediment control BMPs;

x. Proposed locations of run-off BMPs;

xi. Temporary and/or permanent run-on conveyance (if applicable);

xii. Proposed locations of active treatment systems(s) (if applicable);

xiii. Locations of storage areas for waste, construction materials, project staging areas, stockpiles, vehicles, equipment and vehicle maintenance, loading/unloading of materials, site access (entrance/exits), fueling, water storage, water transfer for dust control, demolition, and areas of other construction support activities; and

xiv. Site-specific procedures to implement final stabilization BMPs as soon as reasonably practicable.

IV.P. Annual Reporting Requirements

IV.P.1. The discharger shall electronically certify and submit an Annual Report through SMARTS by September 1st for the previous reporting period from July 1st through June 30th if a WDID number is active for at least 90 days within the reporting period.

IV.P.2. The discharger shall retain an electronic copy or hard copy of each Annual Report for a minimum of three years after the date the Annual Report is certified.

IV.P.3. The Annual Report shall consist of the following:

a. The summary of all stormwater sampling and monitoring reports and supporting documents (e.g., laboratory reports);

b. The summary of all corrective actions taken during the compliance year;

c. The identification and explanation of any compliance activities (e.g., missed sampling or visual inspections) or corrective actions that were not implemented;

d. The summary of all the General Permit violations;

e. The names of individual(s) who performed the site inspections, sampling, visual inspections, and/or measurements;

f. The date, place, time of site inspections, sampling, visual inspections, and/or measurements, including the amount of precipitation measured in inches; and

g. All visual inspection and sample collection exception records and reports.

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V. SITE ROLES AND PERSONNEL

V.A. Discharger Responsibilities

V.A.1. The discharger, as defined in Attachment B, is responsible for all site activity affiliated with General Permit compliance and non-compliance including work done by QSDs, QSPs, and QSP delegates.

V.A.2. The discharger shall ensure that the SWPPP and any required amendments are developed by a QSD. SWPPP changes or amendments shall be uploaded through SMARTS within 30 calendar days.

V.A.3. The discharger shall ensure that all persons responsible for implementing this General Permit's requirements for a project shall be appropriately licensed or certified in accordance with this General Permit. For example, the discharger shall verify personnel serving as QSD(s) or QSP(s) have an active and current certificate, and engineering and/or geology work performed for the site is conducted by a California licensed professional.

V.A.4. The discharger shall ensure that the correct construction start and end date are:

a. Used for each regulated construction project's risk determination;

b. Listed in SMARTS; and

c. Included on the unique WDID number notification form in a site location viewable by the public or readily available upon request if unable to post publicly.

V.A.5. The discharger shall ensure project data and contact information is current in SMARTS.

V.A.6. If a Legally Responsible Person changes, the discharger shall update the contact information for the Legally Responsible Person in SMARTS.

V.B. Legally Responsible Person

V.B.1. When the discharger is required to sign, certify, and electronically submit any documents required by the General Permit, the State or Regional Water Board, or U.S. EPA, the signatory for the discharger is the Legally Responsible Person and must meet the definition of "Legally Responsible Person" set forth in Attachment B.

V.B.2. The Legally Responsible Person may designate a Duly Authorized Representative, as defined in Attachment B, who may sign, certify, and electronically submit any documents, reports, or information required by this General Permit, the State or Regional Water Boards, or U.S. EPA. The Legally Responsible Person shall update the designation in SMARTS if there are any changes to the Duly Authorized Representative.

V.B.3. The Legally Responsible Person and, if applicable, Duly Authorized Representative shall comply with the electronic signature and certification

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requirements set forth in Section VI.H when submitting information required by the General Permit.

V.C. Discharger's Responsibilities for Qualified SWPPP Developer Performance

V.C.1. The discharger shall retain a QSD from the beginning of the project through the Notice of Termination approval.

V.C.2. A QSD is required to assess how construction activities will affect sediment transport, erosion, and other discharges of pollutants in stormwater runoff in the SWPPP design and implementation. The QSD is required to revise the SWPPP to address potential problems identified by visual inspections, sampling data, comments from a QSP, or their own site observations.

V.C.3. A QSD is required to include in the SWPPP the name, email, and phone number of all the QSP-trained delegate(s).

V.C.4. The discharger shall ensure that a QSD performs the following on-site visual inspections[13]:

a. Within 30 days of construction activities commencing on a site;

b. Within 30 days of a discharger replacing the QSD;

c. Twice annually, once August through October and once January through March;

d. Within 14 calendar days after a numeric action level exceedance; and

e. Within the time period requested in writing from Water Board staff.

V.C.5. A QSD may perform the work of a QSP.

V.D. Discharger's Responsibilities for Qualified SWPPP Practitioner Performance

V.D.1. The discharger shall ensure that a QSP reviews work performed by trained delegates including visual inspections, sampling, BMP implementation activities, and other required tasks listed in the SWPPP.

V.D.2. The discharger shall ensure that a QSP performs the following on-site visual inspections[14]:

a. Once every calendar month;

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13 These on-site visual inspection requirements are the minimum required and may be increased by the discharger or a QSD during times of high-risk construction activities, excessive site problems, or other conditions that warrant increased oversight by a QSD.

14 These on-site visual inspection requirements are the minimum requirements and may be increased by the discharger or a QSD during times of high-risk construction

b. Within 72 hours prior to a forecasted Qualifying Precipitation Event to inspect areas of concern to verify the status of any deficiencies, BMPs, or other identified issues at the site. If extended forecast precipitation data (greater than 72 hours) is available from the National Weather Service, the pre-precipitation event inspection may be done up to 120 hours in advance;

c. Within 14 days after a numeric action level exceedance the QSP shall visually inspect the drainage area of exceedance and document any areas of concern; and

d. Prior to the submittal of General Permit Notice of Termination or Change of Information (for acreage changes) of all or part of a site.

V.D.3. The discharger shall ensure that a QSP verifies the following:

a. All BMPs required in the SWPPP are implemented, correctly installed, inspected, and maintained;

b. Track out of construction related material at site entrances and exits is controlled;

c. The SMARTS generated WDID number notification form is in a site location viewable by the public or readily available upon request, kept up to date, and the start and end dates are correct and match the dates listed in SMARTS for the project;

d. Sampling protocols for stormwater and non-stormwater discharges are correctly performed as described in the SWPPP by on-site trained personnel delegated by a QSP (including, but not limited to, taking representative samples of the runoff);

e. Contact information including, name, phone number, and email address for the discharger, Legally Responsible Person, QSD(s), and QSP(s) is correct and updated in SMARTS within 90 days of a change); and

f. Photo documentation of problem areas of erosion, new sediment deposition, unauthorized non-stormwater discharges, and/or failed BMPs is included in the SWPPP and are made available upon a regulatory inspector's request.

FOR BIDDING PURPOSES ONLY

V.E. Discharger Responsibilities for Delegates' Performance

V.E.1. The discharger may authorize a QSP to delegate visual inspections, sampling, and/or SWPPP and BMP implementation activities to others (delegates) (e.g., superintendent, project manager, foreman, contractor, coworker) that have received training for their respective tasks. A QSP opting to delegate tasks to

activities, excessive site problems, or other conditions that warrant increased oversight of the site.

others shall provide the following training based on the guidelines set by the Construction General Permit Training Team:

a. Foundational training for all delegates regarding stormwater compliance roles and responsibilities, forecast information, and documentation and reporting procedures; and

b. Site-specific training regarding visual inspections, sampling procedures, and/or SWPPP and BMP implementation activities relevant to the delegate's assigned responsibilities.

V.E.2. The discharger shall ensure the following for QSP-delegate(s):

a. A QSP has determined the delegate(s) can perform and have a competent understanding of the visual inspection, sampling, and/or SWPPP and BMP implementation tasks prior to fully delegating the responsibility to the individual;

b. The current delegate(s), including name, email, and phone number, are maintained in a training log, uploaded as an attachment to the SWPPP in SMARTS, prior to the delegate performing the delegated function; and

c. The delegate(s) have a system used to record and report issues back to the QSP within 24 hours of when a corrective action is needed.

V.E.3. The delegate cannot perform the QSD and QSP inspections required in Section V.C.4 or Section V.D.2, respectively.

V.F. Becoming a Qualified SWPPP Developer (QSD) or Qualified SWPPP Practitioner (QSP)

V.F.1. All QSDs and QSPs shall have fundamental knowledge of erosion and sedimentation processes, best management practices, and their implementation to control pollutants in stormwater discharges.

V.F.2. California licensed professional engineers or geologists may self-certify their eligibility to serve as a QSD/QSP via the State Water Board Construction Stormwater Program website.

V.F.2.a. Consistent with Title 16, California Code of Regulations, § 475 Code of Professional Conduct, a California Board for Professional Engineers, Land Surveyors, and Geologists (CBPELSG) licensee shall provide service for a project in a manner that is consistent with the laws, codes, ordinances, and regulations applicable to that project. A CBPELSG licensee shall not misrepresent their scope of authority affiliated with their professional license.

V.F.2.b. The State Water Board expects that a CBPELSG licensee serving a discharger enrolled in this General Permit has thorough knowledge of the conditions and requirements of this General Permit and the required supporting documents and information.

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V.F.3. A person can obtain a QSD or QSP certification through the CASQA by completing the following steps:

Step 1: Complete a required prerequisite to take the QSD or QSP training course;

Step 2: Complete the QSD or QSP training course;

Step 3: Pass the QSD or QSP exam; and

Step 4: Register as a QSD or QSP though the CASQA website.

V.F.4. A QSD applicant shall currently possess at least one of the following prerequisites:

a. A California landscape architect registration;

b. A professional hydrologist registration through the American Institute of Hydrology;

c. A Certified Professional in Erosion and Sediment Control (CPESC)™ registration through EnviroCert International, Inc.;

d. A Certified Professional in Stormwater Quality (CPSWQ)™ registration through EnviroCert International, Inc.; or

e. Any prerequisite course approved by the State Water Board's Division of Water Quality Deputy Director in accordance with Section V.G.

V.F.5. A QSP applicant shall currently possess at least one of the following prerequisites:

a. A Certified Erosion, Sediment, and Stormwater Inspector (CESSWI) registered through Enviro Cert International, Inc.;

b. A certified inspector of sediment and erosion control registered through Certified Inspector of Sediment and Erosion Control (CISEC) Inc.;

c. A Construction Management degree from an accredited 4-year institution that includes coursework that covers the underlying principles of erosion and sediment control and practices of reducing pollution in stormwater; or

d. Any prerequisite course approved by the State Water Board's Division of Water Quality Deputy Director in accordance with Section V.H.

V.F.6. To remain in good standing with their certification, QSDs and QSPs registered through CASQA shall:

a. Complete 6 hours, annually, of continuing education on site assessment techniques, best management practice design and implementation, inspection techniques, or monitoring approaches. This requirement can be fulfilled in whole or in part by continuing education taken to maintain any of the approved underlying prerequisites; and

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b. Complete the online QSD or QSP renewal process every two years, including a review of materials addressing permit implementation updates, clarifications, and experiences as provided by the Construction General Permit Training Team.

V.G. Pre-existing QSP and QSD qualification

V.G.1. A QSD or QSP who maintained a valid certification as of the effective date of this General Permit shall remain in good standing.

V.G.1.a. Existing QSDs and QSPs certified through CASQA shall, prior to the expiration date of their current certificate, certify that they have maintained a valid underlying certification and complete the recertification review or refresher training through CASQA's renewal process.

V.G.1.b. Existing QSD/QSPs who have self-certified with the State Water Board that they are a California licensed professional engineer or California licensed professional geologist shall complete the recertification process through the State Water Board Construction Stormwater Program website and complete self-directed training required by the State Water Board before September 1, 2024.

V.H. QSP and QSD Prerequisite Course Qualification

V.H.1. The State Water Board's Division of Water Quality Deputy Director may approve the qualification of additional prerequisite courses for QSD and QSP certification.

V.H.2. Individuals may recommend additional prerequisite courses by emailing the Stormwater Help Desk (stormwater@waterboards.ca.gov). The course curriculum shall meet an acceptable level of training and require continuing education to maintain their certification.

V.H.3. The Construction General Permit Training Team will review any recommended prerequisite courses and provide feedback for the State Water Board Division of Water Quality Deputy Director's consideration. If approved, the course will be listed on the State Water Board's Construction Stormwater Program website (https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.html) as an approved prerequisite course.

V.I. Water Board Rescission of a QSP or QSD Certification

V.I.1. The State Water Board Executive Director or a Regional Water Board Executive Officer may:

a. Suspend any QSD or QSP certification and require that additional training be completed as a condition of re-instatement if the Executive Director or Executive Officer finds, in writing, that the QSD or QSP in the course of acting as a QSD or QSP at one or more site(s) lacked adequate knowledge or training to perform duties required by the General Permit; and/or

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b. Rescind any QSD or QSP certification if, after providing notice and an opportunity to be heard, the Executive Director or Executive Officer finds, in writing, that the QSD or QSP has in the course of acting as a QSD or QSP at one or more site(s), (1) willfully or negligently caused or allowed a violation of this General Permit; (2) submitted false or misleading information to the State Water Board or any Regional Water Board, (3) used fraud or deception; or (4) failed to use reasonable care and good judgment.

V.I.2. An individual whose QSD or QSP certification has been rescinded may request the State Water Board to review the rescission. Any request for review must be received by the State Water Board no later than 30 days after the date that the individual received written notice of the rescission.

VI. STANDARD PROVISIONS

VI.A. Duty to Comply

VI.A.1. The discharger shall comply with all General Permit conditions and requirements. Any General Permit non-compliance constitutes a violation of the Clean Water Act and the Porter-Cologne Water Quality Control Act and is grounds for enforcement action and/or removal of General Permit coverage.

VI.A.2. The discharger shall comply with effluent standards or prohibitions established under Clean Water Act § 307(a) for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions.

VI.B. Need to Halt or Reduce Activity Not a Defense

A discharger's claim that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with this General Permit shall not be a defense in an enforcement action.

VI.C. Duty to Mitigate

The discharger shall take all responsible steps to minimize or prevent any discharge that has a reasonable likelihood of adversely affecting human health or the environment in violation of this General Permit, which includes ceasing discharge as necessary.

VI.D. Proper Operation and Maintenance

VI.D.1. The discharger shall at all times properly install, operate, and maintain any treatment and control facilities, systems, related appurtenances, and backup or auxiliary systems (treatment control systems) which are installed or used by the discharger to achieve compliance with this General Permit's conditions.

VI.D.2. The discharger shall include adequate laboratory controls and appropriate quality assurance procedures for all treatment control systems.

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VI.E. Property Rights

This General Permit does not: (1) convey any property rights of any sort or any exclusive privileges, (2) authorize any injury to private property or any invasion of personal rights, (3) or authorize any infringement of federal, state, or local laws or regulations.

VI.F. Duty to Maintain Records and Provide Information

VI.F.1. The discharger shall maintain a paper or electronic copy of all required records and reports, including but not limited to, a copy of this General Permit and all its attachments and Fact Sheet, for three years from the date generated or date submitted whichever is later.

VI.F.2. The discharger shall furnish the Water Boards or U.S. EPA, within a reasonable time, any requested information to determine compliance with this General Permit. The discharger shall also furnish, upon request, copies of records that are required to be kept by this General Permit.

VI.G. Inspection and Entry

VI.G.1. The discharger shall allow staff of the Water Boards, U.S. EPA, and/or an authorized representative of the municipal separate storm sewer system receiving the discharge to:

a. Enter the site premises during a regulated construction activity and/or at the location where compliance records are maintained in accordance with this General Permit;

b. Access and copy any compliance records maintained in accordance with this General Permit;

c. Inspect the complete project and site, including any off-site staging areas or material storage areas, and the erosion/sediment controls;

d. Sample, monitor, or install automated sampling equipment to ensure General Permit monitoring compliance; and

e. Conduct bioassessment monitoring (if required by a Regional Board water quality control plan), receiving water monitoring, and/or evaluate the performance of BMPs.

VI.H. Electronic Signature and Certification Requirements

VI.H.1. All documents submitted to the Water Boards (including, but not limited to, Permit Registration Documents, Annual Reports, monitoring records, and

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Notices of Termination) are required to be certified by the Legally Responsible Person[15] or a Duly Authorized Representative[16] through SMARTS.

VI.H.2. All documents (e.g., designs, plans, reports) that require engineering or geologic evaluations and judgments must be prepared by, or under the direction of, appropriately licensed professionals in the State of California. The licensee must sign and provide their registration number or stamp on the documents to be submitted and certified by the Legally Responsible Person or Duly Authorized Representative.

VI.H.3. Any person signing documents under Section VI.H shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I am also aware that my user ID and password constitute my electronic signature and any information I indicate I am electronically certifying contains my signature. I understand that my electronic signature is the legal equivalent of my handwritten signature. My signature on this form certifies that my electronic signature is for my own use, that I will keep it confidential, and that I will not delegate or share it with any other person. Should I wish to delegate such authority, I will do so formally in writing and electronically notify the State Water Board using SMARTS of such delegation within 10 days of the delegation. I further certify that I will protect my electronic signature from unauthorized use, and that I will contact the State Water Board, within two business days of discovery, if I suspect that my electronic signature has been lost, stolen, or otherwise compromised."

VI.H.4. Clean Water Act § 309(c)(4) provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this General Permit, including reports of compliance or non-compliance shall upon conviction, be penalized with a monetary fine of up to $10,000 or by imprisonment for not more than two years, or both.

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15 Defined in this General Permit, Attachment B (Glossary)

16 Defined in this General Permit, Attachment B (Glossary)

VI.I. Anticipated Noncompliance

The discharger shall provide advance notice, in writing, to the applicable Regional Water Board and local stormwater management agency of any planned changes in site construction activities that may result in non-compliance with this General Permit.

VI.J. Reporting of Contaminated Soils

The discharger shall have soils sampled and tested to ensure proper handling and public safety measures are implemented when soil contamination is found or suspected, and a responsible party is not identified, or the responsible party fails to promptly take the appropriate action. The discharger shall notify the appropriate local, state (including the Regional Water Board), and federal agency(ies) when contaminated soil is found at a site.

VI.K. Bypass

VI.K.1. Bypass[17] is prohibited unless the discharger demonstrates one or more of the following conditions:

a. In accordance with the bypass requirements for active treatment systems in Attachment F; or

b. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage[18]; or

c. There were no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated waste, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that could occur during normal periods of equipment downtime or preventative maintenance; or

d. The discharger allowed a bypass to occur that does not cause the exceedance of an effluent limitation(s), due to essential maintenance to assure efficient operation. In such a case, the above bypass conditions are not applicable; and

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17 The intentional diversion of waste streams from any portion of a treatment facility or system.

18 Severe property damage means substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

e. The discharger submitted a notice to the Regional Water Board, at least 14 calendar days in advance of the need for a bypass except where advance notice was not possible due to an emergency situation where the bypass was unavoidable to prevent loss of life, personal injury or severe property damage. If the discharger was unable to notify the Regional Water Board in advance of a bypass the discharger shall submit written notification to the Regional Water Board within 14 days after the bypass occurs.

VI.L. Upset

VI.L.1. To establish an affirmative defense of an upset,[19] a discharger must demonstrate the following through properly signed, contemporaneous operating logs or other relevant evidence:

a. The non-compliance discharge location;

b. The cause(s) of the upset;

c. The treatment facility was properly operated and maintained at the time of the upset;

d. The discharger submitted notice of the upset as required; and

e. Any required remedial measures were implemented as soon as feasibly possible.

VI.L.2. An administrative determination made before an action of noncompliance occurs is not a final administrative action subject to review.

VI.L.3. In an enforcement proceeding, the discharger seeking to establish the occurrence of an upset has the burden of proof.

VI.M. Oil and Hazardous Substance Liability

This General Permit, or parts of this General Permit (including, but not limited to, the findings, requirements, conditions, and provisions) shall not be construed to preclude the institution of any legal action or relieve the discharger from any responsibilities, liabilities, or penalties to which the discharger is or may be subject to under Clean Water Act § 311.

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19 An exceptional incident in which there is unintentional and temporary non-compliance with technology-based numeric effluent limitations because of factors beyond the reasonable control of the discharger. An upset event does not include a large precipitation event, wind event, or other natural weather-related force of nature. An upset does not include non-compliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.

VI.N. Severability

The provisions of this General Permit are severable; if any provision of this General Permit or the application of any provision of this General Permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this General Permit, shall not be affected thereby.

VI.O. Reopener Clause

VI.O.1. This General Permit may be modified, revoked and reissued, or terminated for cause due to promulgation of amended regulations, receipt of U.S. EPA guidance concerning regulated activities, judicial decision, or in accordance with 40 Code of Federal Regulations §§ 122.62, 122.63, 122.64, and 124.5.

VI.O.2. The submittal of a request by the discharger for a General Permit modification, revocation and reissuance, or termination, notification of planned changes, or anticipated non-compliance does not annul any General Permit condition.

VI.O.3 This General Permit shall be modified or revoked and reissued to conform if any applicable toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) promulgated under Clean Water Act §307(a) for a toxic pollutant which is present in the discharge and the standard or prohibition is more stringent than any pollutant limitation in this General Permit. The Water Boards shall provide the public and dischargers notice of the action.

VI.O.4 This General Permit may be reopened before March 23, 2032 to revise the requirements implementing the Los Angeles and Long Beach Harbor Waters TMDL for copper, lead, and zinc, for dischargers that discharge to the Dominguez Channel or the Torrance Lateral Channel. State Water Board staff will work with interested stakeholders to develop a plan to collect additional data related to the forthcoming implementation of the 100 mg/L TSS numeric effluent limitation, including the soil screening investigation, and report to the State Water Board via the Executive Director report no later than September 1, 2024. The State Water Board will evaluate whether the additional data and other available information warrants revising the requirements implementing the Los Angeles and Long Beach Harbor Waters TMDL for copper, lead, and zinc at a publicly noticed Board meeting no later than August 31, 2028.

VI.O.5 This General Permit may be reopened to revise the requirements implementing the Los Angeles Lakes TMDL for chlordane, DDT, dieldrin, and PCBs that discharge to Peck Road Park Lake, Echo Park Lake or Puddingstone Reservoir. State Water Board staff will work with interested stakeholders to develop a plan to collect additional data related to the implementation of the 100 mg/L TSS numeric effluent limitation, including the soil screening investigation, and report to the State Water Board via the Executive Director report no later than September 1, 2023. Upon completion of the work required by the plan, the State Water Board will evaluate whether the additional data and other available

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information warrants revising the requirements implementing the Los Angeles Lakes TMDL for chlordane, DDT, dieldrin, and PCBs at a publicly noticed Board meeting.

VI.P. Penalties for Violations of General Permit Conditions

VI.P.1. Clean Water Act § 309 provides significant penalties for any person who violates a permit condition implementing Clean Water Action §§ 301, 302, 306, 307, 308, 318, or 405 or any permit condition or limitation implementing any such section in a permit issued under § 402. Any person who violates any permit condition of this General Permit is subject to a civil penalty not to exceed $37,500[20] per calendar day of such violation, as well as any other appropriate sanction provided by §309 of the Clean Water Act.

VI.P.2. Clean Water Act § 309(c)(4) provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained by this General Permit, including reports of compliance or non-compliance shall upon conviction, be punished by a fine of not more than $10,000 or by imprisonment for not more than two years or both.

VI.P.3. The Porter-Cologne Water Quality Control Act provides specific administrative, civil, and criminal penalties, which in some cases are greater than those under the Clean Water Act.

VI.Q. Water Quality Based Corrective Actions[21]

VI.Q.1. By the end of each reporting year, if the discharger's construction stormwater and/or non-stormwater discharges contain pollutants that are in violation of Receiving Water Limitations (Section IV.D) or in the event that a Responsible Discharger's discharge exceeds an applicable numeric effluent limitation in Attachment H, the discharger shall:

a. Conduct a site assessment to identify pollutant source(s) within the site that are associated with construction activity and whether the BMPs described in the SWPPP have been properly implemented;

b. Evaluate the site's SWPPP and its implementation to determine whether additional BMPs or SWPPP implementation measures are necessary to reduce or prevent pollutants in all regulated discharges to comply with the Receiving Water Limitations (Section IV.D) or applicable numeric effluent limitations in Attachment H; and

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20 May be further adjusted in accordance with the Federal Civil Penalties Inflation Adjustment Act.

21 Terms including, but not limited to, Responsible Dischargers, numeric effluent limitations and exceedances are defined in Attachment B of this General Permit.

c. Certify and submit, through SMARTS, documentation based upon the above site assessment and SWPPP evaluation that:

i. Additional BMPs and/or SWPPP implementation measures have been identified and included in the SWPPP to comply with the Receiving Water Limitations (Section IV.D) or applicable numeric effluent limitations in Attachment H; or

ii. No additional BMPs or SWPPP implementation measures are required to reduce or prevent pollutants in all regulated discharges to comply with the Receiving Water Limitations (Section IV.D) or applicable numeric effluent limitations in Attachment H.

VI.Q.2. The Regional Water Board or its delegate may require revisions of the discharger's water quality-based corrective actions and/or request additional supporting documentation.

VI.R. Continuation of Expired General Permit

This General Permit continues in force and effect until the effective date of a new General Permit adopted the State Water Board or the State Water Board rescinds this General Permit.

VII. REGIONAL WATER BOARD AUTHORITIES

VII.A. Regional Water Boards (as defined in Attachment B) may terminate General Permit coverage upon determination that a discharger has failed to comply with General Permit requirements. The Regional Water Boards may also terminate General Permit coverage upon determination that the subject discharges must be regulated through a separate Regional Water Board-issued NPDES permit.

VII.B. Regional Water Boards may require a discharger to comply with additional monitoring and reporting requirements, including but not limited to, increasing sampling frequency, requiring analysis of additional parameters, increasing the frequency of inspections by the Qualified SWPPP Developer and Qualified SWPPP Practitioner, or implementation of recommendations by the Qualified SWPPP Developer and Qualified SWPPP Practitioner, pursuant to California Water Code § 13383.

VII.C. All Regional Water Board actions that modify requirements for compliance, pursuant to California Water Code §13383, with this General Permit shall be provided to the discharger in writing and submitted through SMARTS.

VII.D. Regional Water Boards may require dischargers to retain records required by this General Permit for more than the three years.

VII.E. Regional Water Boards may obtain site-specific data, records, or documentation demonstrating one or more numeric action level exceedances occurred at a site and may direct the discharger to revise their SWPPP and/or BMPs to address the exceedance.

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VII.F. Consistent with California Water Code §§13350(a) and/or 13376, Regional Water Boards finding a discharger in violation of a prohibition or requirement in this General Permit with the potential to discharge pollutants into the waters of the United States, may require a discharger to revise and re-submit the SWPPP, other required documents and/or implement additional BMPs to address site-specific conditions.

VII.G. Consistent with 40 Code of Federal Regulations §§ 122.26(a)(9)(i)(D) and 122.26(a)(9)(i)(C), a Regional Water Board may require any discharge of stormwater and non-stormwater from construction activity that is not regulated by this General Permit, and that may cause or contribute to an exceedance of a water quality standard, to obtain General Permit coverage.

VII.H. A Regional Water Board has the authority to require a Risk Level determination to be reassessed for a site currently regulated under this General Permit, or with an active waiver, as deemed necessary, including but not limited to the following circumstances:

1. The discharger has a demonstrated history of General Permit non-compliance with this General Permit or its predecessors;
2. The subject construction site poses a significant risk of causing or contributing to an exceedance of a water quality standard without the implementation of the additional Risk Level 2 or 3 requirements; or
3. The Regional Water Board staff have documented that the discharger Risk Level for the subject site is calculated incorrectly.

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FACT SHEET

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED
WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES
(GENERAL PERMIT)

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I. BACKGROUND

I.A. History

The Federal Water Pollution Control Act (also referred to as the Clean Water Act (CWA)) was amended in 1972 to provide that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge complies with a National Pollutant Discharge Elimination System (NPDES) permit. The 1987 amendments to the Clean Water Act added § 402(p), which establishes a framework for regulating municipal and industrial stormwater discharges under the NPDES Program. The United States Environmental Protection Agency (U.S. EPA) published final regulations on November 16, 1990, establishing stormwater permit application requirements for specified categories of industries. The regulations provide that discharges of stormwater to waters of the United States from construction projects that encompass five or more acres of soil disturbance are effectively prohibited unless the discharge complies with a NPDES permit. Regulations (Phase II Rule) that became final on December 8, 1999, lowered the permitting threshold from five acres to one acre.

The State Water Resources Control Board (State Water Board) has elected to adopt only one statewide general permit at this time that will apply to most stormwater discharges associated with construction and land disturbance activity, although federal regulations allow two permitting options for stormwater discharges (individual permits and general permits).

The State Water Board reissued the Construction General Permit for Stormwater Discharges on September 2, 2009 (Water Quality Order 2009-0009-DWQ). The State Water Board adopted Order 2010-0014-DWQ on November 16, 2010, to clarify the signatory requirements. The State Water Board adopted Order 2012-0006-DWQ on July 17, 2012, to remove numeric effluent limitations outside of the use of active treatment systems. Water Quality Order 2009-0009-DWQ and the subsequent amendments are collectively referred to as the previous permit.

The General Permit accompanying this Fact Sheet regulates stormwater runoff from construction sites. Regulating many stormwater discharges under one general permit greatly reduces the administrative burden associated with permitting individual stormwater discharges. To obtain coverage under this General Permit, dischargers shall electronically certify and submit the Permit Registration Documents, which includes a Notice of Intent, Stormwater Pollution Prevention Plan (SWPPP), and other compliance related documents required by this General Permit and submit the appropriate permit fee to the State Water Board. The Regional Water Quality Control Boards (Regional Water Boards) may issue general permits or individual permits containing more specific provisions as the stormwater program develops and if this occurs, this General Permit will no longer regulate those dischargers.

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I.B. Legal Challenges and Court Decisions

I.B.1. Early Court Decisions

The U.S. EPA promulgated regulations exempting most stormwater discharges from the NPDES permit requirements shortly after the passage of the Clean Water Act. (See 40 Code of Federal Regulations § 125.4 (1975); *see also Natural Resources Defense Council v. Costle* (D.C. Cir. 1977) 568 F.2d 1369, 1372 (Costle); *Defenders of Wildlife v. Browner* (9th Cir. 1999) 191 F.3d 1159, 1163 (Defenders of Wildlife).) The District of Columbia Court of Appeals invalidated the regulation, holding that the U.S. EPA "does not have authority to exempt categories of point sources from the permit requirements of [CWA] § 402." (*Costle*, 568 F.2d at 1377) when environmental groups challenged this exemption in federal court. The *Costle* court rejected the U.S. EPA argument that effluent-based storm sewer regulation was administratively infeasible because of the variable nature of stormwater pollution and the number of affected storm sewers throughout the country. (*Id*. at 1377-82.) Although the court acknowledged the practical problems relating to storm sewer regulation, the court found the U.S. EPA had the flexibility under the Clean Water Act to design regulations that would overcome these problems. *(Id*. at 1379-83.) In particular, the court pointed to general permits and permits based on requiring best management practices (BMPs).

During the next 15 years, the U.S. EPA made numerous attempts to reconcile the statutory requirement of point source regulation with the practical problem of regulating possibly millions of diverse point source discharges of stormwater. (See *Defenders of Wildlife*, 191 F.3d at 1163; see also Gallagher, Clean Water Act in Environmental Law Handbook (Sullivan, edit., 2003) p. 300 (Environmental Law Handbook); Eisen, Toward a Sustainable Urbanism: Lessons from Federal Regulation of Urban Stormwater Runoff (1995) 48 Wash. U.J. Urb. & Contemp. L.1, 40-41 [Regulation of Urban Stormwater Runoff].)

Congress amended the Clean Water Act in 1987 to require NPDES permits for stormwater discharges. (See Clean Water Act § 402(p), 33 USC § 1342(p); *Defenders of Wildlife*, 191 F.3d at 1163; *Natural Resources Defense Council v. U.S. EPA* (9th Cir. 1992) 966 F.2d 1292, 1296.) Congress distinguished between industrial and municipal stormwater discharges in these amendments enacted as part of the Water Quality Act of 1987. Congress provided that NPDES permits regarding industrial stormwater discharges "shall meet all applicable provisions of this section and section 1311 [requiring the U.S. EPA to establish effluent limitations under specific timetables]." (CWA § 402(p)(3)(A), 33 USC § 1342(p)(3)(A); see also Defenders of Wildlife, 191 F.3d at 1163-64.)

U.S. EPA adopted regulations in 1990 specifying the activities that were considered to be "industrial" and thus required discharges of stormwater associated with those activities to obtain coverage under NPDES permits. (55 Fed. Reg. 47,990 (1990); 40 Code of Federal Regulations § 122.26(b)(14).)

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Construction activities were originally deemed a subset of the industrial category. (40 Code of Federal Regulations § 122.26(b)(14)(x).) In 1999, U.S. EPA issued regulations for "Phase II" of stormwater regulation, which required most small construction sites (1-5 acres) to be regulated under the NPDES program. (64 Fed. Reg. 68,722; 40 Code of Federal Regulations § 122.26(b)(15)(i).)

I.B.2. Court Decisions on Public Participation

Two federal court opinions have vacated U.S. EPA's rules that denied meaningful public review of NPDES permit conditions. The Ninth Circuit Court of Appeals on January 14, 2003, held that certain aspects of U.S. EPA's Phase II regulations governing MS4s were invalid primarily because the general permit did not contain express requirements for public participation. (Environmental Defense Center v. U.S. EPA (9th Cir. 2003) 344 F.3d 832.) Specifically, the court determined that applications for general permit coverage (including the Notice of Intent and Stormwater Management Program) must be made available to the public, the applications must be reviewed and determined to meet the applicable standard by the permitting authority before coverage commences, and there must be a process to accommodate public hearings. (Id. at 852-54.) Similarly, the Second Circuit Court of Appeals on February 28, 2005, held that the U.S. EPA's confined animal feeding operation rule violated the Clean Water Act because it allowed dischargers to write their own nutrient management plans without public review. (Waterkeeper Alliance v. U.S. EPA (2d Cir. 2005) 399 F.3d 486.) Although neither decision involved the issuance of construction stormwater permits, this General Permit addresses the courts' rulings where feasible.[1]

The Clean Water Act and the U.S. EPA regulations provide states with the discretion to formulate permit terms, including specifying best management practices (BMPs), to achieve strict compliance with federal technology-based and water quality-based standards. (*Natural Resources Defense Council v. U.S. EPA* (9th Cir. 1992) 966 F.2d 1292, 1308.) Accordingly, this General Permit has developed specific BMPs, numeric action levels, and Total Maximum Daily Load (TMDL)-derived numeric action level and numeric effluent limitations in order to

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1 In *Texas Independent Producers and Royalty Owners Assn. v. U.S. EPA* (7th Cir. 2005) 410 F.3d 964, the Seventh Circuit Court of Appeals held that the U.S. EPA's Construction General Permit was not required to provide the public with the opportunity for a public hearing on the Notice of Intent or Stormwater Pollution Prevention Plan. The Seventh Circuit briefly discussed why it agreed with the Ninth Circuit's dissent in Environmental Defense Center, but generally did not discuss the substantive holdings in Environmental Defense Center and Waterkeeper Alliance, because neither court addressed the initial question of whether the plaintiffs had standing to challenge the permits at issue. However, notwithstanding the Seventh Circuit's decision, it is not binding or controlling on the State Water Board because California is located within the Ninth Circuit.

achieve these minimum federal standards. In addition, the General Permit requires a SWPPP to be developed following specified standards and measures in this General Permit for implementation. This General Permit ensures that the dischargers do not "write their own permits" through discharger-requirements to implement specific BMPs, numeric action levels, and numeric effluent limitations, and SWPPP performance standards and information. As a result, this General Permit does not require each discharger's SWPPP to be reviewed and approved by the Regional Water Boards.

I.B.3. U.S. EPA Construction and Development Effluent Limitations Guidelines and New Source Performance Standards[2]

The U.S. EPA promulgated Effluent Limitation Guidelines and New Source Performance Standards on December 1, 2009, to control the discharge of pollutants from construction sites (See 74 Fed. Reg. 62996, and 40 Code of Federal Regulations § 450.21.). These requirements, known as the "Construction and Development Rule" became effective on February 1, 2010. Following the promulgation of the Construction and Development Rule in 2009, several parties filed petitions for review of the final rule, identifying potential deficiencies with the dataset that the U.S. EPA used to support its decision to adopt a numeric turbidity limitation as well as other issues. The U.S. EPA finalized amendments to the Construction and Development Rule on March 6, 2014, resulting in the removal of the numeric turbidity limitation and monitoring requirements and clarifying changes in the U.S. EPA's 2017 and 2022 NPDES General Permit for Discharges from Construction Activity (Construction General Permit) (See 79 Fed. Reg. 12661 and 80 Fed. Reg. 25235) pursuant to a settlement agreement to resolve the litigation. The U.S. EPA 2022 Construction General Permit was adopted and went into effect on February 17, 2022.

a. Summary of Construction and Development Rule Requirements

The Construction and Development Rule requirements include effluent limitations that apply to all permitted discharges from construction sites (40 Code of Federal Regulations § 450.21) for six general categories: i.) Erosion and Sediment Controls, ii.) Soil Stabilization Requirements, iii.) Dewatering, iv.) Pollution Prevention Measures, v.) Prohibited Discharges, and vi.) Surface Outlets. The effluent limitations are structured to require construction operators to first, prevent the discharge of sediment and other pollutants using effective planning and erosion control measures; and second, control discharges that do occur using effective sediment control measures. Dischargers are required to implement a range of pollution control and prevention measures to limit or

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2 U.S. EPA, Protection of Downstream Waters in Water Quality Standards: Frequently Asked Questions (June 2014), <https://www.epa.gov/sites/production/files/2018-10/documents/protection-downstream-wqs-faqs.pdf> [as of May 20, 2021]

prevent discharges of pollutants, including those from stormwater and non-stormwater discharges. The narrative effluent limitations are designed to prevent or minimize exposure and mobilization of pollutants in stormwater discharge from: (1) sediment and sediment-bound pollutants such as metals and nutrients, (2) construction materials, debris, and other sources of pollutants on construction sites, dissolved construction pollutants, such as nutrients, organics, pesticides, herbicides, and metals, (4) natural pollutants present in construction site soil, such as arsenic or selenium, and (5) previous activities on the site such as agriculture or industrial activity. Source control through minimization of soil erosion is the most effective way of controlling the discharge of these pollutants because, once mobilized by rainfall and stormwater, pollutants can detach from the soil particles and become dissolved pollutants which are not removed by down-slope sediment controls.

b. Incorporation of Construction and Development Rule into this General Permit

This General Permit incorporates the necessary requirements to implement the 2014 Construction and Development Rule amendments. Information on how this General Permit incorporates the Construction and Development Rule is included below.

i. Erosion and Sediment Controls

This General Permit requires dischargers to design, install, and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants through the development and implementation of a site-specific SWPPP and BMPs. The discharger's SWPPP is required to include the site-specific measures implemented to control all construction activity-related pollutants through temporary and permanent erosion and sediment control BMPs (Order, Section IV.O and Attachments D and E). Dischargers are required to implement channel protection and post construction controls to match the pre-construction hydrograph to ensure the minimization of project impacts to downstream channels and streambanks due to erosion and scour, temperature, and loss of ecological services (Attachments D and E). Dischargers are required to set back their construction activities from streams and wetlands unless infeasible to reduce the risk of impacting water quality (e.g., natural stream stability and habitat function). Although this General Permit does not mandate specific setbacks, these distances may be required as part of California Environmental Quality Act (CEQA) or the National Environmental Policy Act (NEPA), the Regional Water Board, municipal requirements, and/or other agencies such as the Department of Fish and Wildlife. The risk calculation and runoff reduction mechanisms in this General Permit are expected to facilitate compliance with any Regional Water Board, local resource agency, and/or California Environmental Quality Act (CEQA) or the National Environmental Policy Act (NEPA). The

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U.S. EPA has provided requirements for determining buffer size.[3] These requirements may provide helpful guidance for sizing construction sites buffers to limit the disturbance of creeks and natural drainage features. Attachments D and E require the discharger to minimize soil compaction when feasible in site areas where final vegetation will occur, or infiltration features will be installed. Dischargers are required to preserve native topsoil on-site when feasible, unless the intended function of a specific area of the site dictates that the topsoil be disturbed or removed. This General Permit encourages dischargers to keep the clearing and grading of native vegetation at the site at a minimum where areas are needed to build the project and to allow fire protection access. An example of an alternative practice to grading is mowing vegetation and leaving the subgrade root structure and soil intact. A guidance document[4] was developed in 2016 providing techniques to address the challenges with site stabilization and climate change. Dischargers are encouraged to:

1) Plan upfront for site stabilization to occur in months with more moisture to lower the need of imported water to stabilize vegetation;
2) Minimize the disturbance of soil to decrease the length of time and cost of final site stabilization;
3) Maintain the soil health to control stormwater pollution and erosion through open pore soil structures which support long-term sustainable vegetative cover;[5] and
4) Apply proper stockpiling practices to preserve soil biota and the native seed bank which reduces the need for fertilizer, seed, and water.[6]

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3 U.S. EPA, 2022. Construction General Permit, Appendix F – Buffer Requirements (2022). https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-f-buffer-reqs.pdf [as of July 19, 2022]

4 Construction General Permit (CGP) Training Team, CGP Review Issue #3 for QSD and QSP Registration and Renewal, Insights for Better Stabilization (2016), <https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/training/cgp_review_issue3.pdf> [as of May 20, 2021]

5 Caltrans, Erosion Control Toolbox <https://dot.ca.gov/programs/design/lap-erosion-control-design/tool-1-lap-erosion-control-toolbox> [as of May 20, 2021]

6 The American Association of State Highway Officials, Construction Practices for Environmental Stewardship Website, 2019. The American Association of State Highways Officials (AASHTO) includes best practices on stockpiling, including Section 4.11.1 on specific guidelines for preserving stockpiles in its online Environmental Stewardship Practices in Construction and Maintenance Compendium. AASHTO

ii. Soil Stabilization Requirements

This General Permit requires dischargers to implement soil stabilization BMPs whenever disturbance activities occur (e.g., clearing, grading, excavating, or other earth disturbing activities). Alternative stabilization measures must be employed as specified by Section III.H of this Order and Attachments D and E of this General Permit in arid, semiarid, and drought-stricken areas where initiating immediate vegetative stabilization measures is infeasible. Stabilization must be completed within a time period determined by the Regional Water Boards. Stabilization may not be required if the intended function of a specific area of the site necessitates that it remains disturbed in limited circumstances.

iii. Dewatering

This General Permit requires dischargers to implement BMPs to control the volume and velocity of dewatering discharges in Section IV.M of the Order. Dischargers are required to minimize the discharge of pollutants from dewatering trenches and excavations through the implementation of BMPs. Dischargers with dewatering activities subject to a separate NPDES, de minimis, or low threat discharger permit for dewatering activities are to obtain coverage through those permits issued by the State or Regional Water Board.

iv. Pollution Prevention Measures

Section IV.O of this Order requires that dischargers design, install, implement, and maintain effective pollution prevention measures to minimize the discharge of pollutants. The SWPPP requirements include the minimization of exposure of pollutants and discharge of pollutants from certain activities included in the Effluent Limitation Guidelines. This General Permit also incorporates specific TMDL requirements for construction stormwater sources to limit loading to impaired waterbodies.

v. Prohibited Discharges

This General Permit authorizes only stormwater and authorized non-stormwater discharges associated with construction activity when in compliance with all General Permit requirements, provisions, limitations, and prohibitions. Section IV.B of this Order prohibits discharges from the following categories:

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recommends stockpiling for up to 6 months, but no longer than a year, and a maximum stockpile height of 4 feet. <https://environment.transportation.org/wp-content/uploads/2021/04/25-254_FR.pdf> [as of April 28, 2022]

1) Dischargers out of compliance with any applicable discharge prohibitions contained in applicable Basin Plans or statewide water quality control plans;
2) Discharges to Areas of Special Biological Significance (ASBS), unless granted an exception issued by the State Water Board;
3) All discharges to waters of the United States except for the stormwater and non-stormwater discharges specifically authorized by this General Permit or in a separate NPDES permit;
4) Debris and trash resulting from construction activities;
5) Wastewater from washout or clean out of areas, structures or equipment with concrete, grout, stucco, paint or other construction materials;
6) Form-release oils and curing compounds;
7) Fuels, oils, fluids, or other materials used in vehicle and equipment operation and maintenance;
8) Soaps, solvents, or detergents used in vehicle and equipment washing or external building wash-down; and
9) Toxic or hazardous substances from a spill or other release (e.g., asbestos, lead, mercury, or polychlorinated biphenyls (PCBs).

vi. Surface Outlets

Attachment J of the General Permit authorizes specific construction dewatering discharges and requires the dewatering activity to utilize outlet structures that withdraw water from the surface of the sediment basin or similar impoundment, unless infeasible.

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I.C. Healthy Soils and Recycled Water

I.C.1. Healthy Soils Initiative

The State of California launched the Healthy Soils Initiative in 2015, which is a collaboration of state agencies and departments to promote the stewardship of healthy soils. The California Environmental Protection Agency is a Healthy Soils Initiative partner. The initiative recognizes that healthy soils can increase water retention and infiltration, improve plant health, prevent erosion, reduce sediment and dust, sequester carbon to reduce greenhouse gas emissions, improve water quality, and improve biological diversity and wildlife habitat.[7]

7 California Department of Food and Agriculture, California's Healthy Soils Initiative, <https://www.cdfa.ca.gov/healthysoils/> [as of May 20, 2021]

This General Permit encourages healthy soils practices through requirements in Attachments D and E of this General Permit, which require dischargers to preserve native topsoil and reduce compaction of soils. Using healthy soils practices will encourage vegetative growth, increase soil stabilization, and conserve water on construction sites.

I.C.2. Recycled Water Use

The State Water Board adopted the Water Quality Control Policy for Recycled Water (Recycled Water Policy) and the Staff Report with Substitute Environmental Documentation on December 11, 2018 and became effective on April 8, 2019. The Recycled Water Policy states, "When used in compliance with this Policy, California Code of Regulations, title 22 and all applicable state and federal water quality laws, the State Water Board finds that recycled water is safe for approved uses, and strongly supports recycled water as a safe alternative to fresh water or potable water for such approved uses."[8]

This General Permit encourages the use of recycled water for appropriate application on construction sites, including irrigation of vegetation and dust control when used in compliance with the Recycled Water Policy, California Code of Regulations, title 22 and all applicable state and federal water quality laws.

I.D. Blue Ribbon Panel of Experts (Panel)

I.D.1. Introduction

The State Water Board convened an expert panel (panel) in 2005 and 2006 to address the feasibility of numeric effluent limitations in California's stormwater permits. Specifically, the panel was asked to address the following:

Is it technically feasible to establish numeric effluent limitations, or some other quantifiable limit, for inclusion in stormwater permits? How would such limitations or criteria be established, and what information and data would be required?[9]

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8 State Water Resources Control Board, Water Quality Control Policy for Recycled Water (December 11, 2018), <https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2018/121118_7_final_amendment_oal.pdf> [as of April 28, 2022]

9 Storm Water Panel, The Feasibility of Numeric Effluent Limits to Discharges of Storm Water Associated with Municipal, Industrial, and Construction Activities (June 19, 2006), <https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/numeric/swpanel_final_report.pdf> [as of May 20, 2021]

I.D.2. The Panel observations:

- "Limited field studies indicate that traditional erosion and sediment controls are highly variable in performance, resulting in highly variable turbidity levels in the site discharge."
- "Site-to-site variability in runoff turbidity from undeveloped sites can also be quite large in many areas of California, particularly in more arid regions with less natural vegetative cover and steep slopes."
- "Active treatment technologies involving the use of polymers with relatively large storage systems now exist that can provide much more consistent and very low discharge turbidity. However, these technologies have to date only been applied to larger construction sites, generally five acres or greater. Furthermore, toxicity has been observed at some locations, although at the vast majority of sites, toxicity has not occurred. There is also the potential for an accidental large release of such chemicals with their use."
- "To date most of the construction permits have focused on TSS and turbidity, but have not addressed other, potentially significant pollutants such as phosphorus and an assortment of chemicals used at construction sites."
- "Currently, there is no required training or certification program for contractors, preparers of soil erosion and sediment control Stormwater Pollution Prevention Plans, or field inspectors."
- "The quality of stormwater discharges from construction sites that effectively employ BMPs likely varies due to site conditions such as climate, soil, and topography."
- "The States of Oregon and Washington have recently adopted similar concepts to the Action Levels described earlier."

I.D.3. Panel Conclusions:

- "It is the consensus of the panel that active treatment technologies make Numeric Limits technically feasible for pollutants commonly associated with stormwater discharges from construction sites (e.g., TSS and turbidity) for larger construction sites. Technical practicalities and cost-effectiveness may make these technologies less feasible for smaller sites, including small drainages within a larger site, as these technologies have seen limited use at small construction sites. If chemical addition is not permitted, then Numeric Limits are not likely feasible."
- "The Board should consider Numeric Limits or Action Levels for other pollutants of relevance to construction sites, but in particular pH. It is of particular concern where fresh concrete or wash water from cement mixers/equipment is exposed to stormwater."

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- "The Board should consider the phased implementation of Numeric Limits and Action Levels, commensurate with the capacity of the dischargers and support industry to respond."

I.D.4. The State Water Board Considerations:

The State Water Board carefully considered the findings of the Panel and related public comments in the development and adoption of the previous permit. The State Water Board also reviewed and considered the comments regarding statewide stormwater policy during the adoption of the Industrial General Permit. From the input received, the State Water Board identified some General Permit and program performance gaps that were addressed in the previous permit and were also adopted in this General Permit. The Summary of Significant Changes (below) in this General Permit align with the Panel's process and findings, and build onto the previous permit.

I.E. Summary of Significant Changes in This General Permit

I.E.1. Significant Changes:

a. Implementation of Total Maximum Daily Loads (TMDL)

TMDLs are regulatory tools providing the maximum amount of a pollutant from potential sources in the watershed that a water body can receive while attaining water quality standards. A TMDL is defined as the sum of the allowable loads of a single pollutant from all contributing point sources (waste load allocations) and non-point sources (load allocations), plus the contribution from background sources. (40 Code of Federal Regulations § 130.2, subd. (i).)

Discharges covered by this General Permit are considered to be point source discharges, and therefore must comply with effluent limitations that are "consistent with the assumptions and requirements of any available waste load allocation for the discharge prepared by the State and approved by U.S. EPA pursuant to 40 Code of Federal Regulations section 130.7." (40 Code of Federal Regulations § 122.44, subd. (d)(1)(vii).) In addition, Water Code § 13263, subdivision (a), requires that waste discharge requirements implement relevant water quality control plans. Many TMDLs in existing water quality control plans include both waste load allocation and implementation requirements.

Attachment H of this General Permit lists the watersheds with U.S. EPA-approved and U.S. EPA-established TMDLs that include TMDL requirements for discharges covered by this General Permit.

i. Where waste load allocations are expressed at a value that is too low for laboratory methods listed in 40 Code of Federal Regulations Part 136 to detect and for pollutants that are sediment-bound, the Water Board has developed a soil screening investigation and total suspended solids numeric

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effluent limitation for sediment-bound pollutants, presented in Attachment H Section I.G.5, to determine compliance.

b. Implementation of Statewide Trash Policy Requirements

The State Water Board adopted an amendment to the Water Quality Control Plan for Ocean Waters of California to Control Trash and Part 1 Trash Provisions of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California (Resolution 2015-0019) in 2015. This Resolution establishes the statewide water quality objective and implementation plan to control trash.

This General Permit implements this Resolution by prohibiting the discharge of any debris and/or trash from construction sites.

c. Removal of Bioassessment Monitoring

The Bioassessment requirements in the previous permit were initially developed to align with a proposed State Water Board biological integrity policy, which is still under development.

The Bioassessment requirements in the previous permit were reviewed by State Water Board staff and it was determined the requirements were not consistently implemented and data was not generated. These requirements did not generate sufficient data regarding corresponding improvements to water quality or watershed heath that would justify the cost of compliance.

The Bioassessment requirements were removed from this General Permit and replaced with acknowledgement to use the Risk Level 3 and linear underground and overhead project Type 3 sites annual fee surcharge to perform monitoring, sampling, and/or bioassessment monitoring through the Surface Water Ambient Monitoring Program (SWAMP) to determine the impacts of large, high-risk construction projects on water quality and watershed health. Future reissuances of this General Permit may include bioassessment or biological integrity requirements to implement specific water quality control plans or state policy for water quality control.

d. Passive Treatment Technologies

State Water Board staff collaborated with stakeholders and other Water Board staff to discuss the use of passive treatment chemicals and technologies throughout the life of the previous permit, and it was determined that many passive treatment chemical types are potentially toxic to fish and other aquatic organisms. Staff also considered and reviewed regulations regarding these

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technologies from U.S. EPA and several other jurisdictions.[10,11,12] Cationic polyacrylamide-based flocculant products are acutely toxic to aquatic species in small quantities and are neurotoxins. Other flocculant products such as anionic polyacrylamide-based flocculants are chronically toxic to aquatic species in large quantities.

Staff additionally identified low-turbidity discharges from passive treatment chemical application sites do not always correspond to low levels of solids in the discharge and/or an improvement in water quality downstream because:

i. Turbidity monitoring solely measures small size solids suspended in the water; turbidity monitoring does not measure particle size, weight, or bed load of sediment from flocculated solids leaving a site; and

ii. Passive treatment chemicals discharged either by aerial deposition or via stormwater runoff contributes similar level of threat to aquatic life from toxicity.

This General Permit contains passive treatment provisions in Attachment G designed to provide the first set of regulations for construction activities use of passive treatment technologies and to align with the U.S. EPA's Construction General Permit requirements for treatment chemicals.

e. Water Quality Control Plan for Ocean Waters of California (California Ocean Plan)

On March 20, 2012, the State Water Board adopted Resolution 2012-0012 (amended by Resolution 2012-0031) which contained a general exception to the California Ocean Plan for discharges of stormwater and non-point sources. This General Permit requires dischargers who discharge to Areas of Special Biological Significance (ASBS) who have been granted an exception to the California Ocean Plan to comply with requirements in Attachment I.

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10 Toronto and Region Conservation, Anionic Polyacrylamide Application Guide for Urban Construction in Ontario (June 2013), <https://sustainabletechnologies.ca/app/uploads/2013/02/Polymer-Guide-Final_NewFormat.pdf> [as of May 20, 2021]

11 State of Washington Department of Ecology, Emerging Stormwater Treatment Technologies (TAPE) (2018), <https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies> [as of May 20, 2021]

12 U.S. EPA, Support Document for the Third Six-Year Review of Drinking Water Regulations for Acrylamide and Epichlorohydrin (December 2016), <https://www.epa.gov/sites/production/files/2016-12/documents/810r16019.pdf> [as of May 20, 2021]

f. Sufficiently Sensitive Test Methods

U.S. EPA has finalized minor amendments to its Clean Water Act regulations to codify that under the NPDES program, where U.S. EPA has promulgated or otherwise approved analytical methods under 40 Code of Federal Regulations Part 136, or 40 Code of Federal Regulations Chapter I, subchapters N and O, dischargers must use “sufficiently sensitive” analytical test methods. The purpose of the rulemaking was to clarify that NPDES permittees must use U.S. EPA approved analytical methods that are capable of detecting and measuring the pollutants at, or below, the applicable water quality criteria or permit limits.

This General Permit requires the use of sufficiently sensitive methods to meet the requirements of the amended Clean Water Act regulations described above and requires the discharger to ensure all laboratory analyses are sufficiently sensitive and conducted according to test procedures under 40 Code of Federal Regulations Part 136, including the observation of holding times, detection limits, and other measures designed to ensure quality assurance and quality control.

For any calculations required by this General Permit, a value of zero (0) will be assigned for all analytical results less than the minimum level as reported by the laboratory, so long as a sufficiently sensitive method was used (as evidenced by the reported method detection limit and minimum level which is also referred to as the reporting limit).

g. Notice of Non-Applicability

California Water Code § 13399.30 sets forth the authority for the Water Board to provide entities (referring to the person) a process for determining this General Permit does not apply to the entity’s activities through a Notice of Non-Applicability. The addition of the Notice of Non-Applicability provisions in this General Permit addresses the determination process and required information for construction sites situated in areas where stormwater discharges to waters that are not hydrologically connected to waters of the United States.

h. Sampling and Monitoring Requirements

Sampling and Monitoring requirements have changed in this General Permit as follows:

i. The Qualified SWPPP Developer (QSD) and Qualified SWPPP Practitioner (QSP) have additional requirements to visit the site, conduct visual inspections, and assess site conditions;

ii. The QSDs and QSPs are required to do on-site visual inspections at intervals that reflect potential changes to the construction site (e.g., start of construction, replacement of a QSD, twice yearly); and

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iii. Samples must be collected during precipitation events with 0.5"[13] or more predicted within a 24-hour period. This is defined as a Qualifying Precipitation Event for sampling and inspection requirements. The stormwater can be water from rain, snow, or any other precipitation. Qualifying Precipitation Events continue on subsequent 24-hour periods that have precipitation of 0.25" or more forecast, and end with two consecutive 24-hour periods with less than 0.25" forecast.

i. Removal of Rain Event Action Plan

The previous permit designed the Rain Event Action Plan (REAP) to provide an on-site inspection checklist for dischargers to implement requirements prior to a precipitation event. This tool has been discussed over the last ten years internally and externally with stakeholders. This General Permit implements more action-based requirements in lieu of the reporting-based strategy embodied by the REAP. This General Permit replaces REAPS with 1) QSD involvement over the life of the project, 2) additional inspections and visual observations, and 3) an increased requirement to document and implement these site corrective actions.

j. Notice of Termination Process

The Notice of Termination requirements have been updated to include additional project-specific termination information to streamline the Regional Water Board review process. Given that the Notice of Terminations should now be submitted with the complete details to determine approval, this General Permit includes an automatic approval provision after 30 days if not otherwise under review or addressed by the Regional Water Board. This change is to expedite Notice of Termination approval and to reduce the risk of prolonged financial burdens on dischargers for continued on-site monitoring and annual fee payments.

k. Appendices 2 and 2.1 Post Construction Water Balance Calculator

The previous permit included post-construction performance standards requirements and information in Appendices 2 and 2.1. These specific appendices have been removed from this General Permit because these requirements and information are now in Stormwater Applications and Reports Tracking System (SMARTS) and are available for review through the public SMARTS portal. Additionally, Appendix 2 had requirements for post-construction maps contours. This requirement has been removed in this General Permit because this General Permit includes additional SWPPP map requirements and Notice of Termination map requirements. After adoption of

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13 Xie, W., et. al. (2016). Models for Estimating Daily Rainfall Erosivity in China. Journal of Hydrology v. 535, p. 527-558.

this General Permit, the State Water Board may hold public or focused stakeholder meetings to discuss any necessary updates or changes to the post-construction water balance calculator in SMARTS. Some of this information will also be incorporated into online web-based maps, calculators, and/or visualizations as implementation guidance to the regulated community.

I.F. Cost Considerations

I.F.1. Passive Treatment Technology Provisions

The passive treatment technologies (passive treatment) requirements in this General Permit provide a regulatory pathway for dischargers to treat runoff for excess sediment without the use of an active treatment system while protecting water quality. The new passive treatment provisions were added due to requests from the regulated community, regulatory staff, and other stakeholders. The major components of the new Passive Treatment provisions that have expected cost components are: 1) consultant or discharger hours to develop and implement the Passive Treatment Plan, and 2) hours for Qualified SWPPP Developer (QSD) to implement the Passive Treatment Plan and monitor passive treatment application and use.

a. Hours for consultants and/or dischargers to develop and implement the Passive Treatment Plan.

   The passive treatment technologies in Attachment G requires the development of the Passive Treatment Plan. The costs associated with development and execution of the Passive Treatment Plan are in labor hours, training, collection of manufacturer information and potential hazards to the environment, and research on site-specific implementation of the Attachment G requirements. These costs, based on an hourly QSD billing rate of $80 to $120, are estimated at $3,000 to $5,000.

b. QSD hours to implement Passive Treatment Plan and monitor site-specific passive treatment application and use, including post-event sampling.

   A QSD is needed to develop and implement the Passive Treatment Plan and will require office and field hours for that individual. This is often a contracting cost to a consultant from the discharger or payment of QSD-staff hours for the discharger's organization. This cost will be highly variable, depending on the amount and duration of exposed soil conditions and the number of precipitation events that produce discharge from a site. The range is therefore estimated at $2,500 to $6,500 per year for the QSD and $500 to $1,250 in laboratory analysis costs.

I.F.2. Training

The reissuance of this General Permit requires updates to the QSD and QSP training program first introduced in the previous permit. Additional and revised

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training for all parties implementing this General Permit have been identified since 2009 and incorporated into this reissuance. Specific training needs to include: 1) Qualified SWPPP Developers (QSDs) and Qualified SWPPP Practitioners (QSPs) revised roles on the site, 2) training for passive treatment and TMDL implementation, and 3) statewide re-test and/or re-certification of Qualified SWPPP Developers, Qualified SWPPP Practitioners, and Trainers of Record.

a. QSD and QSP revised site roles

The Order and Attachments D and E require more involvement by the QSD and QSP, which is a potential increase in cost to the discharger as these are often contracted positions. Additional duties for the QSD under this permit include required field inspections and post-storm monitoring of passive treatment systems. On average, these duties should require 5 to 7 additional field days per year, at an estimated cost of $4,000 to $6,000, and up to two additional office days per year, at an estimated cost of $1,600. The revised roles for the QSP are expected to result in discharger savings, particularly since the increased QSD inspections may reduce QSP field time.

b. Additional training needed for passive treatment and TMDL implementation.

QSD and QSP personnel will need additional training to come up to speed on the new provisions of this General Permit. New requirements such as passive treatment and TMDL implementation will extend training content and create a learning curve for QSDs and QSPs trained under the previous permit. A four-hour refresher-level course would provide adequate additional training on these subjects, at an estimated cost of $200 to $250 for the training and $150 to $225 for the employee's time.

c. Potential statewide re-test and re-certification

If the Construction General Permit Training Team determines that all QSD/QSPs need to be re-tested or somehow re-certify their knowledge, this could incur costs to the state as well as to the dischargers for time spent. Assuming that any such re-testing and re-certification would be an online process, the additional cost would amount to two or three hours of employee time, or up to $125.

I.F.3. Cost Variability

The State Water Board recognizes that there is high variability in cost across all construction projects. Cost variability relates to many factors including: 1) short term vs. long term projects, 2) risk level of the project, and 3) construction season/schedule. Below is a discussion of these variables and their impact on overall cost for implementation of the General Permit.

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a. Short-term vs. long-term projects

Costs associated with the Construction General Permit are already variable due to the ephemeral nature of construction projects and the variation in size and site conditions. Short-term projects that can be completed during dry periods will incur minimal or no additional costs between permits, with expenditures still proportional to size. Projects that span one or more wet periods with more difficult erosion and sediment control issues, or sites that are in a TMDL watershed, will likely have more costs. This can be mostly attributed to increased QSD oversight and additional sampling and analysis requirements.

b. Risk dependent

The project risk calculation creates great variability in BMP cost, ranging from as little as 0.5 percent of the project total for Risk Level 1 site to four percent of the project total for Risk Level 3 sites. Higher risk sites will have more costs associated with BMPs, potential use of passive treatment, active treatment, increased monitoring requirements, and costs associated with discharging to high-risk receiving waters.

c. Construction activity season and schedule

The General Permit implementation costs are minimized for construction projects that use scheduling as a primary BMP and that schedule construction outside of time periods with likely precipitation events. The requirement for advanced BMPs is reduced, including cost associated with treatment (passive or active) if there is no water on-site. Sampling and analysis costs will be non-existent if no discharge occurs.

I.F.4. Savings

This General Permit includes several cost saving areas. After the previous permit, the State Water Board analyzed the provisions that were clear and enforceable, resulted in valuable data collection, and improved water quality. Changes were made to the previous permit to address areas that were not providing valuable data or improving water quality, including: 1) removal of the Rain Event Action Plan (REAP), 2) revised monitoring and sampling frequency, 3) clarifying the allowance of an inactive project status, 4) improved efficiency for reporting and data collection in SMARTS, 5) programmatic permitting for linear underground and overhead projects, and 6) including a 30-day automatic Notice of Termination approval unless notified by the Regional Water Board that the Notice of Termination is denied, returned, or accepted for review.

a. Rain Event Action Plan removal

The development and implementation of the Rain Event Action Plan in the previous permit resulted in minimal data and un-documented improvements in water quality. The removal of this requirement will save the discharger time and

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money, estimated at $2,500 to $3,500 per year in report preparation and $350 to $500 for labor.

b. Revised monitoring frequency

This General Permit includes a revised monitoring frequency that aligns with real-time site conditions and focuses on the implementation of BMPs and inspections. These requirements still ensure representative sampling and monitoring are conducted and includes BMP evaluations after numeric action level exceedances. For a one-year project duration, the savings are estimated at $1,750 to $2,000.

c. Inactive project status

Cost savings for sites to reduce monitoring and inspections during periods of inactivity. The savings come from fewer SWPPP implementation and monitoring hours for consultants and site personnel.

d. Annual Report, SMARTS, and implementation tools

The Annual Report is being redesigned to reduce the number of additional uploads and completion time for the discharger. When feasible, screens will be enhanced to streamline system use and staff is working on implementation tools outside of SMARTS (e.g., web-based maps).

e. Programmatic permitting for linear underground and overhead projects

Allowing linear underground and overhead projects to certify and submit one Notice of Intent for projects that have similar construction activity scopes and are located within one Regional Water Board office boundary will save time and money in application processes, changes of information, and initial inspections.

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I.G. Incorporation of Total Maximum Daily Load (TMDL) Requirements and Cost

I.G.1. Introduction

This General Permit's TMDL requirements provide a consistent implementation approach for TMDLs with similar pollutants and waste load allocations, streamlining the process for construction projects to achieve compliance. Responsible Dischargers are required to implement applicable TMDL waste load allocations through the following TMDL-specific requirements developed for this General Permit: compliance with this General Permit, Revised Universal Soil Loss Equation, Version 2, (RUSLE2) modeling, numeric action levels, and/or numeric effluent limitations. This consistency between TMDLs provides cost-efficient implementation for Responsible Dischargers in achieving compliance with applicable TMDL requirements. The discussion below is to provide:

a. An overview of TMDL implementation where the State Water Board has provided cost-efficiencies;

b. General information on TMDL pollutant categories and estimated compliance costs associated with TMDL requirements for Responsible Dischargers;

c. Examples of appropriate existing BMPs; and

d. General costs (high, medium, low) for potential TMDL-pollutant BMP categories.

I.G.2. Using this General Permit's Implementation Framework

Costs are site-specific and vary depending on multiple factors described categorically in Section I.F.3 above. This general information is provided to frame the cost considerations for Responsible Dischargers implementing applicable TMDL waste load allocation requirements. The incorporation of TMDL requirements into this General Permit allows for the use of its monitoring and reporting framework to avoid, where possible to meet the TMDL requirements, incurring additional costs associated with TMDL implementation (e.g., additional and separate reports for numeric action level and numeric effluent limitation exceedances, unique monitoring and sampling requirements specific to TMDLs).

a. The TMDL implementation requirements in this General Permit rely on Responsible Dischargers to complete a thorough pollutant source assessment for the entire duration of their construction project, which shall be included within their SWPPP. Only Responsible Dischargers that identify on-site sources of pollutants associated with an applicable TMDL, as listed in Attachment H, are required to comply with additional TMDL requirements. This provision takes into consideration construction site pollutant source variability and reduces the implementation burden to implement TMDL requirements for pollutants that are not present on their site from construction activities. The additional cost for a TMDL-level pollutant source assessment is estimated at $1,000 to $1,250, including additional field time and SWPPP preparation. Dischargers complying with the alternative approach described in Section I.W.6.g.vi of this Fact Sheet may incur additional costs related to the soil screening required as part of the pollutant source assessment. The soil screening cost is estimated at $200 per sample.

b. Twenty-nine (29) of the TMDL waste load allocations have been translated to require compliance with this General Permit, without imposing additional RUSLE2 modeling, numeric action levels, or numeric effluent limitations.

c. Ninety-three (93) TMDL waste load allocations were translated to require using RUSLE2 modeling to demonstrate a construction site's annual soil loss will not deliver more sediment to a water body than pre-construction conditions. This translation was derived in consideration of costs for TMDLs with mass-based waste load allocations, rather than imposing TMDL-specific monitoring requirements for pollutants that are associated with sediment discharges.

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d. Sixty-two (62) of the TMDL waste load allocations have been translated to require numeric action levels, to consistently implement the General Permit's framework using numeric action levels compliance and reporting. Responsible Dischargers are required to follow the same stormwater management requirements for both TMDL-related and non-TMDL-related numeric action level exceedances in this General Permit. TMDLs with concentration-based waste load allocations to be met in receiving waters, are translated into numeric action levels to be met at the construction site discharge location(s), to avoid costly and often infeasible receiving water monitoring.

e. Twenty-one (21) TMDL waste load allocations have been translated to impose numeric effluent limitations for pollutants, with required assessments and monitoring consistent with the regulatory framework of this General Permit. However, Responsible Dischargers will follow the water quality based corrective action process in this General Permit and perform the required actions for TMDL-related numeric effluent limitation exceedances instead of a numeric effluent limitation violation report required for non-TMDL numeric effluent limitations. A Responsible Discharger that exceeds a TMDL-related numeric effluent limitation is in violation of this General Permit and may be subject to mandatory minimum penalties, whereas numeric action level exceedances are not violations of this General Permit. Only applicable TMDLs with concentration-based waste load allocations, to be met at the construction site discharge location(s), were translated into numeric effluent limitations.

I.G.3. TMDL-related Numeric Action Level and Numeric Effluent Limitation Exceedances

The incorporation of TMDL implementation requirements may represent an increase in the cost of compliance for certain Responsible Dischargers. The following conditions must occur for a Responsible Discharger to exceed an applicable TMDL-related numeric action level or numeric effluent limitation:

Condition 1: The discharger discharges stormwater and authorized non-stormwater, either directly or through a municipal separate sewer system or other conveyance, to impaired water bodies or watersheds identified in a U.S. EPA-approved TMDL that assigns a concentration-based waste load allocation to construction stormwater discharges. Concentration-based waste load allocations are translated into numeric effluent limitations or numeric action levels and are listed in Attachment H, Table H-2.

Condition 2: The discharger identifies through the site-specific pollutant source assessment that one or more TMDL-specific pollutants are present at the site with the potential to enter discharge.

If the above conditions occur, the discharger is considered a Responsible Discharger for a TMDL, and subject to TMDL-related numeric action levels or numeric effluent limitations.

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Condition 3: The Responsible Discharger triggers the non-visible sampling requirements for the TMDL-specific pollutant when the pollutants may be discharged due to failure to implement BMPs, a container spill or leak, or a BMP breach, failure, or malfunction.

If the spill or leak, or BMP breach, failure or malfunction are immediately cleaned up and BMPs to control the pollutant were implemented, maintained, or replaced prior to the discharge, the Responsible Discharger is not required to sample its discharge.

Condition 4: The discharger conducts non-visible sampling in accordance with Attachment D, Section III.D.3, and Attachment E, Section III.D.3 and the analytical results report a concentration for the TMDL-specific pollutant above the applicable TMDL-related numeric action level or numeric effluent limitation listed in Attachment H, Table H-2.

Condition 5: Conditions 3 and 4 occur at least twice for any and all discharge locations within the same drainage area, during a given reporting year (July 1 through June 30). Each of the discharger's subsequent analytical results reporting a concentration above the TMDL-related numeric action level or numeric effluent limitation, after the second occurrence, is considered a distinct exceedance.

A Responsible Discharger violates a TMDL-related numeric effluent limitation only after all the above conditions occur. Responsible Dischargers that exceeded a TMDL-related numeric effluent limitation or numeric action level will continue to implement iterative corrective actions and BMP implementation to prevent further exceedances. Dischargers that do not take corrective actions following an exceedance are in violation of this General Permit.

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I.G.4. Availability of Implementation Tools

The State Water Board recognizes the need to provide Responsible Dischargers tools and information to navigate the applicability of TMDL requirements, determine the spatial location of the requirements, and provide support for compliance analyses. To reduce the Responsible Discharger's cost of complying with the TMDL requirements, state-developed tools to assist in the implementation of and compliance with the TMDL requirements will be made free and publicly available. These include a TMDL applicability flowchart, a GIS-based TMDL applicability map, and additional implementation guidance and training for potential compliance methods.

I.G.5. TMDL Pollutant Categories

This General Permit implements a number of TMDLs separated into the following seven TMDL pollutant categories:

a. Bacteria

b. Chloride and salts

c. Diazinon

d. Nutrients

e. Sediment

f. Temperature

g. Metals and Toxics

Attachment H, Table H-2 of this General Permit lists all TMDLs applicable to Responsible Dischargers. For each TMDL, Table 2 cross-references one or more of the pollutant categories above.

a. Bacteria[14,15]

Sources of bacteria and other pathogens in watersheds include, but are not limited to, animal excrement (from stormwater infrastructure and animals) and sanitary sewer overflows of human excrement. Major contributors from construction sites may include wild or tamed animals on the premises, waste handling, portable toilets, and contaminants in erodible materials. This Fact Sheet contains supportive information referenced from the bacteria TMDLs that construction stormwater dischargers are not a significant source of bacteria and therefore would meet the waste load allocations.

The bacteria TMDLs in Attachment H require the implementation of existing minimum BMPs to control stormwater exposure to bacteria sources, thus compliance with these TMDLs is not expected to result in significant additional costs.

b. Chloride and Salts[16]

Salts such as boron, calcium chloride (CaCl), magnesium chloride (MgCl), sodium chloride (NaCl), and sulphate can accumulate in soils within the watershed. Three TMDLs in Attachment H identify construction stormwater

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14 Los Angeles Regional Water Board, Ballona Creek, Estuary, and Tributary Bacteria TMDL (June 7, 2012), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/R12-008_RB_BPA.pdf> [as of May 20, 2021]

15 CASQA, Construction BMP Handbook (January 2015), <https://www.casqa.org/sites/default/files/casqa-handbook-construction/master_hanbook_file_2015_sec.pdf> [as of May 20, 2021] (CASQA Construction BMP Handbook)

16 Los Angeles Regional Water Board, Calleguas Creek Watershed Salts TMDL (October 4, 2007), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/2007-016_RB_BPA.pdf> [as of May 20, 2021]

dischargers as potential sources of chloride and salts. For two of the three TMDLs, compliance with this General Permit was sufficient to meet the assigned waste load allocations, thus not imposing any TMDL-specific costs on the Responsible Dischargers. However, the Upper Santa Clara River TMDL for chloride assigned a concentration-based waste load allocation, which was translated into a numeric action level. As a result, Responsible Dischargers for the Upper Santa Clara River Chloride TMDL can expect a medium to low-cost impact.

Responsible Dischargers in the Upper Santa Clara River watershed (Region 4) may be required to conduct non-visible pollutant monitoring to analyze for boron, chloride, sulfate, and total dissolved solids as part of the TMDL implementation requirements. The estimated additional cost of the non-visible pollutant monitoring for the Upper Santa Clara River TMDL would be approximately $200-$400 for sampling and $150-$250 for analysis and SMARTS data entry, per sampled discharge location per event.

c. Diazinon[17]

Diazinon is an organophosphate pesticide that does not sorb to sediment but is instead mobilized through soils by dissolving in water. Stormwater runoff can come into contact with areas where diazinon was applied and transport the pollutant into the watershed. Although diazinon was once used in both agricultural and urban settings, it has since been banned for non-agricultural uses by the California Department of Pesticide Regulations. Because this General Permit requires all dischargers to perform a pollutant source assessment, and diazinon is banned for non-agricultural uses, compliance with the diazinon TMDL requirements is not expected to incur additional costs.

d. Nutrients[18,19]

Nutrients (e.g., ammonia, nitrogen compounds, and phosphorous) can be found in stormwater runoff from construction sites, industrial areas, and urban areas. Sources of nutrients from construction sites may include background

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17 San Diego Regional Water Quality Control Board, Chollas Creek Diazinon Total Maximum Daily Load (August 14, 2002) <https://www.waterboards.ca.gov/sandiego/water_issues/programs/tmdls/chollascreekdiazinon.html> [as of May 20, 2021]

18 United States EPA Region IX, Los Angeles Area Lakes Total Maximum Daily Loads for Nitrogen, Phosphorus, Mercury, Trash, Organochlorine Pesticides and PCBs (March 26, 2012), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/Established/Lakes/LALakesTMDLsEntireDocument.pdf> [as of May 20, 2021]

19 CASQA Construction BMP Handbook, p. 1-7.

concentrations, storage and application of fertilizers, and discharges of nutrient-rich sediments. Most of the nutrient TMDLs in Attachment H require that dischargers comply with waste load allocations by meeting the translated numeric action levels or numeric effluent limitations, while one TMDL relies on RUSLE2 modeling. The compliance cost impact for implementation of the nutrient TMDLs is expected to be medium to high since additional BMPs (filter media BMPs for phosphorus and advanced BMPs for nitrogen) and monitoring may be required for controlling the specific nutrient concentrations from construction sites.

The RUSLE2 modeling used to demonstrate compliance with the San Diego Creek and Newport Bay Nutrients TMDL in Region 8 is estimated to add $750 to $1,500 in costs, per project.

If non-visible pollutant monitoring is required, Responsible Dischargers in some watersheds located in Regions 3, 4 and 8 (Central Coast, Los Angeles Basin and Santa Ana), as specified in Attachment H, shall conduct analyses for the TMDL-specific pollutant(s) such as total nitrogen, ammonia, nitrates, nitrites, phosphorous, and orthophosphates. The estimated additional cost of the TMDL monitoring would be approximately $200-$400 for sampling and $200-$400 for analysis and SMARTS data entry, per sampled discharge location per event.

The May 2021 draft of the Construction Stormwater General Permit, issued for public comments, proposed translations of nitrogen-based nutrient waste load allocations into numeric effluent limitations. The translation of the nitrogen-based nutrient waste load allocations was revised to numeric action levels in this General Permit per the following explanation that numeric action levels are consistent with the assumptions and requirements of the waste load allocations.

All applicable TMDLs with nitrogen-based nutrient waste load allocations discuss low flow as the critical condition for the receiving water impairment. Unlike general urban runoff that occurs year-round, construction stormwater discharges only occur as a result of precipitation events; discharges from construction sites do not typically occur during low flow receiving water conditions. A numeric action level is a more appropriate limitation to implement a TMDL primarily concerned with dry weather discharges. Further, each TMDL discusses municipal wastewater treatment plants as a principal source of nutrient loading. Although stormwater is identified as a potential source, the TMDL did not calculate a source-specific waste load allocation and instead used the water quality objective as the waste load allocation for nutrients. Although the TMDLs sets the compliance location at the point of discharge, because of how the waste load allocation was calculated, the waste load allocations are similar to TMDLs where the compliance point is set at the receiving water. As set forth in Section I.D.3, this General Permit translated

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concentration-based waste load allocations to be met in receiving waters into numeric action levels.

The State Water Board has very few nitrogen-based nutrient sampling results from construction stormwater because the previous permit did not require sampling for nutrients. However, nutrient data is available from required monitoring in the Industrial Stormwater General Permit. An analysis of all stormwater data from implementation of the Industrial Stormwater General Permit from 2015 – 2021 shows that of collected nutrients samples, approximately 95 percent of nitrate-plus-nitrite samples (as nitrogen), and 92 percent of ammonia samples had concentration results were lower than numeric action levels listed in this General Permit. The average sampling results, 0.68 mg/L for nitrate-plus-nitrite and 2.16 mg/L for ammonia, were below the numeric action levels in the Industrial Stormwater General Permit. Both observed average sampling results are a fraction of the action levels in this General Permit. The sampling results available through the implementation of the statewide Industrial Stormwater General Permit include stormwater discharge data from industrial facilities, such as fertilizer manufacturers, with significant potential sources of nutrients. In contrast, sources of nutrients from construction sites are generally limited to existing legacy concentrations in the sediment from past land uses that involved application of fertilizers, pesticides, and herbicides, and storage facilities that store the chemicals. Accordingly, it is generally expected that construction stormwater discharges will not exceed the waste load allocations and numeric action levels are appropriate.

Numeric action levels are consistent with the TMDLs and protective of water quality. All dischargers are required to implement sediment control BMPs and eliminate or minimize site erosion. If the Discharger exceeds the numeric action level, as set forth in Attachment H, Section I.D.3.e, the discharger must report and respond to a numeric action level exceedances. As described in Attachment D and E, Section III.G, when there is an exceedance of a numeric action level, dischargers must determine the source of the pollutant, implement corrective actions to reduce or prevent further exceedances and implement iterative corrective actions until the discharge is in compliance with the action level. Within 14 calendar days of an exceedance, a QSD and QSP must perform on-site visual inspections and the QSP must document any areas of concern (Order, Section V.C.3 & V.D.4). For example, if the construction activities include the application or storage of fertilizers, pesticides, and herbicides, exposure of those products to stormwater must be prevented or minimized. Corrective actions may also include implementing BMPs that eliminate stormwater discharges, BMPs with filter media, or other sediment control BMPs. The Regional Water Boards may require additional monitoring, reporting, and BMP requirements upon obtaining site-specific information about an exceedance to a numeric action level (Attachment H, Section I.D.3.f). The

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State Water Board expects that dischargers can feasibly comply with the nitrogen numeric action levels in this General Permit without the need to implement more advanced BMPs, which as discussed below are not typically possible to install at construction sites.

The most effective BMPs for removal of nitrogen-based nutrients through denitrification, biofiltration, or bioretention are advanced structural treatment BMPs that are used at permanent sites, not temporary construction sites. Denitrification, the process by which nitrates are reduced to gaseous nitrogen by facultative microbes under anaerobic conditions, is often employed at wastewater treatment plants with numeric effluent limitations for ammonia and/or nitrates. Biofiltration BMPs capture and treat stormwater runoff using conditioned soil beds for planting vegetation and establishing microbial communities to filter out pollutants. Denitrifying treatment and bioretention BMPs requires the retention of all the construction site's stormwater. Sites would need adequate space to accommodate the proper sizing and design of such treatment BMPs to effectively remove nutrients. Construction sites often have limited available area, and the larger the site, the more area is needed for treatment BMPs. Construction of permanent BMPs is not typically compatible with construction stormwater management, as site conditions are inherently transient during the term of the construction, and the nutrient removal BMPs would only be needed during land disturbance activities.

Biofiltration basins require established vegetation to efficiently remove nutrients. The vegetation in a biofiltration basin typically needs, at minimum, several growing seasons, (at minimum several months under ideal weather and soil conditions, up through several years under non-supportive growing conditions), for the vegetation to establish itself and provide effective treatment for nutrient removal. Most construction projects are active for a short duration with insufficient time to establish a vegetative biofiltration process that effectively removes nutrients. Although biofiltration is a commonly used post-construction BMP, its utility during construction is limited due to the inability to move biofiltration BMPs; additionally, biofiltration BMPs are designed specifically to treat a defined stormwater discharge quality under specific site conditions. Biofiltration BMPs are expensive, generally costing tens-of-thousands of dollars in addition to the cost of retention of the site's stormwater. Due to the time period needed to design and establish effective treatment, the long-term nature of treatment implementation, and the relative cost, biofiltration BMPs are not well-suited for construction sites that are temporary in nature.

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e. Sediment [20]

Excess sediment delivery to stream channels can be a pollutant and is associated with several natural processes as well as anthropogenic sources. Sediment can transport other pollutants that attach to it, including nutrients, trace metals, and organic compounds. Sediment is the primary component of turbidity, the most common sediment water quality analytical parameter used in this General Permit. Anthropogenic construction sources include, but are not limited to, track in and out from earth moving equipment, unpaved access road-related erosion (e.g., construction and maintenance of paved and unpaved roadways), dust, and soil/earth disturbing activities. All Responsible Dischargers are required to comply with the existing requirements of this General Permit, including the turbidity numeric action levels, associated exceedance actions, and the sediment TMDLs incorporated into this General Permit. However, many of the sediment TMDLs will also require additional RUSLE2 modeling to demonstrate compliance with the assigned waste load allocations. Responsible Dischargers for the Los Peñasquitos Lagoon Sediment TMDL are required to submit an estimate of the representative flow rate from their construction site for one precipitation event, each reporting period. Although imposing these additional requirements is expected to result in a low to medium cost impact for Dischargers, they were considered a more cost-effective approach than other means of complying with the TMDL such as TMDL-specific monitoring.

The cost of a runoff flow rate assessment varies by methodology and the method is often determined by the availability of input data. A relatively simple equation such as the Rational Method would require an hour or less for a QSD to calculate. The more complex and accurate National Resources Conservation Service method may require a site visit or extensive internet research and take two to six hours to complete. This translates to a cost range of $100 to $600, based on an average billable rate of $100 per hour for QSDs.

In addition to the regular numeric action level sediment monitoring required by the permit, Responsible Dischargers in some watersheds located in Region 1, as specified in Attachment H, shall conduct RUSLE2 to demonstrate compliance with the waste load allocations. The estimated additional cost of the RUSLE2 calculation requirement will add $750 to $1,500 to each project in these Regions.

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20 California Stormwater Quality Association (CASQA) Construction BMP Handbook, p. 1-7.

f. Temperature[21]

This General Permit includes seven temperature TMDLs, all of which are located in the North Coast Regional Water Quality Control Board's jurisdiction. The removal of riparian vegetation from road building and urbanization construction are amongst the sources observed to increase Northern California stream temperatures, which can negatively impact juvenile salmonids. Excessive sediment input also raises stream temperature by widening stream channels, filling pools, and eliminating riparian vegetation during flood events. Responsible Dischargers are required to comply with the requirements of this General Permit in order to achieve the applicable waste load allocations in the North Coast Temperature Implementation Policy. Compliance with these TMDLs is not expected to result in additional costs.

g. Metals and Toxics[22]

Metals (e.g., aluminum, cadmium, chromium, copper, lead, mercury, nickel, and zinc) and selenium can be found in construction stormwater discharges and are potentially toxic to aquatic life. Many of the equipment and materials used in the built environment (e.g., pipes, rebar, conductors, galvanized metal, paint, vehicles, preserved wood, tires, and vehicle brakes) contain metals, which enter stormwater as the surfaces corrode, decay, dissolve, flake, leach, or rust.

Toxic, synthetic organic compounds (e.g., adhesives, cleaners, herbicides, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides, sealants, solvents) may be found in low concentrations but can still be toxic to aquatic life. Sources of synthetic organic compounds at construction sites include, but are not limited to, exposure of the compounds to stormwater during use and/or storage, improper disposal, and accidental release into storm drains or off-site.

The primary transport mechanism for metals and toxics is the mobilization and discharge of fine sediment through stormwater. Metals and organic compounds have an affinity for other organic substances and will partition from water and sorb to sediment. For this reason, it was appropriate to translate mass-based waste load allocations into requiring additional RUSLE2 modeling to estimate sediment delivery from a construction site into a watershed. Using RUSLE2 to

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21 United States Environmental Protection Agency Region IX, Final Upper Main Eel River and Tributaries (including Tomki Creek, Outlet Creek and Lake Pillsbury) Total Maximum Daily Loads for Temperature and Sediment (December 29, 2004) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/eel_river_upper_main/pdf/uer-tmdl-final-12-28.pdf> [as of May 20, 2021]

22 CASQA Construction BMP Handbook, p. 1-7.

demonstrate compliance with the waste load allocations avoids cost impacts associated with monitoring for toxic and metal pollutants.

However, a number of the metal and toxics TMDLs are assigned concentration-based waste load allocations, which were translated into numeric action levels or numeric effluent limitations. Many dischargers are not currently implementing BMPs designed to minimize concentrations for metals and toxics, but many Responsible Dischargers will need to implement BMPs designed to comply with the TMDL requirements. The compliance cost impact for the metal and toxics TMDL implementation is expected to be similar to that for normal sediment removal unless site-specific advanced BMPs and additional monitoring are required to comply with the requirements of these TMDLs. In the latter case, more advanced systems such as bioretention ponds, active treatment systems, or membrane filtration structures will likely have costs in the tens of thousands of dollars.

If non-visible pollutant monitoring is required, Responsible Dischargers in some watersheds located in Regions 4, 8 and 9 (Los Angeles Basin, Santa Ana, San Diego), as specified in Attachment H, would have to conduct TMDL analyses for metals and toxics listed for the individual watersheds. These pollutants may include copper, lead, zinc, mercury, nickel, cadmium, chromium and selenium, and toxics in the form of organochlorine pesticides, polychlorinated biphenyls (PCB), and polycyclic aromatic hydrocarbons (PAH). The estimated additional cost of this TMDL monitoring would be approximately $200-$400 for sampling and $525-$750 for analysis and SMARTS data entry, per sampling location per event. For the Los Angeles Area Lakes TMDL, the waste load allocations for organochlorine pesticides and PCBs are below the analytical reporting limits. Additionally, the Los Angeles and Long Beach Harbor Waters TMDL waste load allocations for total copper, lead, and zinc are analytically detectible, but limited data from construction site stormwater sampling indicates that compliance with these waste load allocations would be extremely difficult. As further detailed below, because organochlorine pesticides, PCBs, copper, lead, and zinc all bind to sediment and sediment is a common pollutant in stormwater from construction sites that can be managed effectively with BMPs, compliance with these two TMDLs is implemented through a soil screening investigation and, if applicable, a total suspended solids (TSS) numeric effluent limitation detailed in Attachment H, Section I.G.5.

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The soil screening investigation is used to determine the presence of the applicable metals, organochlorine pesticides, or PCBs by comparing the concentration of pollutants in the soil to the analytical reporting limit for each substance. The analytical reporting limit is the lowest concentration at which an analyte can be measured in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

If the analytical reporting limit for any of the TMDL-specific pollutants is exceeded in any soil sample obtained for the soil screening investigation, the Responsible Discharger will be required to sample for TSS as a proxy for the identified TMDL pollutants if the non-visible sampling requirements are triggered. The numeric effluent limitation for TSS is 100 mg/L, and any exceedances require corrective actions detailed in Attachment D, Section III.G and Attachment E, Section III.G.

The value of 100 mg/L TSS is derived from several lines of evidence, including a study where the probability curve between organochlorine pesticides and TSS was modeled to determine that 100 mg/L TSS is protective of water quality when the criteria for 4,4 DDE was 0.00059 mg/L which is equal to the waste load allocation concentrations for chlordane and 4,4 DDT listed in the Los Angeles Area Lakes TMDL. Additionally, a 2018 study found that 100 mg/L TSS correlated with the boundary between particulate and dissolved phase metals in multiple watersheds when the K_d (distribution coefficient) for the metal is 10,000 L/kg.[23]

I.G.6. Stormwater BMP Selection

a. This General Permit provides dischargers flexibility in selecting the site-specific BMPs necessary to achieve compliance. This flexibility is also provided to Responsible Dischargers in selecting, installing, and maintaining the appropriate BMPs for site-specific situations to meet applicable TMDL requirements, including BMP combinations of:

   i. Non-structural BMPs (such as good housekeeping and staff training);

   ii. Structural source control BMPs (physical, structural, or mechanical devices or BMPs intended to prevent pollutants from entering stormwater) such as erosion control practices, maintenance of stormwater facilities (e.g., cleaning out sediment traps), construction of roofs over storage and working areas, and direction of equipment wash water and similar discharges to the sanitary sewer or other end-use systems; and/or

   iii. Structural treatment BMPs which include flow or volume-based treatment BMPs. Structural source control and treatment BMPs usually include a capital investment but are cost-effective compared to removing pollutants

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23 Nasrabadi T, Ruegner H, Schwientek M, Bennett J, Fazel Valipour S, Grathwohl P (2018) “Bulk metal concentrations versus total suspended solids in rivers: Time-invariant & catchment-specific relationships.”
Washington Department of Ecology (2004) “A Total Maximum Daily Load Evaluation for Chlorinated Pesticides and PCBs in the Walla Walla River.”
Angela Gorgogline, Fabián A. Bomberdelli, Bruno J. L. Pitton, Lorence R. Oki, Darren L. Haver and Thomas M. Young (2018), “Role of Sediments in Insecticide Runoff from Urban Surfaces: Analysis and Modeling.”

after they have entered stormwater and been discharged into a receiving water body.

b. Stormwater BMP categories for the TMDL pollutant types above are, in general, physical, chemical, hydraulic, and biological. Selection of appropriate site BMPs must be determined based on site-specific factors. No single BMP can achieve the required pollutant reductions for every given situation or pollutant, and each BMP approach has pros and cons. The Responsible Discharger should consider the cost-benefit[24] when selecting stormwater BMPs. Some factors include, but are not limited to, upfront-cost, maintenance-cost, pollutant removal efficiency per area/treatment unit, local permitting, site hydrology and geology, safety, space, staffing, and monitoring needs for implementing the BMP(s). There are many ways to calculate the upfront and maintenance cost of BMPs that consider, for example, BMP sizing, the annual cost for maintenance and/or the annual maintenance hours required.[25]

Table 1 – University of New Hampshire Stormwater Center[26] Select BMP Maintenance Costs and Hours

BMP	Maintenance Cost (per year)	Annual Maintenance Hours
Bioretention	$1,890.00	20.7
Chamber System	Not Assessed	Not Assessed
Detention Pond	$2,380.00	24.0
Gravel Wetland	$2,138.00	21.7
Porous Asphalt	$1,080.00	6.0
Pervious Concrete	$1,080.00	6.0
Retention Pond	$3,060.00	28.0
Sand Filter	$2,807.00	28.5

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I.G.7. Stormwater BMP Categories

24 State of Hawaii Department of Transportation Highways Division. Stormwater Permanent Best Management Practices Manual, page 7-2 Table 1. (February 2007). <http://hidot.hawaii.gov/wp-content/uploads/2015/05/Appx-E.1-Permanent-BMP-Manual-Feb-2007.pdf>. [as of May 20, 2021]. (State of Hawaii BMP Manual)

25 U.S. EPA. Methodology for developing cost estimates for Opti-Tool Memorandum (February 20, 2016), page 8. <https://www3.epa.gov/region1/npdes/stormwater/tools/green-infrastructure-stormwater-bmp-cost-estimation.pdf>. [as of April 28, 2022]. (U.S. EPA BMP Cost Estimation Memorandum)

26 U.S. EPA BMP Cost Estimation Memorandum, University of New Hampshire Stormwater Center (UNHSC) Select BMP Maintenance Costs and Hours, page 8.

The following categories generally describe currently available types of stormwater BMPs, their expected effectiveness for the TMDL pollutant categories, and some general cost comparisons. The cost comparisons for 6.a-b are based on:

- Staff experience in administering this General Permit for the non-structural and structural source control BMPs;
- The CASQA Industrial and Commercial BMP Handbook for appropriateness of minimum BMPs to control pollutants;
- The CASQA Construction Handbook for appropriateness of minimum BMPs to control pollutants;[27] and
- The California Department of Transportation (Caltrans) Construction Site BMP Manual.[28]

The cost for non-structural controls, which includes good housekeeping, preventative maintenance, spill and leak prevention and response, erosion and sediment controls, employee training programs, and quality assurance and record keeping, is lower than the costs for other BMPs. For example, these costs consist of staff time for training or conducting routine minimum BMP activities and minimal costs for certain materials such as spill kits or for materials for retaining records. Costs for source control BMPs were estimated generally as being low, medium, or high, dependent on a variety of factors.

The cost comparisons and information in Table 2 for 6.a-i are based on general conclusions from research conducted by the California Stormwater Quality Association, U.S. EPA, U.S. Department of Transportation, State of Hawaii Department of Transportation Highways Division, State of Minnesota Pollution Control Agency, and the Water Environment and Reuse Foundation. State Water Board staff reviewed these sources on:

- The selection of BMPs for general categories of pollutants and performance of pollutant removal;
- The provided upfront costs for a BMP category from a range of low, medium, and high; and
- The provided maintenance costs for a BMP category from a range of low, medium, and high.

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27 CASQA Construction BMP Handbook, 2015.

28 California Department of Transportation (Caltrans), Construction Site BMP Manual (May 2017). <https://dot.ca.gov/-/media/dot-media/programs/construction/documents/environmental-compliance/csbmp-may-2017-final.pdf> [as of May 20, 2021]

More specific information on methodology and estimates is available from these sources, which are cited below.

a. **Non-Structural BMPs**, which include, but are not limited to, site sweeping, staff training and education, dumpster and waste management, routine portable toilet maintenance and cleaning, and proper handling and spill response for construction materials.[29] These BMPs can significantly reduce pollutant concentrations in all categories (4.a-g) and can range from low to medium upfront costs depending on the staffing and size of size. In general, operation and maintenance costs are low.

b. **Source control BMPs**, which include minimizing or eliminating exposure of a pollutant source, can significantly reduce pollutant concentrations in all categories (4.a-g). Upfront costs can range from low (e.g., moving materials or activities indoors or under cover) to high (if, for example, the site must move or build extra covered areas/structures). In general, the operation and maintenance costs are low for exposure minimization and elimination BMPs.

c. **Bioretention BMPs[30]** are soil and plant-based filtration structures that reduce runoff velocity and remove pollutants over time through a variety of processes. Bioretention can significantly reduce pollutant concentrations for categories (4.a), (4.d), (4.e), (4.f), and (4.g) (varies for dissolved metals).[31] Usually, costs are medium to high[32] per area treated and are tied to proper sizing and design, with low to medium maintenance requirements and cost.[33]

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29 U.S. Department of Transportation (DOT), Federal Highway Administration. Stormwater Best Management Practices in an Ultra-Urban Setting: Selection and Monitoring. Section 6.5 Table 57. Relative Rankings of Cost Elements and Effective Life of BMP Options. <https://www.environment.fhwa.dot.gov/Env_topics/water/ultraurban_bmp_rpt/uubmp6p4.aspx> [as of April 28, 2022]. (U.S. DOT BMP Selection and Monitoring)

30 California Stormwater Association (CASQA), Industrial and Commercial Best Management Practice Online Handbook September 2014, TC-32. <https://www.casqa.org/sites/default/files/casqa-handbook-industrial/full_handbook_2014.pdf> [as of May 20, 2021] (CASQA Industrial and Commercial BMP Handbook)

31 Water Environment and Reuse Foundation (WERF). International Stormwater BMP Database 2020 Summary Statistics Final Report, <https://www.waterrf.org/system/files/resource/2020-11/DRPT-4968_0.pdf> [as of April 28, 2022]. (International Stormwater BMP Database).

32 State of Hawaii BMP Manual, page 7-2 Table 1.

33 U.S. DOT BMP Selection and Monitoring, section 6.5 Table 57; State of Hawaii BMP Manual, page 7-2 Table 1; U.S. EPA BMP Cost Estimation Memorandum, page 8.

d. **Media or Treatment Filtration BMPs**[34] include either active or passive processes. In passive processes, water flows through treatment media or surface by gravity. In active processes, stormwater flows through media via a pump or similar mechanized system. The media are usually a custom or proprietary blend from the manufacturer and/or vendor (e.g., flocculants, coagulants, carbon, sand, organics). Active systems are chambered and may include pretreatment features to enhance the treatment process. Media filtration can significantly reduce pollutant concentrations categories (4.a), (4.e), and (4.g)[35] depending on the specific treatment media. The costs vary significantly depending on the pollutant(s) intended for treatment, the size of the system, and the system design. Upfront costs are generally medium to high per area treated with medium to high maintenance requirements and cost.[36]

e. **Retention BMPs** (sediment basin, retention wet pond or extended detention wet pond)[37] are constructed basins that have a permanent pool of water most of the year which settle out pollutants and can use plant life to biologically remove pollutants. Retention can significantly reduce pollutant concentrations for all categories but (4.c) and effectiveness for category (4.g) varies depending on the metal and whether the metal is dissolved.[38] The upfront and maintenance requirements and costs are tied to proper sizing and design of the system and vary from medium to low.[39]

f. **Detention BMPs** (Dry extended detention ponds, dry ponds, extended detention basins, detention ponds, extended detention ponds)[40] are basins with designed outlets to achieve a required stormwater draw down time (e.g., 24, 48, or 72 hours). The basins are designed to detain stormwater runoff for some minimum time (e.g., 48 hours) allowing particles and associated pollutants to settle. These basins have a temporary wet pool dependent on the infiltration rate of the subsoil. Detention can significantly reduce pollutant concentrations

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34 CASQA Industrial and Commercial BMP Handbook, TC-40 Media Filter.

35 CASQA Industrial and Commercial BMP Handbook, TC-40 Media Filter.

36 State of Hawaii BMP Manual, page 7-2 Table 1; U.S. DOT BMP Selection and Monitoring, section 6.5 Table 57; U.S. EPA BMP Cost Estimation Memorandum, page 8.

37 CASQA Industrial and Commercial BMP Handbook, TC-20 Wet Pond.

38 WERF International Stormwater BMP Database 2016 Summary Report.

39 State of Hawaii BMP Manual, page 7-2 Table 1; U.S. DOT BMP Selection and Monitoring, section 6.5 Table 57; U.S. EPA BMP Cost Estimation Memorandum, page 8.

40 CASQA Industrial and Commercial BMP Handbook, TC-22 Extended Detention Basins.

for all categories except for (4.c) and (4.g), though detention's effectiveness for metals is variable depending on the metal and whether the metal is dissolved.[41] The upfront and maintenance requirements and costs are tied to proper sizing and design of the system and vary from medium to low.[42]

g. **Wetland BMPs** (constructed wetlands)[43] are constructed basins with a permanent pool of water for most of the year and are shallower with more vegetation than wet ponds. Stormwater is stored in the shallow pools of vegetation. Pollutant removal is achieved through microbial transformation, plant uptake, settling, and adsorption. Pretreatment is suggested to reduce the needed annual maintenance by reducing the amount of sediment and other solids entering the BMP. Wetlands can significantly reduce pollutant concentrations for all categories except for (4.b) and (4.c).[44] The upfront costs are medium to high, and the operation and maintenance costs and requirements are medium.[45]

h. **Infiltration BMPs** (volume reduction)[46] are trenches or basins which store stormwater in the void space between the media (e.g., rock, stones, soil media) and infiltrates/exfiltrates through the bottom and sides into the ground. Infiltration reduces stormwater discharge volume and pollutant loadings to surface waters and can recharge groundwater aquifers or be used for other appropriate purposes and provide cost-savings by offsetting the use of potable water (e.g., cooling towers and equipment cleaning water). Pretreatment is necessary to limit the amount of gross pollutants, oil & grease, and sediment to the system to ensure the system functions properly. Infiltration can significantly reduce pollutant concentrations for all categories, however, in all cases fate and transport of pollutants to groundwater should be evaluated for impacts to drinking water beneficial uses (e.g., salts, solvents). The upfront and

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41 WERF International Stormwater BMP Database 2016 Summary Report.

42 State of Hawaii BMP Manual, page 7-2 Table 1; U.S. DOT BMP Selection and Monitoring, section 6.5 Table 57; U.S. EPA BMP Cost Estimation Memorandum, page 8.

43 CASQA Industrial and Commercial BMP Handbook, TC-21 Constructed Wetlands.

44 WERF International Stormwater BMP Database 2016 Summary Report.

45 State of Hawaii BMP Manual, page 7-2 Table 1; U.S. DOT BMP Selection and Monitoring, section 6.5 Table 57; U.S. EPA BMP Cost Estimation Memorandum, page 8.

46 CASQA Industrial and Commercial BMP Handbook, TC-10 Infiltration Trench and TC-11 Infiltration Basin.

maintenance costs and requirements are tied to proper sizing and design of the system and are medium.[47]

Table 2 – Effective BMP Examples for TMDL Pollutant Categories[48]

Best Management Practice	Bacteria (4.a)	Chloride and Salts (4.b)[49]	Diazinon (4.c)	Nutrients (4.d)	Sediment (4.e)	Temperature (4.f)	Toxics and Metals (4.g)[50]
Non-Structural and Exposure Minimization	X	X	X	X	X	X	X
Bioretention Devices	X			X	X	X	X
Media or Treatment Filtration	X				X		X
Retention Basins/ Ponds	X	X		X	X	X	X
Detention Basins/ Ponds	X	X		X	X	X	
Constructed Wetlands	X			X	X	X	X
Infiltration or Volume Reduction	X	X		X	X	X	X

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47 State of Hawaii BMP Manual, page 7-2 Table 1; U.S. DOT BMP Selection and Monitoring, section 6.5 Table 57; U.S. EPA BMP Cost Estimation Memorandum, page 8.

48 WERF International Stormwater BMP Database 2016 Summary Report. Also see Table 2 footnotes 47 and 48.

49 Not evaluated in the WERF International Stormwater BMP Database 2017 Summary and is based upon guidance from the Minnesota 2015 Industrial Stormwater BMP Handbook.

50 From CASQA TC-10 and TC-11 not evaluated in the WERF International Stormwater BMP Database 2017 Summary.

I.H. Rationale

I.H.1. General Permit Approach

A General Permit for construction activities over one acre is an appropriate permitting approach for the following reasons:

a. A General Permit is an efficient method to establish the essential regulatory requirements for a broad range of construction activities under differing site conditions;

b. A General Permit is the most efficient method to handle the large number of construction stormwater permit applications;

c. A General Permit application process for coverage is far less onerous than that for individual permit and hence more cost effective;

d. A General Permit is consistent with U.S. EPA's four-tier permitting strategy, the purpose of which is to use the flexibility provided by the Clean Water Act in designing a workable and efficient permitting system; and

e. A General Permit is designed to provide coverage for a group of related facilities or operations of a specific industry type or group of industries. It is appropriate when the discharge characteristics are sufficiently similar, and a standard set of permit requirements can effectively provide environmental protection and comply with water quality standards for discharges. In most cases, the general permit will provide sufficient and appropriate management requirements to protect the quality of receiving waters from discharges of stormwater from construction sites.

There may be instances where a General Permit is not appropriate for a specific construction project. A Regional Water Board may require any discharger otherwise covered under this General Permit to apply for and obtain an individual permit or apply for coverage under a more specific General Permit. The Regional Water Board must determine that this General Permit does not provide adequate assurance that water quality will be protected, or that there is a site-specific reason why an individual permit should be required.

There may be other permits or requirements in addition to this General Permit. For example, the discharger may also need a streambed alteration agreement from the California Department of Fish and Wildlife, a Water Quality Certification (CWA § 401) as administered by the State and Regional Water Boards, CWA § 404 permit administered by the U.S. Army Corp. of Engineers, and/or a permit for low threat or de minimis discharges. Contact the appropriate Regional Water Board(s) to determine if other permits are required for the construction activity.

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I.H.2. Antidegradation Findings

Federal regulations at 40 Code of Federal Regulations § 131.12 require that state water quality standards include an antidegradation policy consistent with federal requirements. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16 ("Statement of Policy with Respect to Maintaining High Quality of Waters in California"). Where the federal antidegradation policy is applicable, the State Water Board has interpreted Resolution No. 68-16 to incorporate the federal antidegradation policy.[51] The permitted discharge must be consistent with the antidegradation provision of 40 Code of Federal Regulations § 131.12 and State Water Board Resolution No. 68-16. The State Water Board finds that the permitted discharges authorized by this general NPDES permit are consistent with the antidegradation provisions of 40 Code of Federal Regulations § 131.12 and State Water Board Resolution No. 68-16, as set forth herein.

In the context of this general NPDES permit, compliance with the federal antidegradation policy requires consideration of the following. First, the State Water Board must ensure that "existing instream uses and the level of water quality necessary to protect the existing uses" are maintained and protected.[52] Second, if the baseline quality of a waterbody for a given constituent "exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water,[53] that quality shall be maintained and protected" through the requirements of this general NPDES permit unless the State Water Board makes findings that: (1) any lowering of the water quality is "necessary to accommodate important economic or social development in the area in which the waters are located"; (2) "water quality adequate to protect existing uses fully" is assured; and (3) "the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control" are achieved.[54] Before allowing any lowering of high quality water, the Board must conduct an analysis of alternatives that evaluates practicable alternatives that would prevent or lessen the degradation associated with the discharges permitted. In the context of 40 Code of Federal

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51 State Water Board Order WQ 86-17 (Fay), pages 16-19.

52 State Water Board, Administrative Procedures Update, Antidegradation Policy Implementation for NPDES Permitting, 90-004 (APU 90-004), page 4. 40 Code of Federal Regulations § 131.12(a)(1). This provision has been interpreted to mean that, "[i]f baseline water quality is equal to or less than the quality as defined by the water quality objective, water quality shall be maintained or improved to a level that achieves the objectives."

53 This discussion refers to such waters as "high quality waters."

54 40 Code of Federal Regulations § 131.12(a)(2).

Regulations § 131.12(a)(2)(ii), practicable means "technologically possible, able to be put into practice, and economically viable."[55]

The permit must also comply with any requirements of State Water Board Resolution No. 68-16 beyond those imposed through incorporation of the federal antidegradation policy.[56] Resolution No. 68-16 requires that high quality waters be maintained unless degradation is justified based on findings that any lowering of water quality is "consistent with the maximum benefit to the people of the State" and "will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies" and further that the discharge is subject to "waste discharge requirements which will result in the best practicable treatment or control of the discharge."[57] The baseline quality considered in making the appropriate findings is the best quality of the water since 1968, the year of adoption of Resolution No. 68-16, or a lower level if that lower level was allowed through a permitting or other regulatory action, such as establishing a water quality objective, that was consistent with the federal and state antidegradation policies.[58] The following analysis assumes, without deciding, that the baseline for antidegradation analysis is 1968.[59]

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55 40 Code of Federal Regulations § 131.3(n).

56 State Water Board Order No WQ 86-17 (Fay), page 23, Finding No. 11

57 State Water Board Orders WQ 81-5 (*City of Lompoc*), WQ 82-5 (*Chino Basin Municipal Water District)*, WQ 90-6 (*Environmental Resources Protection Council*). State Water Board Resolution 68-16, Resolve 2. Best practicable treatment or control is not defined in Resolution 68-16; however, the State Water Board has evaluated what level of treatment or control is technically achievable using "best efforts." *Questions and Answers,* State Water Board Resolution 68-16, (Feb. 16, 1995), pp. 5-6. The State Water Board states: "To evaluate the best practicable treatment or control method, the discharger should compare the proposed method to existing proven technology; evaluate performance data, e.g., through treatability studies; compare alternative methods of treatment or control; and/or consider the method currently used by the discharger or similarly situated dischargers...The costs of the treatment or control should also be considered...."

58 State Water Board APU 90-004, page.4. The baseline for application of the federal antidegradation policy is 1975, which is the date used in 40 Code of Federal Regulations § 131.3(e) to define existing uses of a waterbody. For state antidegradation requirements, see also *Asociacion de Gente Unida por el Agua (AGUA) v. Central Valley Water Board* (2012) 210 Cal.App.4th 1255,1270. The baseline for the application of the state antidegradation policy is generally the highest water quality achieved since 1968, the year the policy was adopted.

59 State Water Board Resolution 68-16, Resolve 1. The baseline may be later than 1968 for two reasons. First, the appropriate baseline is determined by the date on which a

a. The Board Is Not Required to Make Waterbody by Waterbody and Pollutant by Pollutant Antidegradation Findings

The State Water Board finds that it is not required to conduct a waterbody by waterbody and pollutant by pollutant antidegradation analysis for this permit. The State Water Board makes this finding for two reasons. First, the Administrative Procedures Update, Antidegradation Policy Implementation for NPDES Permitting, 90-004 (APU 90-004), which specifies a waterbody by waterbody and pollutant by pollutant analysis for some permitting actions, does not address permitting for diffuse stormwater discharges. Second, APU 90-004 itself indicates that a waterbody by waterbody and pollutant by pollutant analysis is only required when conducting a "complete" antidegradation analysis; a complete analysis, in turn, is not required where any "reduction in water quality is temporally limited and would not result in any long-term deleterious effects on water quality."[60] As detailed below in the section regarding waters that do not meet water quality objectives and in Alternative 1, a complete analysis is not required. The discussion below elaborates on these two reasons.

APU 90-004 is a State Water Board internal guidance document establishing methods for implementing the federal and state antidegradation policies in NPDES permits. APU 90-004 suggests that an antidegradation analysis requires a pollutant by pollutant and waterbody by waterbody analysis in certain contexts, specifically where the discharge at issue is a discrete discharge from a singular facility, such as discharges from publicly owned treatment works. However, APU 90-004 has limited value when considering antidegradation in the context of diffuse stormwater discharges from tens of thousands of future construction projects of a wide variety distributed throughout the entire state over the life of the permit, each with the potential for discharging multiple

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policy establishing the level of water quality to protect was effective. State Water Board APU 90-004, page 2. The various water quality control plans and State Policies for Water Quality Control have been adopted and amended many times since the 1970's to include new or revised water quality objectives. Second, a permitting action with appropriate antidegradation findings allowing degradation may establish a new baseline consistent with the level of water quality achieved under that permit. The State Water Board has regulated construction stormwater discharges in the past through general permits issued in 1999 and 2009. APU 90-004 acknowledges that no antidegradation analysis is required where the water board has no expectation that water quality will be reduced by the permitting action; here, if the water quality achieved under the prior general permits had been used as the baseline, arguably, no antidegradation analysis would have been required. Nevertheless, for ease of analysis, 1968 is used herein as the baseline.

60 State Water Board APU 90-004, page 2.

pollutants, to a wide variety of waterbodies statewide.[61] This interpretation is sensible, if not necessary, for this general NPDES permit, given the short-term nature of construction projects and the fact that, as of the date of adoption of this permit, the type and location of the construction projects that will be regulated by this General Permit is unknown. Therefore, only a generalized antidegradation analysis can, and must, be conducted for the discharges authorized by this general NPDES permit.

In addition, reliable data on the baseline water quality since 1968 is not available for all pollutants for all surface waters of the state that might receive discharges authorized by this General Permit. The State Water Board did not begin conducting statewide assessments of water quality until 1973. That first assessment was based only on very limited sampling for only five water quality parameters on portions of 23 water bodies. Over the course of the next five decades, those assessments have gradually become more comprehensive and thorough, culminating with the State Water Board's most recent 2020-2022 Integrated Report, which assessed the waterbodies for three of the nine Regional Water Quality Control Boards. However, even though a large amount of ambient water quality data is now collected and evaluated for these biennial assessments, the integrated reports are focused on assessing whether the waterbodies are supporting beneficial uses. The assessments are not intended to provide information about whether the waterbodies are of a higher quality than necessary to support their beneficial uses.[62] As a result, this analysis assumes that some of the waterbodies that will receive stormwater discharges from some of the construction sites are high quality waters with respect to at least some pollutants that might be in the authorized discharges. Due to the wide variety and unknown identity of the large number of potential waterbodies that might receive authorized discharges from construction projects under this permit and the lack of specific, reliable data regarding each potential receiving waterbody, the analysis of waterbodies that might be affected by this general NPDES permit must also be done at a generalized level.

The State Water Board additionally finds that, even if APU 90-004 applies to the issuance of this permit, it requires at most a "simple" antidegradation analysis. APU 90-004 contemplates that a "simple" antidegradation analysis is

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61 State Water Board Order WQ 2018-0002, page 77. Reaches a similar conclusion for agricultural discharges. This is even more so for the discharges authorized by this Order, because, unlike discharges from agricultural lands, there is much more uncertainty as to the location of the future construction projects and the temporal nature of discharges of stormwater from construction sites.

62 Regional Water Quality Control Boards Biennial Assessments. <https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment> [as of July 19, 2022]

appropriate under specified circumstances. In particular, as stated above, APU 90-004 states that a simple antidegradation analysis is allowed when the "[Water] Board determines the reduction in water quality is temporally limited and will not result in any long-term deleterious effects on water quality; e.g., will cease after a storm event is over."[63]

APU 90-004 does not provide guidance on the scope and content of a simple antidegradation analysis. Nor does it define the terms "temporally limited" or "long term." Those terms must therefore be interpreted in the context of the types of discharges being permitted and with deference to the best professional judgment of the State Water Board. Construction stormwater discharges fit within the example provided by the APU and are temporal and inherently short-term. Therefore, any degradation would be temporally limited and would not result in long-term deleterious effects on water quality. In addition, the permit continues the requirements of the previous permits or imposes equivalent or more protective requirements such that, in at least at a generalized level, the water quality established under the prior permits is expected to be maintained and improved.

The State Water Board determines that the findings made below meet the requirements of a simple antidegradation analysis and are also consistent with an antidegradation analysis done at a generalized level, as appropriate for this permit. With these findings, based on the information available to it and using its best professional judgment, the State Water Board concludes that the discharge will not be adverse to the intent and purpose of the State and federal antidegradation policies. Regardless of APU 90-004's application, however, the below analysis is consistent with the generalized antidegradation analysis appropriate for this general NPDES permit and complies with both the federal antidegradation regulations, and with the State antidegradation policy.

b. The State Water Board Makes the Following Antidegradation Findings

The discharges permitted in the permit are consistent with the antidegradation provisions of 40 Code of Federal Regulations § 131.12 and Resolution No. 68-16. The State Water Board's conclusion that the terms and conditions of the permit are consistent with the antidegradation policies is based on the following analysis.

First, for waterbodies that meet, but do not exceed, the water quality objective for a particular pollutant, no antidegradation findings are required. For these waterbody and pollutant combinations, compliance with the General Permit's requirements ensures that all construction stormwater discharges authorized by

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63 State Water Board APU 90-004, p. 2

this permit do not interfere with the maintenance and protection of existing beneficial uses and water quality objectives.

i. Waterbodies that do not meet water quality objectives (waterbodies that are not high quality)

Because coverage under this General Permit is available statewide, this General Permit authorizes discharges to at least some surface waters that are not meeting water quality objectives. Some of these waterbodies are listed on the State Water Board's section 303(d) list of impaired waters, some of which have applicable TMDLs developed by the Regional Water Boards or U.S. EPA.[64] Some receiving waters are not meeting water quality objectives for multiple pollutants. Under both federal and state antidegradation policies, these receiving waters are not considered "high quality" waters for these pollutants. For receiving waters that are not high quality waters, the federal antidegradation policy requires that regulatory actions ensure that existing instream uses and the level of water quality necessary to protect the existing uses are maintained and protected. (40 Code of Federal Regulations § 131.12(a)(1).)[65] The General Permit ensures that existing instream (beneficial) uses and the level of water quality necessary to protect the existing uses are maintained and protected through requirements that discharges authorized by this General Permit do not cause or contribute to exceedances of water quality objectives in the receiving water and to restore impaired waterbodies by requiring compliance with TMDL-specific requirements as set forth in Attachment H and compliance with receiving water limitations set forth in the General Permit, Section IV.D. These provisions are collectively designed to ensure that discharges authorized by this General Permit do not cause any further degradation of impaired waterbodies and do not interfere with the improvement of the quality of such waters to a level protective of existing uses over a time schedule that is as short as possible.

The antidegradation policies do not explicitly or implicitly override the authority and discretion the Clean Water Act and the Water Code grant to the State Water Board as to how it structures a permit to ensure water

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64 Impaired waters, or waters that are not high quality, are not confined to those listed only on the 303(d) List. There are several reasons for this, including but not limited to that some of the 303(d) Lists do not reflect current data. In addition, sometimes the State lacks sufficient data to add a waterbody to the 303(d) List. Accordingly, the 303(d) List itself does not reflect all waterbodies that are impaired.

65 By its terms, State Water Board Resolution No. 68-16 does not separately apply to waters that are not high quality, except by incorporating the federal antidegradation policy as discussed above.

quality necessary to protect beneficial uses. The law does not require immediate restoration of impaired waterbodies nor does it require an immediate prohibition of discharges that contribute to an exceedance in the waterbody. Rather, federal regulations at 40 Code of Federal Regulations § 122.47 allow NPDES permits to have compliance schedules. Similarly, Water Code § 13263, subdivision (c), authorizes the Regional Water Boards to include a time schedule for achieving water quality objectives in waste discharge requirements. Consistent with Water Code § 13242, TMDL implementation plans, as incorporated into the water quality control plans, include a time schedule for actions to be taken. When issuing waste discharge requirements, Water Code § 13263 requires Regional Boards to implement any relevant water quality control plans that have been adopted. Certainly, water quality objectives must be achieved; but the law, as cited above, recognizes and allows for the fact that it can take time to restore or achieve the objectives. In this regard, some impaired waterbodies may fail to improve or, rarely, continue to degrade, for a period of time before showing improvement. This period of time may be as long as multiple years. This is not contrary to the authorities for compliance schedules stated above and is not contrary to the antidegradation policies.

ii. High quality waterbodies

Some of the waterbodies within the area covered by this General Permit may be high quality waters for certain pollutants. Some of these waterbodies may be currently high quality as compared to currently applicable objectives. Others of these waterbodies may be currently impaired but may be classified as high quality waters because they were historically high quality for certain pollutants.

Although compliance with the General Permit will generally not result in degradation in high quality waters, compliance with the General Permit does not guarantee that there could never be any degradation in any high quality waters from a specific construction project. Therefore, the State Water Board makes the following findings to comply with antidegradation requirements for any discharges authorized by this General Permit to high quality waters.

For high quality waterbodies, the State Water Board finds as follows:

First, to determine whether the discharge is necessary, the State Water Board must determine whether there are any cost-effective alternatives available that eliminate or reduce the reduction in water quality. For a general, statewide permit, the appropriate inquiry is whether there are cost-effective alternatives to the regulatory framework in the General Permit, not whether there is a cost-effective alternative to an individual project eligible for enrollment under the General Permit. The State Water Board has

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determined that construction stormwater discharges are appropriately regulated under a general permit rather than individual NPDES permits. There are typically approximately 10,000 ongoing construction projects with stormwater discharges authorized under this General Permit (or its predecessor general permits) at any given time, according to the State Water Board's SMARTS database. These projects typically last from one to three years, at which point coverage under this General Permit is terminated and discharges are no longer authorized. Employing the large number of additional staff necessary to review and issue such a high volume of individual stormwater permits would not be efficient use of resources, would necessitate very large increases in permit fees under Water Code § 13260, subdivision (d)(1)(B) to pay for the additional staff, and would likely result in economic disruption due to delays in permitting construction projects. As further explained in Fact Sheet, Section I.H.1, a General Permit is the appropriate mechanism to regulate a large number of similar discharges while still protecting water quality.

Practicable Alternatives: The State Water Board has evaluated a range of practicable alternatives that would prevent or lessen any degradation associated with permitted construction stormwater discharges to high quality waters. These alternatives are discussed below.

Alternative 1 – The first alternative is the approach that the General Permit takes. The General Permit requires dischargers, with the assistance of qualified stormwater professionals, to:

1) Determine the risk the construction project poses on the receiving water, based on how much sediment is anticipated to be discharged offsite and whether the receiving water is impaired for sediment or supports COLD, SPAWN, and MIGRATORY beneficial uses. Higher risk projects must comply with additional permit requirements, including sampling and monitoring, and additional BMPs.

2) Assess conditions at the construction site that could impact stormwater quality such as sources of pollutants that could be transported offsite by stormwater runoff.

3) Develop a site-specific Stormwater Pollution Prevention Plan to include information needed to demonstrate compliance with all requirements of the permit and to ensure water quality is protected (Fact Sheet, Section I.V.). This includes identification and implementation of a suite of best management practices tailored to the construction project and the conditions at the site to minimize or eliminate the stormwater discharges, or the pollutants in the stormwater discharges, or both, in compliance with BCT/BAT/BPT standards.

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4) Visually inspect the construction site to verify implementation of best management practices is in accordance with the Stormwater Pollution Prevention Plan.

5) Monitor stormwater discharges for pH and turbidity during each day of a qualifying precipitation event and compare sample results to numeric action levels to verify that implementation of the best management practices is protective of water quality.

6) Monitor stormwater discharges for TMDL-specific pollutants, if applicable, and compare to a TMDL-related numeric action level or numeric effluent limitation to verify that the discharge complies with the TMDL-based waste load allocations. TMDL monitoring requirements apply if the site is in a TMDL watershed with waste load allocations translated into numeric action levels or numeric effluent limitations; has sources of the TMDL-specific pollutant(s) onsite; and there is a failure to implement best management practices, a container spill or leak, or a best management practices breach, failure, or malfunction.

7) Take corrective actions such as repairing or implementing additional best management practices, if visual inspections and discharge monitoring indicate a deficiency.

8) Submit sampling and annual reports regarding implementation of this General Permit.

All discharges authorized by this General Permit must comply with receiving water limitations that require that discharges 1) do not adversely affect human health or the environment, 2) do not contain pollutants in quantities that threaten to cause pollution or public nuisance, 3) do not contain pollutants that cause or contribute to an exceedance of any applicable water quality objectives or standards contained within an applicable water quality control plan, and 4) comply with the applicable TMDL implementation requirements of this General Permit (Order, Section IV.D). Furthermore, the Regional Water Boards retain the authority to impose any additional site-specific requirements where necessary to prevent degradation and to protect water quality standards.

Under this General Permit, there are disincentives to discharging such that dischargers already seek to minimize or eliminate their stormwater discharges where possible. The General Permit promotes efforts to maximize the capture of stormwater from construction sites through retention basins, infiltration galleries, and other controls that reduce the amount of stormwater that is discharged from the site. If there are no discharges, the General Permit's sampling requirements and any otherwise applicable numeric action levels or numeric effluent limitations are not

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applicable to that discharger and the discharger would not risk an enforcement action for any potential discharge-related General Permit violations. Accordingly, dischargers have an incentive to schedule their work during dry weather or to retain stormwater whenever possible. Collectively, these requirements generally prevent degradation, and where that is not possible, minimize degradation and the duration of any degradation. This alternative does not, however, guarantee that no construction site will ever have authorized stormwater discharges that may result in temporary, limited degradation.

Alternative 2 – The second alternative would be more stringent permit requirements in watersheds with high quality waters. Different approaches for more stringent requirements could include a construction prohibition, a prohibition of discharges, a requirement that active treatment be used for all pollutants in all stormwater discharges, or numeric effluent limitations for all pollutants in all stormwater discharges.

The State Water Board finds that more stringent requirements are not currently possible for any of these approaches for the following reasons:

- **Construction prohibition**: Such a prohibition would exceed the State Water Board's authority to regulate discharges of waste to waters of the state from discharges. The State Water Board does not have the authority to directly regulate land use. (Wat. Code, §§ 13260, 13263.) Such a prohibition is also not possible because many construction projects are essential and cannot be relocated (e.g., repair of existing roads and utilities).
- **Prohibition on discharges**: By eliminating all stormwater discharges, pollutants from stormwater would not reach high quality receiving waters during wet weather and therefore could not cause any degradation. As wet weather will always occur, this approach would require all construction sites to retain all stormwater through retention basins, infiltration galleries, and other controls that would prevent stormwater from reaching surface waters through infiltration, evaporation, or storage and reuse. The complete retention to eliminate any possibility of discharge is not typically technologically or economically feasible in many locations. Although retention, detention, and run-on BMPs are frequently implemented as part of the SWPPP, these BMPs are typically designed only to reduce stormwater discharges or the likelihood thereof, not to completely eliminate discharges. Retention that eliminates the possibility of discharges to any surface waters would require much larger sizing than a retention or detention BMP used to reduce discharges because it would need to be sized to capture even extreme weather

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events.[66] U.S. EPA estimated that the base cost, which does not include costs of acquiring the land,[67] annual maintenance costs, design, geotechnical testing, legal fees, land costs, and other unexpected or additional costs such as fees for disposing of contaminated excavated soils, for a retention and detention basins is $0.50-$1.00 per cubic foot.[68] The estimate of typical costs reflects 15,000 – 150,000 cubic feet of storage. Thus, a retention basin for a 50-acre residential site would have the base cost of $100,000. But this base cost only represents the typical implementation of stormwater BMPs, which only provide for detention or partial retention. A retention basin for a 50-acre residential site that eliminated the possibility of discharge would need to be much larger and therefore is more costly. Most California counties require stormwater basins to be designed to a 2-year, 24-hour storm intensity at minimum. Assuming a typical bare soil runoff coefficient of 0.35 (Type C soil), a 2-year, 24-hour storm (2.27 inches of rainfall) at a 50-acre site in Orange County, for example, would produce a total of approximately 3.31 acre-feet of runoff per day. Adding a normal Factor of Safety for detention structures of 2.0, 5,770 cubic feet of water would need to be retained per acre, or 288,400 cubic feet for the entire parcel. An 'atmospheric river' type storm that lasted three days at this intensity would require at least six times this amount of storage, as the runoff coefficient would increase each day. The costs would vary significantly depending on land costs (e.g., urban versus rural area) and slope. Complete retention of all stormwater would not be technologically feasible at all construction sites.

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66 For example, in October 2021, there were historic Category 5 atmospheric rivers throughout California.

67 The cost of acquiring land can be substantial.
E.g. Working Paper 19-01: The Price of Residential Land for Counties, ZIP codes, and Census Tracts in the United States.,
<https://www.fhfa.gov/PolicyProgramsResearch/Research/Pages/wp1901.aspx> [as of July 19, 2022]. For example, in Los Angeles County, residential land costs were estimated at $1-3 million per acre. *Id.*
See also, Southern California Coastal Water Research Project. *Concept Development: Design Storm for Water Quality in the Los Angeles Region, Technical Report 520.* October 1, 2007, page 7.
<https://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/520_designStorm.pdf> [as of July 19, 2022].

68 U.S. EPA Urban Storm Water BMP Preliminary Data Summary - 1999, page 6-3.
<https://www.epa.gov/sites/default/files/2015-11/documents/urban-stormwater-bmps_preliminary-study_1999.pdf> [as of July 19, 2022]. Other costs could include, for example, filling, regrading, and vegetating the retention pond after the construction project has concluded.

Certain sediment types are poorly suited for infiltration (e.g., clay soils infiltrate poorly). Construction sites are inherently dynamic, but retention basins cannot move. Stormwater may have different discharge points during different phases of construction, and a retention basin could not be moved to accommodate the changing points. In urban areas with infill development, there is not sufficient space for such large retention basins. In some cases, such large basins could also implicate vector control or public safety issues.[69] In other areas where the groundwater table is high, it may not be possible to design an effective retention basin without hitting the groundwater table and potentially causing groundwater quality problems.

Even if complete retention were technologically possible, the costs associated with constructing effective complete retention structures are not generally economically feasible for most construction projects.[70] Expensive, structural BMPs are generally not economically feasible to implement on construction sites, which are temporary in nature, in part because the useful life of the investment is short-term and difficult to recoup. Requiring implementation of substantially more expensive controls may render projects that are beneficial to the people of the state economically infeasible. For example, government-funded road projects often operate on fixed budgets where increased costs on one construction project leaves less money to complete other projects.[71] Similarly, restoration projects are frequently funded by grants. Increased construction costs would render less money available for additional restoration projects. Increased construction

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69 Southern California Coastal Water Research Project. *Concept Development: Design Storm for Water Quality in the Los Angeles Region, Technical Report 520*. October 1, 2007, page 7. <https://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/520_designStorm.pdf> [as of July 19, 2022]. Notes the potential trade-offs between water quality and ensuring public safety, including protecting property from flood damage and maintaining passable roadways.

70 Southern California Coastal Water Research Project. *Concept Development: Design Storm for Water Quality in the Los Angeles Region, Technical Report 520*. October 1, 2007, p. 14. <https://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/520_designStorm.pdf> [as of July 19, 2022]. Provides an example. Discusses the feasibility of BMP implementation costs in the Ballona Creek watershed and highlighting the difference between new or redevelopment versus retrofit.

71 Overview of Transportation Funding (2015). <https://lao.ca.gov/handouts/transportation/2015/Transportation-Funding-022315.pdf> [as of July 19, 2022]. For example, general obligation bonds can help pay for transportation projects and are for a set amount.

costs might also deter affordable housing projects, which operate on thin margins and frequently depend on government subsidies.[72]

Determining a range of costs for complete retention of stormwater is complex due to the wide variety of conditions. Costs vary widely across construction projects throughout California due to precipitation, size, soil types, topography, and other location-specific factors such as labor costs. Two examples of costs to complete full retention of stormwater on a site with 16 acres of disturbed soil area (mean CGP size), based solely on the difference in precipitation, are as follows:

On a 16-acre project in the rainy North Coast region, a 2 year, 24-hour storm (2.93 inches of rainfall) would require a 148,900 cubic foot capacity detention basin, equivalent to a 29,780 square foot excavation at five feet in depth, including the required one foot of freeboard. A typical cost of $10/cubic yard for excavation[73] is approximately $55,150, not including off-haul of spoils, if required. In addition, the basin would require engineered backfill if any roadways or buildings were subsequently constructed at the site, increasing the costs by $415,000 for import backfill and compaction (at $75/cubic yard).[74] This scenario would therefore have a total cost of at least $470,150, since there would be additional costs for engineering design and final grading.

On a 16-acre project in an arid southern California region, the 2-year, 24-hour storm (1.72 inches of rainfall) for a similar level of retention would require an 87,400 cubic foot capacity detention basin at an excavation-only cost of $32,375. Using the same assumptions as above, engineered backfill would increase the total costs to at least $275,150.

The above examples show excavation and backfill costs only for a one-day design storm, and would add $3,000–$5,000 to the cost of each house in a typical residential development, depending on location (based on six houses/acre). However, an ‘atmospheric river’ storm lasting three days at the same intensity would require far more retention capacity, as the runoff coefficient would increase each day. In the northern part of the state, such a storm would necessitate an 893,400 cubic foot (33,100 cubic yard) basin, covering four acres at a four-foot depth and one foot of freeboard. The costs

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72 Affordable Housing and Sustainable Communities Program. <https://www.hcd.ca.gov/affordable-housing-and-sustainable-communities> [as of July 19, 2022]. Provides an example.

73 Caltrans project 01-476604, Mendocino County, Item 044. <http://website.dot.ca.gov/hq/construc/estdet/01-476604-025.txt> [as of July 19, 2022]

74 Caltrans project 01-262004, Mendocino County, Item 072. <http://website.dot.ca.gov/hq/construc/estdet/01-262004-064.txt> [as of July 19, 2022]

for excavation and engineered backfill would amount to $2.8 million. Complete retention of stormwater for all construction sites regulated by this General Permit would be cost prohibitive.

- **Active treatment**: This approach would be to require the use of active treatment of all construction stormwater prior to discharge in areas with high quality waters. This approach may not be feasible because generally speaking, this permit may not specify the design location, type of construction, or particular manner in which compliance may be achieved with a requirement. (Wat. Code, § 13360.) In addition, active treatment is highly effective at treating water for TSS and turbidity, but generally does not remove pollutants that do not sorb to sediment, such as dissolved phase metals and hydrocarbon compounds. In order for this approach to be successful in guaranteeing no degradation of high quality waters, it would be necessary for active treatment to reliably treat all pollutants to levels that are equal to, or better than, the actual levels of each pollutant in each waterbody. Such limitations could only be established if the high quality waterbody and existing levels of each pollutant for which that water was high quality were known. As explained above, this data does not exist on a statewide basis. In addition, active treatment of all stormwater would likely be cost-prohibitive for some construction sites, because the cost of active treatment is directly related to the volume of stormwater that must be treated. For example, costs for a one-time use of active treatment systems ranges from $10,029 for 1.9 acres to $96,674 for 145 acres.[75] However, current information obtained from staff conversations with an active treatment system vendor in the Sacramento area indicates that installed systems typically range from $70,000-$80,000 for a 200 gallon per minute seasonal system to $700,000 for a 2,000 gallon per minute seasonal system such as may be required to accommodate 3-inch storm events on a 16-acre site. Finally, based on staff conversations with the same active treatment system vendor and staff's limited market search for additional active treatment vendors, active treatment systems are not evenly distributed throughout the state and there are currently an insufficient number of systems available to deploy to all construction sites during regional precipitation events.

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75 U.S. EPA, Development Document for Final Effluent Guidelines and Standards for the Construction & Development Category (Nov. 2009) page. 9-35. <https://www.epa.gov/sites/default/files/2015-06/documents/construction_development_dd_2009_chapters_1-11.pdf> [as of July 19, 2022]

- **Establishment of numeric effluent limitations for discharges to high quality waters**: In order to prevent any degradation of any high quality water under this approach, the General Permit would have to implement water quality-based numeric effluent limitations that are equal to, or lower than, the actual ambient levels of each pollutant in each waterbody. Such limitations could only be established if the high quality waterbody and existing levels of each pollutant for which that water was high quality were known. As explained above, this data does not exist on a statewide basis. Even if the data did exist, it would not be possible to determine whether the methods to achieve compliance with the numeric effluent limitations would be technically or economically feasible at most or all construction sites. Further, because such numeric effluent limitations would necessarily be waterbody and pollutant specific, administration of such limitations would not be feasible under the General Permit structure.

Alternative 3 – Given the uncertainties about the locations of, and data limitations about, high quality waters, a third alternative would be to mandate specific requirements that would apply to all construction projects statewide. These statewide requirements could include more numeric effluent limitations, more stringent numeric action levels, or requiring the installation of specific BMPs, like active treatment.

- **Require on-site stormwater retention for a compliance storm**: Because a prohibition on all discharges is not feasible as discussed above, one approach would be to require controls that eliminated discharges in most storms. For example, dischargers could be required to retain all runoff from the 95th percentile, 24-hour storm volume or the 85th percentile, 24-hour storm volume.[76] Requiring all construction sites to install retention basins designed to retain all stormwater from large "compliance storms," rather than complete retention from storms of all sizes, would encounter similar technological and economic difficulties as those identified above, just at a somewhat lesser scale. Considerations would have to include engineering design cost, available space for both the basin and excavation spoils stockpiles, avoidance of underground utility installations, schedule delays caused by constructing, using, backfilling and regrading the basin, off-haul of spoils and import of

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76 Southern California Coastal Water Research Project. *Concept Development: Design Storm for Water Quality in the Los Angeles Region, Technical Report 520*, October 1, 2007, page 12. <https://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/520_designStorm.pdf> [as of July 19, 2022]. For example, a BMP sized to capture 90% instead of 80% of decadal runoff volume would require a BMP nearly triple the size.

engineered fill, if required, disposition of accumulated stormwater or allowance for evaporation, vector control, and safety barriers. Further, there is no guarantee that the discharges from storms larger than the selected compliance storm would not cause degradation of high quality waters.

- **Establishment of numeric technology based effluent limitations statewide**: Even assuming that there might be a treatment technology that, if utilized, could guarantee no degradation of high quality waters, the State Water Board does not have the data that would be necessary to impose effluent limitation that would be derived from the use of that technology. In previous litigation, the superior court determined that the State Water Board did not have sufficient BMP performance data to impose technology based numeric effluent limitations for pH and turbidity for Risk Level 3 sites. Absent the development of this needed additional data, the Board would not be able to support the implementation of numeric technology based effluent limitations to prevent any possibility of degradation.[77]
- **Active treatment**: This option would suffer from the same problems identified for active treatment described under alternative 2, above. Consistent with the Blue Ribbon Panel's findings, active treatment is not feasible for all sites: "The active treatment systems have generally been employed on sites five acres or larger. While the systems are technically

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77 *California Building Industry Association v. State Water Resources Control Board*, Sacramento Superior Court Case No. 34-20009-80000338-CU-WM-GDS. Effluent Limitations Guidelines and Standards for the Construction and Development Point Source Category, 79 Federal Register 12661-01 (March 06,2014). The U.S. EPA provides an explanation for not including a previous numeric effluent limitation for turbidity in its Effluent Limitation Guidelines for construction stormwater: "At this time, EPA is concerned that a numeric limitation may create a disincentive to green infrastructure techniques for managing stormwater. For example, meeting a numeric standard may require installation of a sediment basin or other impoundment on certain sites, which may be a disincentive to installing distributed stormwater controls. Also, EPA recognizes that additional data collection would likely be necessary in order to inform any establishment of numeric discharge standards and monitoring requirements in the future. At such time that EPA decides on a path forward with respect to numeric discharge standards and monitoring requirements, EPA will take appropriate actions to notify interested stakeholders. EPA encourages interested parties to continue submitting data and information to EPA with respect to numeric discharge standards at construction sites."

feasible for sites of any size, including sites or drainages as small as an acre or less, the cost may be prohibitive."[78]

- **Use of other, specific BMPs**: Alternative 1 already requires the use of minimum BMPs such as non-structural BMPs (e.g., maintenance, good housekeeping, staff training/education, proper handling, spill response, project planning/scheduling) and source control BMPs (e.g., site design and planning, irrigation). This alternative approach would be to specify that certain additional BMPs would need to be used at all sites. This approach may not be feasible because generally speaking, as discussed above, this General Permit may not specify the design location, type of construction, or particular manner in which compliance may be had with a requirement. (Wat. Code, § 13360.) In addition, the efficacy of any structural BMPs are both site specific and pollutant specific, such that there are not universally beneficial BMPs that should be mandatory on all sites.

One of the first basic steps in creating a stormwater management plan is to assess site and watershed conditions. Site and watershed conditions include information such as geographic features or landmarks, drainage patterns, and general topography. Next, a plan should evaluate pollutants of concern and other additional benefits that BMPs can provide. Accordingly, the selection of appropriate BMPs is a highly site-specific inquiry. Because of the complexity of appropriate BMP selection, the permit requires a qualified stormwater professional to identify the appropriate site-specific BMPs and prepare the SWPPP. The General Permit imposes substantial education and training requirements for qualified stormwater professionals to ensure that the selection of site-specific BMPs is appropriate. (See General Permit, Sections V.C. – V.I.)

For example, bioretention basins are very effective for multiple pollutants, but are not feasible at many construction sites, as discussed in further detail in Fact Sheet, Section I.G.5.d. Media filters are another BMP that may be effective at removing multiple pollutants, but are already typically recommended by qualified stormwater professionals under Alternative 1. Accordingly, requiring the universal use of specific structural BMPs for antidegradation purposes is not a feasible alternative because requiring specific BMPs may not be effective at reducing pollution and may not be technically feasible or cost effective depending on site characteristics.

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78 The Feasibility of Numeric Effluent Limits Applicable to Discharges of Storm Water Associated with Municipal, Industrial, and Construction Activities, page 16.

iii. Economic and Social Development Considerations and Consistency with Maximum Benefit to the People of the State

The State Water Board adopts the approach set forth in Alternative 1 for the General Permit. This alternative may allow limited and temporal degradation of high quality waters by construction stormwater discharges, but this alternative does require all construction stormwater discharges to not cause or contribute to exceedances of water quality objectives or interfere with the maintenance and protection of beneficial uses for high quality waters in all cases. Two of the approaches described under Alternative 2 would guarantee no degradation of high quality waters (i.e., construction prohibition and prohibition on discharges), but all of the approaches described under Alternative 2 are infeasible for the reasons described above and would hamper important social and economic development. The approaches described under Alternative 3 would not guarantee no degradation of high quality waters from authorized discharges, and are either technically or economically infeasible, or contrary to the framework of a general permit in which the methods for reducing or eliminating pollutants in stormwater discharges are developed by a stormwater professional and tailored to each individual construction site, or both.

The limited and temporal degradation of high quality waters that could occur under this General Permit is necessary to accommodate important economic or social development in the area and is consistent with the maximum benefit to the people of the state. Construction activities support important economic and social development. Construction is a large, vital industry in California, adding an estimated $240 billion in value in 2017 and a major source of employment.[79] The U.S. Bureau of Labor Statistics estimates that there are 968,760 construction laborers in California.[80] Construction projects include critical infrastructure (e.g., broadband

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79 U. S. Census Bureau. Construction (NAICS Sector 23), (2017). <https://www.census.gov/data/tables/2017/econ/economic-census/naics-sector-23.html> [as of July 19, 2022].
Legislative Analyst's Office. CalFacts 2018. Construction is one of the major sectors for California's 17 million jobs. <https://lao.ca.gov/reports/2018/3905/calfacts-2018.pdf> [as of July 19, 2022].

80 U. S. Bureau of Labor Statistics. Occupation Employment and Wage Statistics, 47-2061 Construction Laborers (May 2021). <https://www.bls.gov/oes/current/oes472061.htm> [as of July 19, 2022].

internet,[81] roads,[82] utility lines), public safety (e.g., flood control,[83] system hardening[84]), restoration,[85] housing,[86] and commercial development. As noted by many commenters on the draft versions of this General Permit, California is facing a housing shortage.

Where there is a public utility, increased construction costs could be passed on by increased fees to utility users or road users. Higher construction costs could affect whether a housing project remains affordable.

Importantly, under Alternative 1, notwithstanding the possibility of limited and temporal degradation from some authorized stormwater discharges, the State Water Board finds that authorized stormwater discharges will not cause or contribute to exceedances of water quality objectives in high quality waters, and therefore will not cause pollution or conditions of nuisance or otherwise adversely affect beneficial uses of the receiving waterbodies. Because all beneficial uses will be maintained and protected, there will be only very minor impacts to water quality resulting from any degradation that does occur, so any resulting harm to the public interest associated with any degradation will also be very minor and speculative

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81 State of California Executive Department. Executive Order N-73-20 (August 14, 2020). <https://www.gov.ca.gov/wp-content/uploads/2020/08/8.14.20-EO-N-73-20.pdf> [as of July 19, 2022].

82 State Highway Operation and Protection Program. Ten-Year Project Book, Fiscal Years 2021/22-2030/31. <https://dot.ca.gov/-/media/dot-media/programs/asset-management/documents/2022-q2-book-combined-a11y.pdf> [as of July 19, 2022].

83 California Department of Water Resources. Small Communities Flood Risk Reduction. <https://water.ca.gov/Work-With-Us/Grants-And-Loans/Small-Communities-Flood-Risk-Reduction> [July 19, 2022].

84 E.g., Governor Newsom Signs Historic Legislation to Boost California's Housing Supply and Fight the Housing Crisis (September 16, 2021). <https://www.nytimes.com/2021/07/21/business/energy-environment/pge-underground-powerlines-wildfires.html> [as of July 19, 2022]. In response to wildfires, utility companies aim to put power lines underground.

85 Southern California Wetlands Recovery Project. Work Plan 2020. <https://scwrp.org/wp-content/uploads/2020/04/Work-Plan-Report-2020.pdf> [as of July 19, 2022].

86 Office of the Governor. Governor Newsom Signs Historic Legislation to Boost California's Housing Supply and Fight the Housing Crisis (September 16, 2021). <https://www.gov.ca.gov/2021/09/16/governor-newsom-signs-historic-legislation-to-boost-californias-housing-supply-and-fight-the-housing-crisis/> [as of July 19, 2022]. In 2021, Governor Newsom signed bipartisan legislation to expand housing production in California.

because all high quality waters will still fully support all beneficial uses. Therefore, it is not necessary to analyze the harm to the public interest associated with the authorized stormwater discharges, especially in a generalized and simple antidegradation analysis.

iv. Requirement for Highest Statutory and Regulatory Requirements and Best Practicable Treatment and Control

The permit requires the highest statutory and regulatory requirements and requires that the dischargers meet best practicable treatment or control and, as described more fully above, requires the following:

- Implementation of BAT/BCT/BPT, including compliance with U.S. EPA's effluent limitation guidelines for the construction and development category as the level of pollutant abatement that is the best available technology economically achievable;
- Compliance with receiving water limitations;
- Enhanced requirements on non-stormwater discharges;
- TMDL-specific requirements that are consistent with the waste load allocations established by TMDLs that identify construction stormwater as a source; and
- Reservation of authority for the Regional Water Boards to retain the ability to impose additional sampling and monitoring requirements or coverage under an individual NPDES permit if necessary.

v. Public Participation:

Numerous public participation opportunities have been provided during the development of this permit. In addition to the minimum public participation requirements required by the federal regulations governing NPDES permits and Water Code § 13167, State Water Board staff has met informally with stakeholders, held staff workshops, and accepted comments on an administrative draft of the permit.

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I.I. Regional Water Board Authorities

Because this General Permit will be issued to thousands of construction sites across the State, the Regional Water Boards retain discretionary authority over certain issues that may arise from the discharges in their respective regions. This General Permit does not grant the Regional Water Boards any authority they do not otherwise have; rather, it merely emphasizes that the Regional Water Boards can take specific actions related to this General Permit. For example, the Regional Water Boards will be enforcing this General Permit and may need to adjust some requirements for a discharger based on the discharger's compliance history.

I.J. Construction Activities Covered

I.J.1. General Activities Covered

Construction activity phases (demolition and pre-development site preparation, grading and land development, streets and utilities, vertical construction, and final landscaping and site stabilization) can impact a construction site's runoff sediment supply, pollutant loading, and transport characteristics. These modifications can occur both during and after the construction phase and, without proper controls, such as the requirements set forth in this General Permit, could result in significant degradation of the established water body beneficial uses in California. The primary stormwater pollutant at construction sites is excess sediment. Excess sediment can cloud the water and reduce the amount of sunlight reaching aquatic plants, clog fish gills, smother aquatic habitat and spawning areas, and impede navigation in our waterways. Sediment also transports other pollutants such as nutrients, metals, oils, and greases, and pesticides. In addition to sediment, other pollutants that are commonly associated with construction activities include, but are not limited to, pollutants from cement, stucco, paints, cleaning materials, general debris, chemicals associated with historical structures mobilized through demolition, historical contamination chemicals in soil mobilized by construction disturbance, and other construction related products easily transported by stormwater runoff. Dischargers can reduce and avoid the effects of these pollutants on water quality through better construction site design and use of best management practices (BMPs).

a. In accordance with the Ninth Circuit Court of Appeals' decision in *Natural Resource Defense Council v. U.S. EPA* (9th Cir. 2008) 526 F.3d 591, and subsequent denial of the U.S. EPA's petition for reconsideration in November 2008, oil and gas construction activities discharging stormwater contaminated only with sediment are no longer exempt from the NPDES program;

b. Site geotechnical investigation work requires special precaution when backfilling bore holes so that aquifers are adequately protected from surface contamination;

c. Disturbances related to geotechnical or other site investigation work is a construction activity requiring permit coverage;

d. Construction activities that disturb 1 or more acres of soil associated with the construction of new fire prevention methods (e.g., fire barriers, fire breaks, and fire prevention areas) require permit coverage;

e. Stormwater discharges from dredge spoil placement that occur outside of U.S. Army Corps of Engineers jurisdiction (upland sites) and that disturb one or more acres of land surface from construction activity are covered by this General Permit. Construction projects that include in-water work that require a

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Clean Water Act 404 permit should contact the Regional Board to determine whether a Clean Water Act 401 Certification is necessary; and

f. Concrete mixing for the purpose of construction, in which all mixing activities occur solely within a specific project site, may do so under this General Permit. The project site boundary are those as defined in the project's site-specific SWPPP.

I.J.2. Linear Underground and Overhead Projects subject to this General Permit

a. Underground and overhead facilities typically constructed as linear underground and overhead projects include, but are not limited to, any conveyance, pipe, or pipeline for the transportation of any gaseous, liquid (including water, wastewater for domestic municipal services), liquescent, or slurry substance; any cable line or wire for the transmission of electrical energy; any cable line or wire for communications (e.g., telephone, telegraph, radio, or television messages); and associated ancillary facilities. Construction activities associated with linear underground and overhead projects include, but are not limited to, those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities) and include, but are not limited to, underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/or pavement repair or replacement, and stockpile/borrow locations.

b. Water Quality Order 2003-0007-DWQ regulated construction activities associated with small linear underground and overhead projects that resulted in land disturbances greater than one acre, but less than five acres. These projects were considered non-traditional construction projects. Attachment E of this Order now regulates all construction activities from linear underground and overhead projects resulting in land disturbances greater than one acre.

c. All disturbances to the ground must be accounted for and considered additive. The following formula attempts to account for all disturbances from the construction activity, not just the trenching activity itself:

$$\text{Total Disturbed Area} = W_t * L_t + A_p + D_b * N_b + W_r * L_r$$

Where:

- W_t is the width of the disturbance, including trench width, plus the immediate access width;
- L_t is the length of the trench or project pipe;

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- A_p is the area where project-related activity occurs (i.e., equipment and material storage, staging, and preparation areas not on paved surfaces, ancillary facility areas);
- D_b is the bore hole diameter multiplied by the immediate access width;
- N_b is the number of bore holes;
- W_r is the new road construction width; and
- L_r is the length of the new road.

This formula illustrates how to account for all disturbances to the ground resulting from the construction activity. Although dischargers are not required to use this exact formula, they must include all disturbances to the ground in their total calculation.

d. The visual inspection requirements set forth in Monitoring and Reporting Requirements in Attachment E are applicable to all linear underground and overhead projects regardless of type.

e. This General Permit's visual inspection requirements apply to linear underground and overhead project Type 1 projects in both populated (developed or paved) and rural (undeveloped or unpaved) settings. In a populated environment, daily closure requirements for an open excavation may be an important element of a SWPPP for stormwater protection and safety plans because open excavations present a safety hazard to both pedestrians and traffic. However, uncovered excavations in rural settings do not pose as significant a threat to safety. Likewise, it makes sense for linear underground and overhead project Type 1 projects in developed settings to return disturbed land back to pre-construction conditions daily, because of incidental non-stormwater discharges in an urban environment and the associated potential for runoff from paved, impermeable surfaces. However, projects in rural settings, are less likely to have impervious surfaces and non-stormwater discharges and may not present the same threat to water quality.

I.J.3. Demolition

a. When a construction project involves demolition or renovation, construction and demolition debris is created. Construction and demolition debris can consist of three types of wastes:

   i. Inert or non-hazardous waste;

   ii. Hazardous waste as regulated by the United States Environmental Protection Agency under the Resource Conservation and Recovery Act (RCRA); and

   iii. Items that contain hazardous components that might be regulated by the state.

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b. This General Permit requires best management practices (BMPs) to reduce the exposure of hazardous materials found in older structures from mobilizing in stormwater. Common hazardous materials related to demolition can be found on the U.S. EPA's website[87] and include but are not limited to:

i. Asbestos-Containing Materials

State of California Department of Industrial Relations Cal/OSHA has adopted regulations regarding asbestos exposure California Code of Regulations, Title 8, § 1529.

ii. Mercury Containing Devices

Many structures utilize devices that contain mercury. Mercury is persistent and toxic to human health and the environment. Mercury containing devices such as thermostats fluorescent lamps shall be isolated, removed and taken to an appropriate disposal facility.

iii. Lead-Based Paint

Older structures have a high likelihood of containing lead-based interior and exterior lead-based paint. During the demolition process the lead-based paint can be mobilized and behave like dust. The lead-based paint can be inhaled by workers on the demolition site and tracked off-site causing hazardous exposure to lead to the community. Therefore, it is important to minimize exposure by implementing lead-safe practices during demolition activities.

iv. Polychlorinated Biphenyls (PCBs) in Caulk

PCBs have been identified in caulk in many older structures. Protective BMPs and OSHA approved Personal Protective Equipment shall be utilized to prevent the exposure of PCBs to workers and the surrounding environment during and after demolition.

In order to be in compliant with all PCB TMDLs, Mercury TMDLs and statewide policies, dischargers are required to schedule demolition at times of the year with a low probability of a precipitation event, cover demolished material when activity stops for the day or prior to precipitation, or have a certified individual examine the structure for hazardous materials and mitigate the hazard with a method that prevents the material from discharging off-site.

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87 U.S. EPA, Harmful Materials and Residential Demolition, <https://www.epa.gov/large-scale-residential-demolition/harmful-materials-and-residential-demolition> [as of May 20, 2021]

Because of the production ban of PCBs in 1979, this General Permit has requirements for demolition of buildings built prior to January 1, 1980.[88]

I.J.4. Common Plan of Development or Sale

U.S. EPA regulations include the term "common plan of development or sale" to ensure that acreage within a common project does not artificially escape this General Permit's requirements because construction activities are phased, split among smaller parcels, or completed by different owners or developers. The State Water Board is required to exercise its regulatory discretion in providing a common-sense interpretation of the term as it applies to construction projects and permit coverage. An overbroad interpretation of the term would render meaningless the clear "one acre" federal permitting threshold and would potentially trigger permitting of almost any construction activity that occurs within an area that had previously received area-wide utility or road improvements.

The 2008 U.S. EPA NPDES General Permit for Discharges from Construction Activity (2008 Construction General Permit) provided further clarification on the common plan of development or sale regarding non-contiguous construction activities. Where discrete construction projects within a larger common plan of development or sale are located at least 1/4 mile apart and the area between the projects is not being disturbed, each individual project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline, or utility project that is part of the same "common plan" is not concurrently being disturbed. For example, oil and gas well pads separated by 1/4 mile could be treated as separate projects. However, if the same two well pads and an interconnecting access road were all under construction at the same time, they would generally be considered as part of a single "common plan" for permitting purposes. If a utility company was constructing new trunk lines off an existing transmission line to serve separate residential subdivisions located more than 1/4 mile apart, the two trunk line projects could be considered separate projects.

Construction projects generally receive grading and/or building permits (Local Permits) from local authorities prior to initiating construction activity. These Local Permits spell out the scope of the project, the parcels involved, the type of construction approved, etc. Referring to the Local Permit helps define "common plan of development or sale." In cases such as tract home development, a Local Permit will include all phases of the construction project including rough grading, utility and road installation, and vertical construction. All construction activities approved in the Local Permit are part of the common plan and must remain under the General Permit until construction is completed. For custom home construction,

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88 Geosyntec Consultants for the Bay Area Stormwater Management Association. Integrated Monitoring Report Part B: PCB and Mercury Loads Avoided and Reduced via Stormwater (IMR). 2013.

Local Permits typically only approve vertical construction as the rough grading, utilities, and road improvements were already independently completed under the previous Local Permit. In the case of a custom home site, the homeowner must submit plans and obtain a distinct and separate Local Permit from the local authority in order to proceed. General Permit coverage for an individual homeowner building a custom home on a private lot of less than one acre is not required. Similarly, the installation of a swimming pool, deck, or landscaping that disturbs less than one acre that was not part of any previous Local Permit are not required to obtain General Permit coverage.

The following are several examples of construction activity of less than one acre that would require permit coverage:

a. A landowner receives a building permit(s) to build tract homes on a 100-acre site split into 200 one-third acre parcels, (the remaining acreage consists of streets and parkways) which are sold to individual homeowners as they are completed. The landowner completes and sells all the parcels except for two. Although the remaining two parcels combined are less than one acre, the landowner must continue permit coverage for the two parcels.

b. One of the parcels discussed above is sold to another owner who intends to complete the construction as already approved in the local permit. The new landowner must electronically certify and submit Permit Registration Documents to complete the construction even if the new landowner is required to obtain a separate Local Permit.

c. The landowner in (1) above purchases 50 additional one half-acre parcels adjacent to the original 200-acre project. The landowner seeks a Local Permit (or amendment to existing local permit) to build on 20 parcels while leaving the remaining 30 parcels for future development. The landowner must amend Permit Registration Documents to include the 20 parcels 14 days prior to commencement of construction activity on those parcels.

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I.K. Construction Activities Not Covered

I.K.1. Traditional and Linear Construction Activities Not Covered

Construction activities not covered by this General Permit are listed in the Order Section II.B and Section II.D.

I.K.2. Notice of Non-Applicability

Reliance on approved jurisdictional determinations is not allowed in the General Permit for a number of reasons. First, approved jurisdictional determinations delineate the scope of waters of the United States. They do not determine whether an activity results in a discharge to a water of the United States. Second, the scope of waters of the United States is subject to changes based on change of regulations or judicial decisions. Approved jurisdictional determinations are valid

for a discrete number of years, and they may not be up-to-date with respect to implementing the current regulations if there is an intervening change during the duration of the validity of the approved jurisdictional determination. Finally, it is likely that the approved jurisdictional determination was requested by another party and in another context, such as the discharge of dredged or fill material. As such, the findings may not be easily extrapolated.

In 1998, the California Water Code was amended to require entities who are requested by the State Water Board to obtain General Permit coverage, but that have a valid reason to not obtain General Permit coverage, to submit a Notice of Non-Applicability (NONA). (Cal Wat. Code, § 13399.30, subd. (a)(2)).

The State Water Board considered allowing Entities to review United States Army Corp of Engineer approved jurisdictional determinations to evaluate, without a California licensed professional geologist, whether their facility location is within a basin and/or other physical location that is not hydrologically connected to waters of the United States. The State Water Board believes that this process can be difficult in some cases. In addition, there may be areas of the state that are not hydrologically connected to waters of the United States for which there is not a corresponding United States Army Corps of Engineer approved Jurisdictional Determination. Therefore, all “No Discharge” Technical Reports must be signed (wet signature and license number) by a California licensed professional engineer or geologist. In addition, the discharger must obtain a concurrence letter from the Regional Water Board that has jurisdiction over the site location.

I.K.3. Small Construction Erosivity Waiver

The U.S. EPA’s Stormwater Phase II Final Rule provides the option for a Small Construction Rainfall Erosivity waiver. This waiver applies to construction sites between 1 and 5 acres and allows permitting authorities to waive those sites that do not have adverse water quality impacts.

Projects that do not qualify for the Small Construction Rainfall Erosivity waiver include:

a. Projects that are part of a larger common plan of development disturbing more than 5 acres; and/or

b. Projects with construction lasting one year or greater.

Dischargers eligible for the Small Construction Erosivity waiver are exempt from coverage for this General Permit. The discharger must certify and submit to the State Water Board that small construction activity will occur only when the rainfall erosivity factor (“R” factor in the Revised Universal Soil Loss Equation) is less than 5 to obtain the waiver. The period of construction activity begins when the WDID number is issued and ends when the disturbed areas of the project meet the final stabilization conditions in Order Section III.H. The R value is calculated from the construction start date through all phases of construction (initial land disturbance

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through final stabilization). Small projects that are part of a larger plan of development (less than 5 combined acres of disturbance) use the earliest start date associated with the plan of development and their estimated time of meeting the final stabilization requirements.

Projects that qualify for the small construction erosivity waiver are not subject to the post-construction standards of this General Permit, but may be subject to existing permitted Phase I or Phase II municipal separate storm sewer system (MS4) post-construction requirements.

A waiver eligibility condition requires the operator to periodically inspect and properly maintain the area until the criteria for final stabilization defined in this General Permit is met. If use of this interim stabilization eligibility condition is relied upon to qualify for the waiver, a signature on the waiver with a certification statement constitutes acceptance of and commitment to complete the final stabilization process. The discharger must apply for a waiver in SMARTS prior to commencing construction activities.

U.S. EPA funded a cooperative agreement with Texas A&M University to develop an online rainfall erosivity calculator. Dischargers can access the calculator from the U.S. EPA's website.[89] Use of the calculator allows the discharger to determine potential eligibility for the rainfall erosivity waiver. It may also be useful in determining the time periods during which construction activity could be waived from General Permit coverage.

I.L. Obtaining and Modifying General Permit Coverage

This General Permit states the Legally Responsible Person (LRP) or a person legally authorized to sign and certify on behalf of the LRP is responsible for obtaining General Permit coverage. The LRP must electronically submit[90] Permit Registration Documents prior to commencement of construction activities in the Stormwater Multiple Application Report Tracking System (SMARTS). Permit Registration Documents consist of:

- A Notice of Intent;
- A Risk Assessment;
- Post-Construction Calculations (when applicable);
- A Site Map;
- A SWPPP; and

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89 U.S. EPA, Rainfall Erosivity Factor Calculator for Small Construction Sites, <https://lew.epa.gov/> [as of May 20, 2021]

90 Each signatory (LRP or DAR) must have an electronic authorization form on file with the State Water Board for each organization they represent in SMARTS.

- The application fee.

A Waste Discharge Identification number (WDID) will automatically be emailed to the LRP once these components have been submitted and are deemed complete. Failure to obtain coverage under this General Permit for stormwater discharges to waters of the United States is a violation of the Clean Water Act and the California Water Code.

The LRP is typically the person who possesses the title of the land, easement, or leasehold interest of the estate upon which the construction activities will occur for the regulated site. The LRP for linear underground and overhead projects is typically the person authorized to make management decisions of the utility company, municipality, or other public or private company or agency that owns or operates the linear underground and overhead project.

The Duly Authorized Representative is a person who has legal authority to sign, certify, and electronically submit Permit Registration Documents and Notices of Termination on behalf of the Legally Responsible Person.

It is expected that as the stormwater program develops, the Regional Water Boards may issue general or individual permits containing more specific provisions. If this occurs, this General Permit no longer regulates those dischargers obtaining coverage under those general or individual permits.

Any information provided to the Regional Water Board shall comply with the Homeland Security Act and any other federal law that concerns security in the United States; any information that does not comply should not be submitted.

Annual Reports must be submitted by projects that are enrolled under this General Permit for more than 90 days in a reporting period. The Annual Reports shall be submitted electronically in SMARTS. Annual Reports are due to the State Water Board by September 1st of each year with a July 1st through June 30th reporting period.

The application requirements clearly identify the responsible parties, locations, and scope of operations of dischargers covered by this General Permit and documents the discharger's knowledge of the General Permit's requirements. Regional Water Boards will enter their inspection and enforcement data into SMARTS.

Coverage under this General Permit remains in effect until a Notice of Termination is submitted in SMARTS and approved by the applicable Regional Water Board where the project is located. The discharger is responsible for any missed or outstanding invoices if the Regional Water Board denies the Notice of Termination. For outstanding invoices, a complete Notice of Termination must be received by the Regional Water Board 90 days from the original invoice date in order to cancel the invoice. The invoice is deemed valid and payable if a complete Notice of Termination is received after 90 days.

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This General Permit allows a discharger to terminate portions of a construction project if those portions have been sold to another owner. This General Permit is not transferable, so the new owner has the responsibility to obtain coverage, update the Stormwater Pollution Prevention Plan (SWPPP), and comply with General Permit requirements. The seller must notify the new owner about their responsibilities concerning this General Permit and must notify the State Water Board by submitting the new owner's name, address, and phone number on the Change of Information form for the termination to be processed. The seller must also disclose the state of construction, if construction activity is ongoing, or if the post-construction requirements are completed. The new owner for ongoing construction activity after the change of ownership is not exempt from this General Permit's SWPPP requirements and must submit new Permit Registration Documents within 30 days of the date of change of ownership. The new owner is expected to review and update the existing SWPPP to ensure it is appropriate for the construction activity being undertaken.[91]

The Legally Responsible Person is always ultimately responsible for project compliance. This individual must certify the Permit Registration Documents and will be the recipient of any Notices of Violations or Administrative Civil Liabilities (fines) for the project.

The current annual fees are included in the Water Code fee schedule[92] and are based on total disturbed area (acres) of the construction project. Projects continuing from the previous permit into this General Permit will pay the annual fees based on their current billing cycle.

Consistent with the 2022 U.S. EPA NPDES General Permit for Discharges from Construction Activity, this General Permit requires the discharger to post a sign or other General Permit coverage notice at a location viewable and legible by the public from a safe, publicly accessible location. This General Permit requires the posting of the project's unique WDID number, waiver identification number, and site and project contact information. If posting in a publicly accessible location is not possible, the discharger must make the site-specific WDID readily available upon request.

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91 The SWPPP must be amended, or a new SWPPP developed by the discharger's QSD if not already in compliance with this General Permit's SWPPP requirements in the Order for Linear Underground and Overhead Projects.

92 State Water Resources Control Board, NPDES Storm Water Fees, <https://waterboards.ca.gov/resources/fees/water_quality/#stormwater> [as of May 20, 2021]

I.M. Notice of Termination Final Stabilization

This General Permit is consistent with the 2022 U.S. EPA NPDES General Permit for Discharges from Construction Activity which requires the following for Notice of Termination final stabilization:

I.M.1. Establish uniform, perennial cover of vegetation[93] (i.e., evenly distributed, without large bare areas) to provide 70 percent or more of the cover that is provided by permanent vegetation in local undisturbed areas; and/or

I.M.2. Implement permanent non-vegetative stabilization measures to provide effective cover of any areas of exposed soil.

I.M.3. Exceptions:

a. Arid, semi-arid, and drought-stricken areas. Final stabilization is met if the area has been seeded or planted to establish vegetation that provides 70 percent or more of the cover that is provided by permanent vegetation in local undisturbed areas within three years and, to the extent necessary to prevent erosion on the seeded or planted area, non-vegetative erosion controls have been applied that provide cover for at least three years without active maintenance.

b. Disturbed areas on agricultural land that are restored to their preconstruction agricultural use.

c. Areas that need to remain disturbed (e.g., racetracks, animal corrals, baseball diamonds, etc.). In limited circumstances, stabilization may not be required if the intended function of a specific area of the site necessitates that it remains disturbed, and only the minimum area needed remains disturbed (e.g., dirt access roads, utility pole pads, areas being used for storage of vehicles, equipment, materials).

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I.N. Discharge Prohibitions

This General Permit authorizes the discharge of stormwater to surface waters from construction activities that result in the disturbance of one or more acres of land, provided that the discharger satisfies all General Permit conditions. This General Permit prohibits the discharge of pollutants other than stormwater and non-stormwater discharges authorized by this General Permit or another NPDES permit. This General Permit also prohibits all discharges which contain a hazardous substance in excess of reportable quantities established in 40 Code of Federal Regulations §§ 117.3 and 302.4, unless a separate NPDES permit has been issued to regulate those discharges. In addition, this General Permit incorporates discharge prohibitions contained in water quality control plans, as implemented by the nine

93 Applications of products where stabilization is dependent on vegetative growth (e.g., hydroseed) does not meet final stabilization criteria if vegetative growth is not achieved.

Regional Water Boards. Discharges to Areas of Special Biological Significance (ASBS) are prohibited unless covered by an exception that the State Water Board has approved.

Non-stormwater discharges include a wide variety of sources, including improper dumping, spills, or leakage from storage tanks or transfer areas. Non-stormwater discharges may contribute significant pollutant loads to receiving waters. Measures to control spills, leakage, and dumping, and to prevent illicit connections during construction must be addressed through structural as well as non-structural BMPs. The State Water Board recognizes, however, that certain non-stormwater discharges may be necessary for the completion of construction projects. Authorized non-stormwater discharges may include those from de-chlorinated potable water sources such as: fire hydrant flushing, irrigation of vegetative erosion control measures, pipe flushing and testing, water to control dust, uncontaminated ground water dewatering, and other discharges not subject to a separate general NPDES permit adopted by a region. Therefore, this General Permit authorizes such discharges provided they meet the following conditions:

These authorized non-stormwater discharges must:

1. Comply with BMPs as described in the SWPPP;
2. Filter or treat, using appropriate technology, all dewatering discharges from sedimentation basins;
3. Meet the numeric action levels for pH and turbidity; and
4. Not cause or contribute to a violation of water quality standards.

Additionally, authorized non-stormwater discharges must not be used to clean up failed or inadequate construction or post-construction BMPs designed to keep materials on-site. This General Permit prohibits the discharge of stormwater that causes or threatens to cause pollution or nuisance. Dewatering is also discussed in Section I.B.3.b.iii above.

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I.O. Technology and Water Quality Based Effluent Limitations for All Types of Discharges

I.O.1. Technology-Based Effluent Limitations

NPDES permits for stormwater discharges associated with construction activity must meet all applicable provisions of §§ 301 and 402 of the Clean Water Act. These provisions require controls of pollutant discharges that utilize best available technology economically achievable (BAT) for toxic pollutants and non-conventional pollutants and best conventional pollutant control technology (BCT) for conventional pollutants. Additionally, these provisions require controls of pollutant discharges to reduce pollutants and any more stringent controls necessary to meet water quality standards. The U.S. EPA has already established such limitations, known as effluent limitation guidelines, for some industrial

categories. The State Water Board implemented the effluent limitation guidelines and standards for the construction and development point source category into this General Permit as discussed in Section I.B.3 above. In instances where there are no effluent limitation guidelines, the permit writer is to use best professional judgment to establish discharger requirements using BAT and BCT technology. This General Permit contains narrative effluent limitations, technology-based numeric effluent limitations for active treatment systems and BMP-based, narrative, and numeric water quality-based effluent limitations for Total Maximum Daily Loads (TMDL) waste load allocation implementation.

The previous permit, as originally adopted by the State Water Board on September 2, 2009, contained numeric effluent limitations for pH (within the range of 6.0 and 9.0 pH units) and turbidity (500 Nephelometric Turbidity Units (NTU)) that applied only to Risk Level 3 and linear underground and overhead project Type 3 construction sites. The California Building Industry Association, the Building Industry Legal Defense Foundation, and the California Business Properties Association (petitioners) challenged the previous permit in *California Building Industry Association et al. v. State Water Resources Control Board*. The Superior Court ruled in favor of the State Water Board on almost all of the issues the petitioners raised, but the Superior Court invalidated the numeric effluent limitations for pH and turbidity for Risk Level 3 and linear underground and overhead project Type 3 sites because it determined that the State Water Board did not have sufficient BMP performance data to support those numeric effluent limitations. As a result of the Superior Court's writ of mandamus, the numeric effluent limitations for pH and turbidity were removed from the previous permit, except for active treatment systems. In addition, the previous permit required Risk Level 3 and linear underground and overhead project Type 3 dischargers with discharges directly to surface waters to conduct receiving water monitoring if directed by Water Boards whenever their effluent exceeds specified receiving water monitoring triggers. The receiving water monitoring triggers were established at the same levels as the previous numeric effluent limitations (effluent pH outside the range of 6.0 and 9.0 pH units or turbidity exceeding 500 NTU). In restoring the receiving water monitoring requirements, the State Water Board determined that it was appropriate to require receiving water monitoring at the request of the Water Boards for these types of sites with discharges directly to surface waters that exceeded the receiving water monitoring triggers under any precipitation event scenarios because these sites represent the highest threat to receiving water quality.

This General Permit includes receiving water monitoring requirements for Risk Level 3 and linear underground and overhead project Type 3 with discharges directly to surface water. An exceedance of a receiving water monitoring trigger is not a violation of this General Permit.

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BAT and BCT technologies include passive systems such as conventional runoff and sediment control and treatment systems such as coagulation or flocculation using sand filtration, when appropriate. Such technologies allow for effective treatment of soil particles less 0.02 mm (medium silt) in diameter. This General Permit requires the discharger to install structural controls, as necessary, such as erosion and sediment controls that meet BAT and BCT to achieve compliance with water quality standards. These effluent limitations constitute compliance with the requirements of the Clean Water Act.

Because this General Permit is an NPDES permit, there is no legal requirement to address the factors set forth in Water Code §§ 13241 and 13263, unless the permit is more stringent than what federal law requires. (See *City of Burbank v. State Water Resources Control Bd*. (2005) 35 Cal.4th 613, 618, 627.) None of the requirements in this General Permit are more stringent than the minimum federal requirements, which include technology-based requirements achieving BAT and BCT and strict compliance with water quality standards. The inclusion of numeric effluent limitations in the permit for active treatment systems does not cause this General Permit to be more stringent than current federal law. Numeric effluent limitations and best management practices are simply two different methods of achieving the same federal requirement: strict compliance with state water quality standards. Federal law authorizes both narrative and numeric effluent limitations to meet state water quality standards. The use of numeric effluent limitations to achieve compliance with water quality standards is not a more stringent requirement than the use of BMPs. (State Water Board Order No. WQ 2006-0012 (Boeing).) Accordingly, the State Water Board does not need to take into account the factors in Water Code §§ 13241 and 13263.

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The State Water Board has concluded that the establishment of BAT and BCT will not create or aggravate other environmental problems through increases in air pollution, solid waste generation, or energy consumption. While there may be a slight increase in non-water quality impacts due to the implementation of additional monitoring or the construction of additional BMPs, these impacts will be negligible in comparison with the construction activities taking place on-site and would be justified by the water quality benefits associated with compliance.

a. pH Receiving Water Monitoring Trigger

   The minimum standard control methods for pH in runoff requires the use of preventive measures such as avoiding concrete pours during rainy weather, covering concrete and directing flow away from fresh concrete if a pour occurs during rain, covering scrap drywall and stucco materials when stored outside and potentially exposed to rain, and other housekeeping measures to control potential contaminants. If necessary, pH-impaired stormwater from construction sites can be treated in a filter, settling pond, or basin, with additional natural or chemical treatment required to meet pH limits set forth in this General Permit.

The basin or pond acts as a collection point and holds stormwater for a sufficient period for the contaminants to be settled out, either naturally or artificially, and allows any additional treatment to take place. The State Water Board considers these techniques to be equivalent to BCT. The State Water Board used best professional judgement in determining the pH concentration discharge limitations.

The chosen trigger was established by calculating three standard deviations above and below the mean pH of runoff from highway construction sites[94] in California. Proper implementation of BMPs should result in discharges that are within the range of 6.0 to 9.0 pH units.

b. Turbidity Receiving Water Monitoring Trigger

The turbidity receiving water monitoring trigger of 500 NTU is a performance-based trigger and was developed using three different analyses aimed at finding the appropriate threshold to set the performance-based limit to ensure environmental protection, effluent quality, and cost-effectiveness. The analyses fell into three, main types: (1) an ecoregion-specific dataset developed by Simon et. al. (2004); (2) Statewide Regional Water Quality Control Board enforcement data; and (3) published, peer-reviewed studies and reports on in-situ performance of best management practices in terms of erosion and sediment control on active construction sites.

A 1:3 relationship between turbidity (expressed as NTU) and suspended sediment concentration (expressed as mg/L) is assumed based on a review of suspended sediment and turbidity data from three gauges used in the USGS National Water Quality Assessment Program:

USGS 11074000 SANTA ANA R BL PRADO DAM CA

USGS 11447650 SACRAMENTO R A FREEPORT CA

USGS 11303500 SAN JOAQUIN R NR VERNALIS CA

The receiving water monitoring trigger represents staff determination that the trigger value is the most practicable based on available data. The turbidity receiving water monitoring trigger represents a bridge between the narrative effluent limitations and receiving water limitations. State Water Board staff analyzed construction site discharge information (monitoring data, estimates) and receiving water monitoring information to support this receiving water monitoring trigger.

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94 California Department of Transportation, Caltrans Construction Sites Runoff Characterization Study (September 2002) <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/ctsw-rt-03-065-a11y.pdf> [as of May 20, 2021]

Compliance with this value does not necessarily represent compliance with either the narrative effluent limitations (as enforced through the BAT and BCT standard) or the receiving water limitations since the turbidity receiving water monitoring trigger represents an appropriate threshold level expected at a site. In the San Diego region, some inland surface waters have a receiving water objective for turbidity equal to 20 NTU. A discharge up to, but not exceeding, the turbidity receiving water monitoring trigger of 500 NTU may still cause or contribute to the exceedance of the 20 NTU standard. Most of the waters of the State are protected by turbidity objectives based on background conditions.

Table 3 – Regional Water Board Basin Plans, Water Quality Objectives for Turbidity

Regional Water Board	WQ Objective	Background/Natural Turbidity	Maximum Increase
1	Based on background	All levels	20 percent
2	Based on background	> 50 NTU	10 percent
3	Based on background	0-50 JTU 50-100 JTU > 100 JTU	20 percent 10 JTU 10 percent
4	Based on background	0-50 NTU > 50 NTU	20 percent 10 percent
5	Based on background	0-5 NTU 5-50 NTU 50-100 NTU > 100 NTU	1 NTU 20 percent 10 NTU 10 percent
6	Based on background	All levels	10 percent
7	Based on background	N/A	N/A
8	Based on background	0-50 NTU 50-100 NTU > 100 NTU	20 percent 10 NTU 10 percent
9	Inland Surface Waters, 20 NTU All others, based on background	0-50 NTU 50-100 NTU > 100 NTU	20 percent 10 NTU 10 percent

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Table 4 shows the suspended sediment concentrations at the 1.5-year flow recurrence interval for the 12 ecoregions in California from Simon et. al (2004).

Table 4 – Results of Ecoregion Analysis

Ecoregion	Percent of California Land Area	Median Suspended Sediment Concentration (mg/L)
1	9.1	874
4	0.2	120
5	8.8	35.6
6	20.7	1530
7	7.7	122
8	3.0	47.4
9	9.4	284
13	5.2	143
14	21.7	5150
78	8.1	581
80	2.4	199
81	3.7	503

The area-weighted average for the suspended sediment concentration is 1633 mg/L.

If a 1:3 relationship between turbidity and suspended sediment is assumed, the median turbidity is 544 NTU.

The following Table 5 is composed of turbidity readings measured in NTUs from administrative civil liability actions for construction sites from 2003 - 2009. This data was derived from the complete listing of construction-related administrative civil liabilities (ACLs) for the six-year period. All administrative civil liabilities were reviewed and those that included turbidimeter readings at the point of stormwater discharge were selected for this dataset.

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Table 5 – Administrative Civil Liabilities (ACL) Sampling Data taken by Regional Water Board Staff

WDID#	Region	Discharger	Turbidity (NTU)
5S34C331884	5S	Bradshaw Interceptor Section 6B	1800
5S05C325110	5S	Bridalwood Subdivision	1670
5S48C336297	5S	Cheyenne at Browns Valley	1629
5R32C314271	5R	Grizzly Ranch Construction	1400
6A090406008	6T	El Dorado County Department of Transportation, Angora Creek	97.4
5S03C346861	5S	TML Development, LLC	1600
6A31C325917	6T	Northstar Village	See Subdata Set

Table 6 – Subdata Set Turbidity for Point of Stormwater Runoff Discharge at Northstar Village

Date	Turbidity (NTU)	Location
10/5/2006	900	Middle Martis Creek
11/2/2006	190	Middle Martis Creek
01/04/2007	36	West Fork, West Martis Creek
02/08/2007	180	Middle Martis Creek
02/09/2007	130	Middle Martis Creek
02/09/2007	290	Middle Martis Creek
02/09/2007	100	West Fork, West Martis Creek
02/10/2007	28	Middle Martis Creek
02/10/2007	23	Middle Martis Creek
02/10/2007	32	Middle Martis Creek
02/10/2007	12	Middle Martis Creek
02/10/2007	60	West Fork, West Martis Creek
02/10/2007	34	West Fork, West Martis Creek

A 95 percent confidence interval for mean turbidity in an administrative civil liability order was constructed. The data set used was a small sample size, so the 500 NTU (the value derived as the receiving water monitoring trigger for this General Permit) needed to be verified as a possible population mean. In this case, the population refers to a hypothetical population of turbidity measurements of which our sample of 20 represents. A t-distribution was assumed due to the small sample size:

Mean: 512.23 NTU

Standard Deviation: 686.85

Margin of Error: 31.45

Confide Interval: 190.78 NTU (Low), 833.68 NTU (High)

Based on a constructed 95 percent confidence interval, an administrative civil liability order turbidity measurement will be between 190.78 – 833.68 NTU. 500 NTU falls within this range. Using the same data set, a small-sample hypothesis test was also performed to test if the administrative civil liability turbidity data set contains enough information to cast doubt on choosing a 500 NTU as a mean. 500 NTU was again chosen due to its proposed use as an acceptable value. The test was carried out using a 95 percent confidence interval. Results indicated that the administrative civil liability turbidity data set does not contain significant sample evidence to reject the claim of 500 NTU as an acceptable mean for the administrative civil liability turbidity population.

There are few published, peer-reviewed studies and reports on in-situ performance of best management practices in terms of erosion and sediment control on active construction sites. The most often cited study is a report titled,

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"Improving the Cost Effectiveness of Highway Construction Site Erosion and Pollution Control"[95]. The primary author, Dr. Horner states the following in a comment letter to the State Water Board summarizing this report:

"The most effective erosion control product was wood fiber mulch applied at two different rates along with a bonding agent and grass seed in sufficient time before the tests to achieve germination. Plots treated in this way reduced influent turbidity by more than 97 percent and discharged effluent exhibiting mean and maximum turbidity values of 21 and 73 NTU, respectively. Some other mulch and blanket materials performed nearly as well. These tests demonstrated the control ability of widely available BMPs over a very broad range of erosion potential."

Other technologies studied in this report produced effluent quality at or near 100 NTU. It is the best professional judgement of the State Water Board staff that erosion control is preferred and that technology performance in a controlled study showing effluent quality directly leaving a BMP is always easier and cheaper to control than effluent being discharged from the project (edge of property, etc.).

To summarize, the analysis showed that: (1) results of the Simon et. al dataset reveals turbidity values in background receiving water in California's ecoregions range from 16 NTU to 1716 NTU (with a mean of 544 NTU); (2) based on a constructed 95 percent confidence interval, construction sites will be subject to administrative civil liability (ACL) when their turbidity measurement falls between 190.78 – 833.68 NTU; and (3) sites with highly controlled discharges employing and maintaining good erosion control practices can discharge effluent from the BMP with turbidity values less than 100 NTU. State Water Board staff has determined, using its best professional judgement, that it is most cost effective to set the receiving water monitoring trigger for turbidity at 500 NTU.

I.O.2. Determining Compliance with Effluent Standards

a. Numeric Action Levels

This General Permit contains technology based numeric action levels for pH and turbidity, and requirements for effluent monitoring at all Risk Level 2 and 3, and linear underground and overhead project Type 2 and 3 sites. The numeric action levels are: a pH numeric action level of 6.5 to 8.5, and a turbidity numeric action level of 250 Nephelometric Turbidity Units (NTUs). Additionally, this General Permit sets a turbidity numeric action level for receiving water

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95 Horner, Guedry, and Kortenhof, Improving the Cost Effectiveness of Highway Construction Site Erosion and Pollution Control (1990) <https://wsdot.wa.gov/research/reports/fullreports/200.1.pdf> [as of April 28, 2022]

monitoring of 500 NTU. Numeric action levels are essentially numeric benchmark values for certain parameters that, if exceeded in effluent sampling, trigger the discharger to take actions.

The primary purpose of numeric action levels is to assist dischargers in evaluating the effectiveness of their on-site measures. Construction sites need to employ many different systems that must work together to achieve compliance with the permit's requirements. The numeric action levels chosen should indicate whether the systems are working as intended. This General Permit requires dischargers with numeric action level exceedances to implement additional, alternative, or improved BMPs and revise their SWPPPs accordingly to either prevent pollutants in stormwater and authorized non-stormwater discharges from being discharged, or to substantially reduce the pollutants to levels consistently below the numeric action levels. An exceedance of a numeric action level does not constitute a violation of this General Permit, however, failure to implement any applicable requirement of this General Permit, or additional BMPs or improved BMPs to adequately prevent future numeric action level exceedances, and/or not reporting any numeric action level exceedance through SMARTS is a violation of this General Permit. Dischargers are required to electronically self-report any discharges that exceed numeric action levels or numeric effluent limitations. Multiple exceedances of a numeric action level or failure to report numeric action level exceedances through SMARTS can be cause for the discharger to implement an active treatment system.

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Another purpose of numeric action levels is to provide information regarding construction activities and water quality impacts. This data will provide the Water Boards and the rest of the stormwater community with more information about levels and types of pollutants present in runoff and how effective the dischargers' BMPs are at reducing pollutants in effluent. The State Water Board also hopes to learn more about the linkage between effluent and receiving water quality. In addition, these requirements will provide information on the mechanisms needed to establish compliance monitoring programs at construction sites in future permit deliberations.

i. pH

The chosen limits were established by calculating one standard deviation above and below the mean pH of runoff from highway construction sites in California. Proper implementation of BMPs should result in discharges that are within the range of 6.5 to 8.5 pH units.

The Caltrans study included 33 highway construction sites throughout California over a period of four years, which included 120 storm events. All of these sites had BMPs in place that would be generally implemented at all types of construction sites in California.

The Surface Water Ambient Monitoring Program (SWAMP) has a Guidance Compendium for Watershed Monitoring and Assessment. Sections 3.1.4 and 3.1.5 of this Compendium contain guidance for pH and turbidity sampling.[96]

ii. Turbidity

The State Water Board's staff used their best professional judgement to develop a numeric action level that can be used as a learning tool to help dischargers improve their site controls, and to provide meaningful information on the effectiveness of stormwater controls. A statewide turbidity numeric action level has been set at 250 NTU.

The Surface Water Ambient Monitoring Program (SWAMP) has a Guidance Compendium for Watershed Monitoring and Assessment. Sections 3.1.4 and 3.1.5 of this Compendium contain guidance for pH and turbidity sampling.

I.O.3. Receiving Water Limitations

Construction activities that cause or contribute to an exceedance of water quality objectives or standards must be addressed. The dynamic nature of construction activity gives the discharger the ability to quickly identify and monitor the source of the exceedances. This is because when stormwater mobilizes sediment, it provides visual cues of erosion, where corrective actions should take place, and how effective they are once implemented.

This General Permit requires that stormwater, dewatering, and authorized non-stormwater discharges eliminate the discharge of pollutants that cause or contribute to an exceedance of any applicable water quality objectives or standards. The sampling and analysis monitoring requirements in this General Permit will help determine whether BMPs installed and maintained are preventing pollutants in discharges from the construction site that may cause or contribute to an exceedance of water quality objectives or standards.

Water quality objectives or standards consist of designated beneficial uses of surface waters and the adoption of ambient criteria necessary to protect those uses. The ambient criteria are termed "water quality objectives" when adopted by the Water Boards. There is a risk that stormwater runoff from construction sites containing pollutants could enter surface waters and cause or contribute to an exceedance of water quality standards. For that reason, dischargers should be aware of the applicable water quality standards in their receiving waters. The best method to ensure compliance with receiving water limitations is to implement

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96 A SWAMP Field Methods Course training CD is also available for the public at <www.waterboards.ca.gov/water_issues/programs/swamp/cdrom.html> or please contact stormwater@waterboards.ca.gov to request a copy. [as of May 20, 2021]

BMPs that prevent pollutants from contacting stormwater or leaving the construction site in runoff.

California water quality standards are published in the Basin Plans adopted by each Regional Water Board, the California Toxics Rule (CTR), the National Toxics Rule (NTR), and Statewide Water Board Plans, for example, the California Ocean Plan.

Dischargers can determine the applicable water quality standards by contacting Regional Water Board staff or by consulting one of the following sources. The actual Basin Plans that contain the water quality standards can be viewed at the website of the appropriate Regional Water Board[97], the State Water Board site for statewide plans,[98] or the U.S. EPA regulations for the NTR and CTR (40 Code of Federal Regulations §§ 131.36-38). Basin Plans and statewide plans are also available by mail from the appropriate Regional Water Board or the State Water Board. The U.S. EPA regulations are available on their website.[99]

I.O.4. Water Quality Based Effluent Limitations for Construction Stormwater: TMDLs and Waste Load Allocations

This General Permit implements Clean Water Act § 303(d) impaired water body(ies) with Regional Water Board or U.S. EPA adopted TMDLs identifying sources regulated by this General Permit. The TMDLs in Attachment H include the specific waste load allocation for this activity and source. Dischargers are required to comply with any applicable TMDL requirements in this General Permit (see Attachment H and Section I.W of this Fact Sheet for additional TMDL applicability information).

Responsible Dischargers that are assigned TMDL-related numeric action levels or numeric effluent limitations are required to collect samples in accordance with the non-visible sampling requirements in Attachments D and E and compare all analytical results to the applicable numeric action levels or numeric effluent limitations specified in Attachment H of this General Permit.

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I.P. Training Qualifications and Requirements

To ensure that the preparation, implementation, and oversight of the SWPPP is sufficient for effective pollution prevention, the Qualified SWPPP Developer and

97 State Water Resources Control Board, RWQCB Directory, <https://www.waterboards.ca.gov/about_us/contact_us/rwqcbs_directory.html> [as of May 20, 2021]

98 State Water Resources Control Board, Plans and Policies, <https://www.waterboards.ca.gov/plans_policies/> [as of May 20, 2021]

99 U.S. EPA Website <https://www.epa.gov/> [as of May 20, 2021]

Qualified SWPPP Practitioner are responsible for creating, revising, overseeing, and implementing the SWPPP.

I.Q. Sampling, Monitoring, Reporting, and Record Keeping for Linear Underground and Overhead Projects and Traditional Construction Monitoring Requirements

I.Q.1. Introduction

This General Permit requires visual monitoring at all sites and effluent water quality monitoring at all Risk Level 2 and 3 and linear underground and overhead project Type 2 and 3 sites (also some Type 1 and Risk Level 1 sites). Receiving water monitoring may be required by the Regional Water Board at some Risk Level 3 and Type 3 sites as described below. All sites are required to submit the sampling results, inspection records, and Annual Reports specified in this General Permit, which contain specific documentation collected over the reporting period.

I.Q.2. Visual

Visual inspections of stormwater discharges, dewatering discharges, authorized non-stormwater discharges, and unauthorized non-stormwater discharges are required for all sites subject to this General Permit. This General Permit requires dischargers to implement corrective actions at the site to address deficiencies identified during the visual monitoring.

All dischargers are required to conduct visual inspections as described in General Permit Attachment's D or E. This General Permit requires the discharger to visually-inspect a site for indications of pollutants in stormwater runoff, erosion, failed BMPs, and improper BMP installation. Each discharge location and drainage area require an inspection for the presence of (or indications such as erosion, pollutant mobilization, or other potential threat to human health and the environment) unauthorized and authorized non-stormwater discharges and their sources. Dischargers must conduct pre, during, and post-precipitation event inspections to: (1) identify adequacy of BMP design, implementation, and effectiveness, (2) identify any necessary additional BMPs, and (3) revise the SWPPP on-site and in SMARTS accordingly. Dischargers must maintain on-site records of all visual observations, personnel performing the observations, observation dates, weather conditions, locations observed, and corrective actions taken in response to the observations.

This General Permit requires visual monitoring for precipitation events which result in the discharge of water from the site. Sites are encouraged to use size catch basins to retain the first flush of a precipitation event, which is consistent with BAT and BCT. The size of a precipitation event cannot be predicted so an adequate trigger for a pre-precipitation event visual inspection is 50 percent or greater probability of producing precipitation based on the National Weather Service Forecast Office of the National Oceanic and Atmospheric Administration (NOAA).

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General Permit Attachments D and E list the minimum criteria for an inspection checklist. Dischargers may develop their own inspection forms or may use a Water Board-developed form if one is available.

Some visual inspections may be delegated by the QSP to an individual that has received training as described in the discharger's site personnel roles and responsibilities in this General Permit.

I.Q.3. Non-Visible Pollutant Monitoring

This General Permit requires that all dischargers develop a sampling and analysis strategy for monitoring pollutants that are not visually detectable in stormwater. Some monitoring may be delegated by the QSP to an individual that has received training as described in the discharger's site personnel roles and responsibilities in this General Permit. Monitoring for non-visible pollutants is required at any site when the exposure of construction materials occurs and where a potential discharge can cause or contribute to an exceedance of a water quality objective or standard. Pollutants found in materials used in large quantities at construction sites throughout California and exposed throughout the rainy season, such as cement, fly ash, and other recycled materials or by-products of combustion are a significant concern for construction discharges. The water quality standards that apply to these materials will depend on their composition. Some of the more common stormwater pollutants from construction activity are not CTR pollutants. Examples of construction non-visible pollutants[100] include, but are not limited to, bacteria and viruses, fertilizers or nutrients, herbicides, greases; lubricants; oils, metals, synthetic chemicals, and pesticides.

a. Bacteria and Viruses

Bacteria and viruses are common stormwater contaminants. Construction site sources include, but are not limited to, animal excrement, waste management, and sanitary facilities. High levels of indicator bacteria in stormwater have led to the closure of beaches, lakes, and rivers to contact recreation such as swimming.

b. Fertilizers and Nutrients

Fertilizers and nutrients are common stormwater contaminants. Construction site sources include, but are not limited to, landscape fertilization, these nutrients can result in excessive vegetation or algae growth in natural water systems or be toxic to aquatic life, resulting in impaired beneficial uses.

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100 Section P.1.b adapted from the CASQA Construction BMP Handbook, p. 1-6, 1-7, 1-10.

c. Herbicides and Pesticides

Herbicides and pesticides (including fungicides, rodenticides, and insecticides) have been detected repeatedly in stormwater at levels toxic to certain organisms, even when pesticides have been applied in accordance with label instructions. The washing of construction equipment used for noxious weed removal can also spread invasive species[101]. Construction site sources include, but are not limited to, noxious weed and vegetation management, pest control, and vector control.

d. Greases, Lubricants, Oils

Greases, lubricants, and oils include a wide array of hydrocarbon compounds and other synthetic materials, some of which are toxic to aquatic organisms at low concentrations. Construction site sources include, but are not limited to, equipment spills and leaks from delivery; storage; use, equipment and vehicle drive train; suspension; hydraulic system cleaning and maintenance, material storage, on-site staff parking areas, paving operations, and waste disposal.

e. Metals

Metals including, but not limited to, cadmium, copper, chromium, iron, lead, nickel, and zinc are commonly found in stormwater and are of concern because some are toxic to aquatic organisms, can bioaccumulate (accumulate to toxic levels in aquatic animals such as fish), and have the potential to contaminate drinking water supplies. Construction site sources, include but are not limited to, naturally occurring metals associated with earth disturbance, gravel materials, construction materials, equipment maintenance, equipment fluids, paving operations, and welding and fabrication activities.

f. Synthetic Chemicals

Synthetic chemicals may be found in stormwater and can be toxic in low concentrations. Construction site sources include, but are not limited to, batteries, construction materials, chemical fire suppression, chemical storage, equipment and vehicle fueling (also related to Section I.Q.3.d above), paving operations, and waste management.

Many of the above sources can result in construction stormwater discharges containing pollutants. For example, high pH can result from improperly maintained treatment systems, cement and gypsum, and wash waters. Salts can also be found

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101 Center for Environmental Excellence by AASHTO, Chapter 4 Construction Practices for Environmental Stewardship 4.11 Vegetation Management in Construction (2019) <https://www.epa.gov/sites/default/files/2015-11/documents/25-25-4-_fr.pdf> [as of April 28, 2022]

in construction site materials, including but not limited to, fertilizers and nutrients, herbicides and pesticides, soil treatments, and surfactants.

Some of these constituents are subject to Statewide Policy, water quality control plans, or Attachment H's TMDL Water Quality Based Effluent Limitations. Dischargers are encouraged to discuss these standards with Water Board staff and other stormwater quality professionals.

The most effective way to reduce or minimize the non-visible sampling and analysis requirements is to reduce and manage exposure of construction materials, activities, and equipment to precipitation and/or stormwater runoff. Materials or activities that are not exposed do not have the potential to enter stormwater runoff, and therefore receiving water sampling is not required. Preventing contact between stormwater and construction materials, equipment, or materials or preventing the runoff are the most important BMPs at any construction site.

Preventing or eliminating the exposure of pollutants at construction sites is not always possible. Some materials and activities, such as soil amendments or earth moving equipment, are designed to be used in a manner that will result in exposure to stormwater. In these cases, it is important to make sure that these materials and activities are applied and operated according to the manufacturer's instructions and at a time when pollutants are less likely to be washed away. Other construction materials can be exposed when storage, waste disposal, or the application of the material is done in a manner not protective of water quality. Representative sampling is required for these situations, unless there is capture and containment of all stormwater that has been exposed. In cases where construction materials may be exposed to stormwater, but the stormwater is contained and is not allowed to run off the site, sampling will only be required when inspections show that the containment failed or is breached, resulting in potential exposure or discharge to receiving waters.

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This General Permit requires the discharger to conduct a pollutant source assessment to develop a list of potential pollutants based on a review of site or project potential sources, which will include construction activities, equipment materials, soil amendments, soil treatments, and historic contamination at the site. The discharger must review existing environmental and real estate documentation to determine the potential pollutants that could be present on the construction site as a result of past land use activities.

Possible reference materials for previously existing pollution and past land uses:

i. Environmental Assessments;

ii. Initial Studies;

iii. Phase 1 Assessments prepared for property transfers;

iv. Environmental Impact Reports or Environmental Impact Statements prepared under the requirements of the National Environmental Policy Act or the California Environmental Quality Act; and

v. Available soil chemical analysis results.

I.Q.4. Effluent Monitoring

Consistent with 40 Code of Federal Regulations, § 122.44, all linear underground and overhead project Type 2 and 3 and Risk Level 2 and 3 dischargers (also some Type 1 and Risk Level 1 sites) must perform sampling and analysis of effluent discharges to characterize discharges associated with construction activity from the entire area disturbed by the project. Dischargers must collect samples of stored or contained stormwater that is discharged during or subsequent to a precipitation event. Some monitoring may be delegated by the QSP to an individual that has received training as described in the discharger's site personnel roles and responsibilities in this General Permit.

This General Permit requires stormwater runoff sampling for pH and turbidity for all Risk Level 2, linear underground and overhead project Type 2, Risk Level 3, and linear underground and overhead project Type 3 sites. Sampling is required at all locations where stormwater, dewatering, and/or authorized non-stormwater associated with construction activity is discharged off-site or enters any on-site waters of the United States (e.g., a creek running through a site). Dischargers are required to identify all sampling locations in the SWPPP and site map and sampling is only required when a discharge occurs. Attachments D and E of this General Permit require specific sampling requirements and non-sampling justifications.

This General Permit contains sampling, analysis, and monitoring requirements for pH and turbidity. Sampling of non-visible pollutants identified in the pollutant source assessment is required when the materials or chemicals have the potential to cause or contribute to an exceedance of a water quality standard (e.g., BMP breach, failure, malfunction, or leak or spill observed during a visual inspection).

This General Permit requires that all dischargers maintain a paper or electronic copy of all required records for three years from the date generated or date submitted, whichever is later. These records shall be available at the site until a Notice of Termination is approved by the Regional Water Board. Linear underground and overhead project documents may be retained in a crew member's vehicle and made available upon request.

a. Traditional Construction Monitoring Requirements

A summary of the monitoring and reporting requirements is found in Table 7 and 8 below. Dischargers are also required to report and retain records in accordance with this General Permit's Order and Attachment D requirements.

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Table 7 – Required Monitoring Elements for Risk Levels

Risk Level	Visual	Non-Visible Pollutants	Effluent	Receiving Water
Risk Level 1	Required	As needed	Where applicable	Not required
Risk Level 2	Required	As needed	pH, turbidity	Not required
Risk Level 3	Required	As needed	pH, turbidity	For discharges directly to surface waters if: 1) pH or turbidity Receiving Water Monitoring Trigger exceeded; and 2) upon Regional Water Board direction

Table 8 – Stormwater Effluent Monitoring Requirements by Risk Level

Level	Frequency	Effluent Monitoring
Risk Level 1	When non-visible pollutants, identified in the SWPPP or otherwise known to be on site, may be discharged due to failure to implement BMPs, a container spill or leak, or a BMP breach, failure, or malfunction.	Applicable non-visible pollutant parameters
Risk Level 2 and 3	When non-visible pollutants, identified in the SWPPP or otherwise known to be on site, may be discharged due to failure to implement BMPs, a container spill or leak, or a BMP breach, failure, or malfunction.	Applicable non-visible pollutant parameters
Risk Level 2 and 3	One sample per discharge location per day of a precipitation event characterizing discharges associated with construction activity from the entire project disturbed area.	pH, turbidity, and applicable non-visible pollutant parameters

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b. Linear Construction Monitoring and Sampling Requirements

Attachment E establishes minimum monitoring and reporting requirements for all linear underground and overhead projects and the specific monitoring requirements depending on project complexity and risk to water quality. The monitoring requirements for Type 1 linear underground and overhead project are less than Type 2 and 3 projects because Type 1 projects have a lower potential to impact water quality.

This General Permit requires the discharger to prepare a monitoring program prior to the start of construction and immediately implement the program at the start of construction for linear underground and overhead projects. The monitoring program must be implemented at the appropriate level to protect water quality at all times throughout the life of the project. Dischargers are also

required to report and retain records in accordance with this General Permit's Order and Attachment E requirements.

Table 9 – Require Monitoring Elements for Linear Underground and Overhead Project Types

Risk Level	Visual	Non-Visible Pollutants	Effluent	Receiving Water
Type 1	Required	As needed	Where applicable	Not required
Type 2	Required	As needed	pH, turbidity	Not required
Type 3	Required	As needed	pH, turbidity	For discharges directly to receiving waters if: 1) pH or turbidity Receiving Water Monitoring Trigger exceed; and 2) upon Regional Water Board direction.

i. Type 1 Linear Underground and Overhead Project Monitoring Requirements

This General Permit requires a discharger to conduct daily visual inspections of Type 1 linear underground and overhead projects during site operating hours while construction activities are occurring. Inspections are to be conducted by qualified personnel and can be conducted in conjunction with other daily activities. Inspections are conducted to ensure the BMPs are adequate, maintained, and in place at the end of the construction day. The required SWPPP revisions (when appropriate) should be based on the results of the daily inspections and reported so the site General Permit implementation is currently reflected. Inspections can be discontinued in non-active construction areas where soil disturbing activities have been completed and final stabilization has been achieved (e.g., trench has been paved, substructures have been installed, and successful final vegetative cover or other stabilization criteria have been met).

A discharger implementing a monitoring program for Type 1 linear underground and overhead projects is required to implement temporary and permanent stabilization BMPs after active construction is completed. Inspection activities are required until adequate permanent stabilization has been established and will continue in areas where re-vegetation is chosen until minimum vegetative coverage has been established. The required photograph requirements taken during site inspections are for verification of requirements and are submitted through SMARTS.

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This General Permit also includes the minimum criteria required for an inspection checklist. Dischargers may develop their own inspection forms or may contact the Water Board for an inspection form, if one is available.

ii. Type 2 and 3 Linear Underground and Overhead Project Monitoring Requirements

This General Permit requires the discharger to conduct daily visual inspections of Type 2 and 3 linear underground and overhead projects during site operating hours when construction activities are occurring. Inspections are to be conducted by qualified personnel and can be in conjunction with other daily activities.

All Type 2 and 3 linear underground and overhead project dischargers are required to conduct inspections by qualified personnel of the construction site during site operating hours prior to all anticipated precipitation events, during, and after actual precipitation events. The discharger is required to conduct inspections during site operating hours for each 24-hour period during extended precipitation events. Inspections can be discontinued in non-active construction areas where soil disturbing activities have been completed and final stabilization has been achieved (e.g., trench has been paved, substructures installed, and successful vegetative cover or other stabilization criteria have been met).

The goals of these inspections are: (1) to identify areas contributing to a stormwater discharge; (2) to evaluate whether measures to reduce pollutant loadings identified in the SWPPP are adequate, properly installed, and functioning in accordance with the terms of this General Permit; and (3) to determine if additional control practices or corrective maintenance activities are needed. Equipment, materials, and workers must be available for rapid response to failures and emergencies. All corrective BMP maintenance is to be performed as soon as possible, depending upon worker safety.

All dischargers are required to develop and implement a monitoring program for inspecting Type 2 and 3 linear underground and overhead projects that require temporary and permanent stabilization BMPs after active construction is completed. The inspections will be conducted to ensure the BMPs are adequate and maintained and will continue until adequate permanent stabilization has been established in areas where revegetation is chosen until minimum vegetative coverage has been established.

This General Permit also requires a log of inspections conducted before, during, and after the precipitation event(s) be maintained in the SWPPP. The log will provide the date and time of the inspection and who conducted the inspection. Photographs must be taken during site inspections and submitted through SMARTS.

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This General Permit's Attachment E lists minimum criteria required for an inspection checklist. Dischargers may develop their own inspection forms or may contact the Water Board for an inspection form, if one is available.

iii. Sampling Requirements for all Linear Underground and Overhead Project Types

Linear underground and overhead projects are subject to sampling and analysis requirements for visible pollutants (i.e., sedimentation/siltation, turbidity, pH) and for non-visible pollutants.

1) Sampling for non-visible pollutants is required for Type 1, 2, and 3 linear underground and overhead projects.

Non-visible pollutant monitoring is required for pollutants associated with construction sites and activities that (1) are not visually detectable in stormwater discharges, (2) are known or should be known to occur on the construction site, and (3) could cause or contribute to an exceedance of water quality standard or objectives in the site's receiving waters. Sample collection for non-visible pollutants are required only: (1) during a precipitation event when pollutants associated with construction activities may be discharged with stormwater runoff in the event of a BMP breach, failure, malfunction, leak or spill, (2) identified in the discharge and is from construction activities and/or materials, and (3) when the discharger has failed to adequately clean the area of material and pollutants. Failure to implement appropriate BMPs will trigger the same sampling requirements as those required in (1) above, or when the discharger has failed to implement appropriate BMPs prior to the next precipitation event.

It is not anticipated that all linear underground and overhead projects will be required to collect samples for pollutants not visually detected in runoff due to the nature and character of the construction site and activities as previously described in this Fact Sheet. Most linear underground and overhead projects are constructed in urban areas with public access (e.g., existing roadways, road shoulders, parking areas, etc.). This raises a concern regarding the potential contribution of pollutants from vehicle use and/or from normal activities of the public (e.g., vehicle washing, landscape fertilization, pest spraying, etc.) in runoff from the project site. Since the dischargers are not necessarily the landowners of the project area and are not able to control the presence of these pollutants in the stormwater that runs through their projects, it is not the intent of this General Permit to require dischargers to sample for these pollutants unless they are generated specifically from the linear underground and overhead project materials and/or activities. This General Permit does not require the discharger to sample for these

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types of pollutants except where the discharger has on-site materials or activities containing or specifically generating these pollutants and when the conditions described above occur.

2) Regional Water Board-Required Additional Monitoring Requirements

The Regional Water Board can require, in writing, additional monitoring requirements in this General Permit under Clean Water Act authority and specific authorities listed in this General Permit's Order and Attachment E. Additional monitoring requirements include, but are not limited to, requirements specified in an enforcement order, additional sampling parameters, frequency, methods, practices, and/or reporting (for stormwater, dewatering, and/or non-stormwater) based upon site-specific analysis.

3) Receiving Water Monitoring

This General Permit protects the receiving water's beneficial uses from construction site pollutants. Risk Level 3 and linear underground and overhead project Type 3 site discharges subject to the receiving water monitoring triggers with: (1) receiving water monitoring trigger exceedances defined in this General Permit, (2) discharges are directly into receiving waters, and (3) the discharger is directed to monitor by the Water Boards are required to monitor the upstream and downstream receiving water(s) for turbidity and pH (if applicable). These requirements were modified to make it clear that they do not apply to discharges to an MS4 that later discharges into a surface water.

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Table 10 – Receiving Water Monitoring Requirements

Level or Type	Receiving Water Monitoring Triggers
Risk Level 1 and Linear Underground and Overhead Project Type 1	Not applicable/required
Risk Level 2 and Linear Underground and Overhead Project Type 2	Not applicable/required
Risk Level 3 and Linear Underground and Overhead Project Type 3	For discharges directly to surface waters if: 1) pH or turbidity Receiving Water Monitoring Trigger exceeded; and 2) upon Regional Water Board direction.

I.Q.5. Reporting Requirements

a. Reporting Numeric Effluent Limitation Violations (Water Quality Based Corrective Actions or Numeric Effluent Limitation Violation Report)

All discharges subject to TMDL-specific numeric effluent limitations requirements must electronically submit all precipitation event sampling results

to the Water Boards through SMARTS no later than 10 days after receiving the field analysis results or analytical laboratory results. The purpose of the electronic certification and submittal of the Water Quality Based Corrective Actions or Numeric Effluent Limitation Violation Report is to: (1) allow public access to General Permit-required reporting, (2) document the discharger's compliance actions, and (3) notify the Water Boards of the exceedance so that they can determine whether any follow-up (e.g., inspection, enforcement) is necessary to bring the site into compliance.

Responsible Dischargers with a water quality exceedance are in violation of this General Permit and must additionally submit the Water Quality Based Corrective Actions or Numeric Effluent Limitation Violation Report containing:

- The analytical method(s), reporting unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit are to be reported as "less than the method detection limit or <MDL");
- The date, place, and time of sampling;
- Any visual observation (inspections);
- Any measurements, including precipitation; and
- A description of the current BMPs associated with the effluent sample that exceeded the numeric effluent limitation and any proposed corrective actions taken.

b. Reporting Numeric Action Level Exceedances (Numeric Action Level Exceedance Report)

All Risk Level 2 and 3 and linear underground and overhead project Type 2 and 3 dischargers must electronically submit all precipitation event sampling results for the pH and turbidity numeric action levels, through SMARTS, no later than 10 days after the conclusion of the precipitation event. All Risk Level 2 and 3 and linear underground and overhead project Type 2 and 3 dischargers must electronically submit all precipitation event sampling results for TMDL-related numeric action levels, through SMARTS, no later than 10 days after receiving the analytical laboratory results. In the event that any effluent sample exceeds an applicable numeric action level, a Regional Water Board or its delegate may request (in writing) that the Risk Level 2 or 3 and linear underground and overhead project Type 2 or 3 dischargers submit and certify a Numeric Action Level Exceedance Report, through SMARTS, within 30 days of receiving the written request.

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In the event that an applicable pH, turbidity or TMDL-specific numeric action level has been exceeded, the required reporting contains:

- The analytical method(s), reporting unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit are to be reported as "less than the method detection limit or <MDL");
- The date, place, and time of sampling;
- Any visual observation (inspections);
- Any measurements, including precipitation; and
- A description of the current BMPs associated with the effluent sample that exceeded the numeric action level and any proposed corrective actions taken.

c. Analytical Sample Reporting

All dischargers are required to certify and submit analytical monitoring results in SMARTS using the monitoring ad hoc report (a separate ad hoc monitoring report is needed for each precipitation event). Electronically certified and submitted sampling and analysis results are required to include an upload of the original laboratory reports and chain of custody forms.

d. Annual Report

All dischargers must prepare and electronically certify and submit an Annual Report no later than September 1st of each year using SMARTS including the specified information described in this General Permit's Order and any additional necessary site compliance information such as a summary of all corrective actions taken during the reporting period, or the identification of any compliance activities or corrective actions that were not implemented.

I.Q.6. Record Keeping

According to 40 Code of Federal Regulations §§ 122.21(p) and 122.41(j), the discharger is required to retain paper or electronic copies of all records required by this General Permit for a period of at least three years from the date generated or the date submitted to the Water Boards. A discharger must retain records for a period beyond three years if directed by Regional Water Board.

I.R. Risk Determination

A site Risk Level calculation is the estimated potential for sediment transport and risk to the receiving water. This General Permit contains calculation requirements to determine a project's Risk Level 1, 2 and 3, or a linear underground and overhead projects Type 1, 2, and 3 as described below. Construction industry-accepted sediment erosion models and Water Boards-provided or site-specific receiving water

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risk models are used to determine pre-construction project and post-construction project risks for all the project's construction phases.

I.R.1. Traditional Construction Projects

a. Overall Risk Determination

There are two major requirements related to site planning and risk determination in this General Permit. The project's overall risk is broken up into two elements: (1) project sediment risk (the relative amount of sediment that can be discharged, given the project and location details) and (2) receiving water risk (the risk sediment discharges pose to the receiving waters).

i. Project Sediment Risk:

The Revised Universal Soil Loss Equation (RUSLE) is used to calculate watershed sediment risk. The RUSLE was originally developed to calculate sheet and rill erosion rate in tons/acre/project duration. It is consistent with the original intent of the RUSLE to not introduce a project size threshold to develop risk categories expressed on tons/project duration.

The Regional Board has the authority to question any aspect of the sediment risk calculation, including the R factor used in determining Watershed Sediment Risk. The RUSLE2 computer program can also be used to calculate the R factor and in many cases yields more accurate values than those generated from the EPA Erosivity Calculator.

Project Sediment Risk is determined by multiplying the R, K, and LS factors from the Revised Universal Soil Loss Equation (RUSLE) to obtain an estimate of project-related bare ground soil loss expressed in tons/acre. The RUSLE equation is as follows:

$$A = (R)(K)(LS)(C)(P)$$

Where:

A is the rate of sheet and rill erosion

R is the rainfall-runoff erosivity factor

K is the soil erodibility factor

LS is the length-slope factor

C is the cover factor (erosion controls)

P is the management operations and support practices (sediment controls)

The C and P factors are given values of 1.0 to simulate bare ground conditions.

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There is a map option[102] and a manual calculation option for determining soil loss. For the map option, the R factor for the project is calculated using the online calculator.[103] To determine soil loss in tons per acre, the discharger multiplies the R factor times the value for K times LS.

For the manual calculation option, the R factor for the project is calculated using the online calculator. The K and LS factors are determined using Attachment D.1.

Soil loss of less than 15 tons/acre is considered **low** sediment risk.

Soil loss between 15 and 75 tons/acre is **medium** sediment risk.

Soil loss over 75 tons/acre is considered **high** sediment risk.

The soil loss values and risk categories were obtained from mean and standard deviation RKLS values from the U.S. EPA EMAP program. High risk is the mean RKLS value plus two standard deviations. Low risk is the mean RKLS value minus two standard deviations

ii. Receiving Water Risk:

Receiving water risk is based on whether a project drains to a water body or watershed that is sediment-sensitive. A sediment-sensitive water body or watershed is either:

- On the most recent 303(d) list for water bodies impaired for sediment; or
- Has the beneficial uses of COLD, SPAWN, and MIGRATORY.

A project that meets at least one of the two criteria has a high receiving water risk. A list of sediment-sensitive water bodies is posted on the State Water Board's website[104] and included in Attachment D.1. An interactive map of 303(d) listed water bodies in California is available on the State Board's website.[105]

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102 The guidance Geographic Information System Risk maps will be provided electronically on the State Water Board's website prior to the effective date of this General Permit.

103 U.S. EPA, Rainfall Erosivity Factor Calculator for Small Construction Sites, <https://lew.epa.gov/> [as of May 20, 2021]

104 State Water Board, Surface Water Quality Assessment Webpage, <https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/#impaired> [as of May 20, 2021]

105 State Water Board, 303(d) Integrated Report <https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2020_2022_integrated_report.html> [as of June 21, 2022]

b. Effluent Standards

All dischargers are subject to the narrative effluent limitations specified in the General Permit. The narrative effluent limitations require stormwater discharges associated with construction activity to meet all applicable provisions of §§ 301 and 402 of the Clean Water Act. These provisions require controls of pollutant discharges that utilize BAT and BCT to reduce pollutants and any more stringent controls necessary to meet water quality standards.

Risk Level 2 dischargers that pose a medium risk to water quality are subject to numeric action levels for pH and turbidity, which were established based on best professional judgement. Risk Level 3 dischargers that pose a high risk to water quality are subject to numeric action levels for pH and turbidity, which were established based on best professional judgement.

c. Effluent Monitoring

Effluent monitoring is required for Risk Level 2 and 3 and linear underground and overhead project Type 2 and 3 project sites as described in the Order, Attachments D and E. Effluent monitoring results must be certified and submitted electronically through SMARTS.

d. Good Housekeeping

Proper handling and management of construction materials can help minimize threats to water quality. The discharger must consider good housekeeping measures for construction materials, waste management, vehicle storage and maintenance, landscape materials, and potential pollutant sources. Examples include conducting an inventory of products used, implementing proper storage and containment, and properly cleaning all leaks from equipment and vehicles.

e. Non-Stormwater Management

This General Permit's Order defines the specific authorized non-stormwater discharges allowed and necessary prohibitions on other non-stormwater discharges. Non-stormwater discharges directly connected to receiving waters or the storm drain system have the potential to negatively impact water quality. The discharger must implement measures to control all non-stormwater discharges (e.g., properly washing vehicles or equipment in contained areas, cleaning streets, and minimizing irrigation runoff) during construction, and construction-associated dewatering activities. This General Permit includes specific construction site dewatering provisions designed to eliminate or reduce pollutant impacts on receiving waters from these activities.

f. Erosion Control

The best way to minimize the risk associated with erosion and sedimentation during construction is to disturb as little of the land surface as possible by fitting the development to the terrain. Little grading is necessary and erosion potential

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is lower when development is tailored to natural land contours. Other effective erosion control measures include preserving existing vegetation where feasible, limiting disturbance, timing disturbances around reduced precipitation conditions, and stabilizing and re-vegetating disturbed areas as soon as possible after grading or construction activities. Particular attention must be paid to large, mass-graded sites where the potential for soil exposure to the erosive effects of rainfall, snow melt, and wind is great and where there is potential for significant sediment discharge from the site to surface waters. Temporary soil stabilization can be the single most important factor in reducing construction site erosion. The discharger is required to consider measures such as: covering disturbed areas with mulch, temporary seeding and vegetation, soil stabilizers, non-toxic binders, fiber rolls or blankets, and permanent seeding. These erosion control measures are only examples of what should be considered and do not preclude the use of new or innovative approaches currently available or being developed. Erosion control BMPs should be the primary means of preventing stormwater contamination, and sediment control techniques should be used to capture any soil that becomes eroded.[106]

Areas that convey stormwater run-off are required to be appropriately armored against in channel erosion. A California licensed professional engineer may need to provide system design and/or calculations to control the erosion in the conveyance of stormwater (drainage channels).

g. Establishing Vegetation

Planting a site may be necessary during the construction phase to establish vegetation prior to termination of the project. Planted vegetation should match surrounding pre-existing native vegetation. It is expected that local climatic conditions, timing, soil types, soil compaction, topography, and nutrients need to be evaluated to ensure seed germination and plant establishment. The employment of healthy soil[107] principles may provide additional guidance on vegetative establishment in dry conditions (e.g., in arid and semi-arid climates dischargers should apply seed prior to the application of mulch). Dischargers may consider the advantages and limitations for each project area in regard to seed planting method (direct drilling, broadcasting, and/or hydraulic applications).

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106 U.S. EPA, Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites (May 2007), <https://www3.epa.gov/npdes/pubs/sw_swppp_guide.pdf> [as of May 20, 2021]

107 California Department of Food and Agriculture, Healthy Soils Program Website <https://www.cdfa.ca.gov/oefi/healthysoils/> [as of May 20, 2021]

h. Sediment Control

Sediment control BMPs should be the secondary means of preventing polluted stormwater discharges. Sediment control techniques recover some of the soil that becomes eroded when erosion control techniques are ineffective. This General Permit requires dischargers to consider perimeter control measures such as installing silt fences or placing straw wattles below slopes. These sediment control measures are only examples of what should be considered and should not preclude new or innovative approaches currently available or being developed.

Additional requirements for the effective implementation of erosion and sediment controls year-round are imposed on Risk Level and Type 2 and 3 dischargers because these sites pose a higher risk to water quality. This General Permit authorizes the Regional Water Boards to require Risk Level 3 and linear underground and overhead project Type 3 dischargers to implement additional site-specific sediment control requirements when the implementation of other erosion or sediment controls are found to be inadequately protecting the receiving waters.

This General Permit requires the use of wildlife friendly BMPs that minimize wildlife entrapment and sets a prohibition on the discharge of trash and debris. Wildlife entrapment can be minimized by providing the means for wildlife to escape dig sites that are deeper than one meter and storing materials, like netting and tubing, in locations that are inaccessible to wildlife. Dischargers should use biodegradable wattles containing no plastic that can remain on a site when possible. Wattles containing plastic netting (including plastic specified as photo-degradable) become “trash” in the environment and/or a trap for wildlife. These are also considered “construction materials and waste” and must be disposed of properly per this General Permit.

i. Run-on and Runoff Control

Inappropriate management of run-on and runoff can result in excessive physical and chemical impacts to receiving waters from sediment and increased flows. The discharger is required to manage all run-on and runoff from a project site. Examples include installing berms and other temporary run-on and runoff diversions. Dischargers are responsible for commingled run-on (onto the site or within the site) from areas not related to the site’s construction activities and the pollutants contained in the commingled discharge.

j. Snow and Ice melt

Construction sites that are affected by snow and ice conditions shall use BMPs to avoid sedimentation migration and erosion from occurring.

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k. Inspection, Maintenance, and Repair

All measures must be periodically inspected, maintained, and repaired to ensure that receiving water quality is protected. Frequent inspections coupled with thorough documentation and timely repair is necessary to ensure that all measures are functioning as intended.

I.R.2. Linear Underground and Overhead Projects

a. Linear Underground and Overhead Risk Determination

Linear underground and overhead projects vary in complexity and water quality concerns based on project type. This General Permit has varying application requirements based on the project's risk to water quality. Factors that lead to the characterization of the project include location, sediment risk, and receiving water risk.

Linear projects are separated into project types based on the location and complexity of a project area or project segment/section area. Linear underground and overhead projects have been categorized into three project types as follows:

i. Type 1 linear projects are those construction projects where:

1) 70 percent or more of the construction activity occurs on a paved surface and where areas disturbed during construction will be returned to preconstruction conditions or equivalent protection established at the end of the construction activities for the day; or

2) Greater than 30 percent of construction activities occur within the non-paved shoulders or land immediately adjacent to paved surfaces, or where construction occurs on unpaved improved roads, including their shoulders or land immediately adjacent to them where:

a) Areas disturbed during construction will be returned to pre-construction conditions or equivalent protection established at the end of the construction activities for the day to minimize the potential for erosion and sediment deposition; and

b) Areas where established vegetation was disturbed during construction will be stabilized and re-vegetated by the end of project. When required, adequate temporary stabilization BMPs will be installed and maintained until vegetation is established to meet minimum cover final stabilization requirements established in this General Permit.

Type 1 linear underground and overhead projects typically do not have a high potential to impact stormwater quality because: (1) these construction activities are not typically conducted during precipitation events, (2) these

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projects are normally constructed over a short period of time[108], minimizing the duration that pollutants could potentially be exposed to precipitation, and (3) disturbed soils such as those from trench excavation are required to be hauled away, backfilled into the trench, and/or covered (e.g., metal plates, pavement, plastic covers over spoil piles) at the end of the site operating hours for the construction day.

Type 1 linear underground and overhead projects are determined during the risk assessment found in Attachment E.1 to be 1) low sediment risk and low receiving water risk; 2) low sediment risk and medium receiving water risk; and 3) medium sediment risk and low receiving water risk.

This General Permit requires the discharger to ensure a SWPPP is developed by a Qualified SWPPP Developer for these construction activities that is specific to linear underground and overhead project type, location, and characteristics.

ii. Type 2 Linear Underground and Overhead Projects

Type 2 linear underground and overhead projects are determined to have a combination of High, Medium, and Low project sediment risk along with High, Medium, and Low receiving water risk. Type 2 linear underground and overhead projects are typically constructed over a short period of time like Type 1 projects, however, Type 2 projects have a higher potential to impact water quality because they:

1) Typically occur outside urban or developed areas;
2) Have larger areas of soil disturbance that are not closed or restored at the end of the day;
3) May have on-site stockpiles of soil, spoil, and other materials;
4) Cross or occur in close proximity to a wide variety of sensitive resources that may include, but are not limited to, steep topography and/or water bodies; and
5) Have larger areas of disturbed soils that may be exposed for a longer time interval before final stabilization, cleanup, and/or reclamation occurs.

This General Permit requires the discharger to ensure a SWPPP is developed by a Qualified SWPPP Developer and is implemented these site-specific construction activities for the project type, location, and characteristics.

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108 Short period of time refers to a project duration of weeks to months, but typically less than one year in duration.

iii. Type 3 Linear Underground and Overhead Projects

Type 3 linear underground and overhead projects are determined to have a combination of High and Medium project sediment risk along with High and Medium receiving water risk. Similar to Type 2 projects, Type 3 projects have a higher potential to impact water quality because they:

1) Typically occur outside urban and developed areas;
2) Have larger areas of soil disturbance that are not closed or restored at the end of the day;
3) May have on-site stockpiles of soil, spoil, and other materials;
4) Cross or occur in close proximity to a wide variety of sensitive resources that may include, but are not limited to, steep topography and/or water bodies; and
5) Have larger areas of disturbed soils that may be exposed for a longer time interval before final stabilization, cleanup, and/or reclamation occurs.

This General Permit requires the discharger to ensure a SWPPP is developed by a Qualified SWPPP Developer and is implemented these site-specific construction activities for the project type, location, and characteristics.

b. Programmatic Permitting for Linear Underground and Overhead Projects

i. Regional Programmatic Permit Coverage:

Regionwide programmatic permit coverage allows a linear underground and overhead project discharger to submit one Notice of Intent for multiple non-contiguous linear underground and overhead projects, if the projects: 1) are located within one Regional Water Board office boundary, 2) are a group of projects of similar scopes with common construction activities, and 3) have the same Legally Responsible Person. Thus, a linear underground and overhead project discharger may be issued a single waste discharge identification number (WDID) for each group of projects (e.g., electrical transmission, gas line transmission, wildfire prevention, etc.) that meet the above criteria.

A linear underground and overhead project discharger opting to obtain regional programmatic permit coverage must submit a common SWPPP with its application that addresses all the construction activities and pollutant sources relevant to the project scope. The linear underground and overhead project discharger must also submit a Linear Construction Activity Notification in SMARTS for each individual project with site-specific information per Attachment E.2, allowing the Regional Water Board to

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enforce individual projects per the requirements in this Order. Each project will share a WDID and will be assigned a WDID extension to identify and track the individual projects. Each individual project is terminated separately through a Linear Construction Termination Notification in SMARTS, pending Regional Water Board staff approval.

Regionwide programmatic permitting was requested by utility stakeholders to improve administrative efficiency related to construction stormwater permitting, in part by training contractors on a common SWPPP that can be implemented on a site-specific basis.

ii. Statewide Programmatic Permit Coverage for Mandated Installation of Broadband Utilities:

Statewide programmatic permit coverage allows a linear underground and overhead project discharger responsible in deploying construction activities to comply with sections 7 – 13 of the Governor's Executive Order N-73-20, or amendments thereto, to submit one Notice of Intent for multiple non-contiguous linear broadband underground and overhead projects, if the projects:

- Are located throughout two or more Regional Water Board boundaries,
- Are a group of projects for broadband utility installation outside of a construction project otherwise regulated by this General Order, and
- Have the same Legally Responsible Person.

The discharger will be issued a single waste discharge identification number (WDID) for each group of projects that meet the above criteria.

A linear underground and overhead project discharger opting to obtain statewide programmatic permit coverage must submit:

- A common SWPPP with its application that addresses all the construction activities and pollutant sources relevant to the project scope, and
- Project-specific additional pollution prevention measures to the common SWPPP, as applicable,

A Linear Construction Activity Notification in SMARTS for each individual project with site-specific and project-specific information per Attachment E.2.

Each individual project will share a common WDID and will be assigned a unique WDID extension corresponding to the Regional Water Board

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jurisdiction and the project risk level. The unique project-specific extension number will allow the corresponding Regional Water Board to enforce individual projects per the requirements in this Order specific to the project risk level. Each individual project is terminated separately through the Linear Construction Termination Notification process in SMARTS, and the Notice of Termination process of this General Permit.

Statewide programmatic permitting was requested by the California Department of Transportation, the statewide agency primarily responsible for the construction activity that fully deploys Governor's Executive Order N-73-20, or amendments thereto, by July 2026. To improve internal project efficiencies to comply with the executive order by July 2026, the Department has reduced its standard design-to-construction procedures from several months to two-to-three weeks. The permit enrollment administrative efficiency provided by statewide programmatic permitting will allow the Department, and other linear project dischargers deploying the executive order, to obtain permit coverage for individual projects, compatible with shortened design-to construction timelines, without submitting repetitive application information for similar projects within different regions.

c. Linear Underground and Overhead Project Effluent Standards

All linear underground and overhead projects are subject to the narrative effluent limitations specified in the General Permit. Type 2 and Type 3 projects are subject to technology-based numeric action levels for pH and turbidity.

d. Linear Underground and Overhead Project Good Housekeeping

Improper use and handling of construction materials could potentially cause a threat to water quality. All linear underground and overhead project dischargers must comply with a minimum set of Good Housekeeping measures specified in Attachment E of this General Permit to ensure proper construction material site management.

e. Linear Underground and Overhead Project Non-Stormwater Management

All linear underground and overhead project dischargers must comply with the Non-Stormwater Management measures specified in Attachment E and Order of this General Permit in order to ensure control of all non-stormwater discharges during construction.

f. Linear Underground and Overhead Project Erosion Control

This General Permit requires all linear underground and overhead projects dischargers to implement effective wind erosion control measures, and soil cover for inactive areas. Type 3 linear underground and overhead projects

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posing a higher risk to water quality are additionally required to ensure the post-construction soil loss is equivalent to or less than the pre-construction levels.

g. Linear Underground and Overhead Project Sediment Control

All linear underground and overhead project dischargers must comply with the general Sediment Control measures specified in Attachment E or this General Permit in order to ensure control and containment of all sediment discharges. Additional requirements for sediment controls are imposed on Type 2 and 3 linear underground and overhead projects due to their higher risk to water quality.

h. Linear Underground and Overhead Projects Run-on and Runoff Control

Discharges originating outside of a project's perimeter and flowing onto the property can adversely affect the quantity and quality of discharges originating from a project site. All linear underground and overhead projects must comply with the run-on and runoff control measures specified in Attachment E of this General Permit in order to ensure proper management of run-on and runoff. Due to the lower risk of impacting water quality, Type 1 linear underground and overhead projects are not required to implement run-on and runoff controls unless deemed necessary by the discharger. Examples include installing berms and other temporary run-on and runoff diversions. Dischargers are responsible for commingled run-on (onto the site or within the site) from areas not related to the site's construction activities and the pollutants contained in the commingled discharge.

i. Linear Underground and Overhead Projects Inspection, Maintenance, and Repair

Proper inspection, maintenance, and repair activities are important to ensure the effectiveness of on-site measures to protect receiving water quality. All linear underground and overhead project dischargers are required to comply with the inspection, maintenance, and repair requirements specified in Attachment E of this General Permit in order to ensure that these activities are adequately performed.

I.S. Active Treatment System[109] Requirements

I.S.1. General

The requirements in Attachment F only apply when an active treatment system is implemented on a project site. An active treatment system is defined in this General Permit as "a controlled treatment system that employs chemical

109 An active treatment system is a treatment system that employs chemical coagulation, chemical flocculation, or electrocoagulation in order to reduce turbidity caused by fine suspended sediment.

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coagulation, chemical flocculation, or electrocoagulation to aid in the reduction of turbidity caused by fine suspended sediment."

The active treatment system is designed to treat and reduce the turbidity level of construction stormwater discharges to meet water quality standards and the requirements of this General Permit at the flowrate required in the Active Treatment System Plans. The specified active treatment system flowrate is designed to dewater the basin within 10 hours. Typical equipment and materials may include pumps, manifolds, flocculants, filter bags, sand media filters, and other items designed to remove suspended materials from construction stormwater. The discharger is required to ensure the operators of the active treatment system are adequately trained and the appropriate professional designed the Active Treatment System Plan.

Bonded-fiber matrices, hydromulches, spray tackifiers, and other land-applied products used to stabilize soil are not considered active treatment nor passive treatment, but rather a form of erosion control.

The use of an active treatment system may be necessary when: (1) traditional erosion and sediment controls do not effectively control accelerated erosion at the construction site, (2) the construction site stormwater discharges may cause or contribute to an exceedance of a water quality standard, and/or (3) site constraints (e.g., very steep or long slope lengths,[110] clay, highly erosive soils) inhibit the ability to construct a correctly sized sediment basin.

The active treatment system industry in California started in the mid-1990s and is relatively young, however many developers use these systems to treat stormwater discharges from their construction sites. The active treatment system requirements in this General Permit are based on those in place for small wastewater treatment systems, active treatment system regulations from the Central Valley Regional Water Quality Control Board (September 2005 memorandum "2005/2006 Rainy Season – Monitoring Requirements for Stormwater Treatment Systems that Utilize Chemical Additives to Enhance Sedimentation"), the State of Washington's Department of Ecology Construction Stormwater Program, and recent advances in technology and knowledge of coagulant performance and aquatic safety.

The effective design of an active treatment system requires a detailed survey and analysis of site conditions. Properly planned and implemented active treatment system provide high-quality discharges and prevent significant impacts to surface water quality, even under extreme environmental conditions.

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110 Pitt, R., S. Clark, and D. Lake. 2006. Construction Site Erosion and Sediment Controls: Planning, Design, and Performance. DEStech Publications. Lancaster, PA. 370pp.

These systems can be very effective in reducing the sediment in stormwater runoff, but the systems that use additives or polymers to enhance sedimentation also pose a potential risk to water quality (e.g., inadequate training, operational failure, equipment failure, additive or polymer release). The State Water Board is concerned about the potential acute and chronic impacts that the polymers and other chemical additives may have on fish and aquatic organisms if released in sufficient quantities or concentrations. The literature and anecdotal evidence of polymer releases causing aquatic toxicity in California supports this concern.[111] For example, cationic polymers have been shown to bind with the negatively charged gills of fish, resulting in mechanical suffocation.[112] This General Permit establishes residual polymer monitoring and toxicity testing requirements due to the potential toxicity impacts associated with the release of additives or polymers into receiving waters from construction sites utilizing an active treatment system.

The primary treatment process in an active treatment system is coagulation and flocculation. Active treatment system operate on the principle that the added coagulant is bound to suspended sediment, forming floc, which is gravitationally settled in tanks or a basin, or removed by sand filters. A typical installation utilizes an injection pump upstream from the clarifier tank, basin, or sand filters, which is electronically metered to both flow rate and suspended solids level of the influent, assuring a constant dose. The coagulant mixes and reacts with the influent, forming a dense floc. The floc may be removed by gravitational setting in a clarifier tank or basin, or by filtration. Water from the clarifier tank, basin, or sand filters may be routed through cartridge(s) and/or bag filters for final polishing. Vendor-specific systems use various methods of dose control, sediment and floc removal, filtration, etc., that are detailed in project-specific documentation. The particular coagulant and/or flocculant used for a given project is determined based on the site water chemistry because the coagulants are specific in their reactions with various types of sediments. Appropriate selection of dosage must be carefully matched to the characteristics of each site. This General Permit prohibits the operation of an active treatment system or the batch storage to cause an uncontrolled release of chemicals used during the flocculation, coagulation, and/or filtration process for suspended sediment particles because these chemicals can negatively affect the beneficial uses of receiving waters and/or degrade water quality (e.g., acute and chronic toxicity).

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Active treatment system are operated in two differing modes, batch or flow-through. Batch treatment can be defined as Pump-Treat-Hold-Test-Release. In

111 RomØen, K., B. Thu, and Ø. Evensen. 2002. Immersion delivery of plasmid DNA II. A study of the potentials of chitosan-based delivery system in rainbow trout (Onchorhynchus mykiss) fry. Journal of Controlled Release 85: 215-225.

112 Bullock, G., V. Blazer, S. Tsukuda, and S. Summerfelt. 2000. Toxicity of acidified chitosan for cultured rainbow trout (Oncorhynchus mykiss). Aquaculture 185:273-280.

batch treatment, water is held in a basin or tank, and is not discharged until treatment is complete. Batch treatment involves holding or recirculating the treated water in a holding basin or tank(s) until treatment is complete or the basin or storage tank(s) is full. In flow-through treatment, water is pumped into the active treatment system directly from the runoff collection system or stormwater holding pond, where it is treated and filtered as it flows through the system and is then directly discharged. “Flow-through treatment” is also referred to as “continuous treatment.”

I.S.2. Active Treatment System Effluent Standards

This General Permit requires discharges of stormwater associated with construction activity that undergo active treatment to comply with special operational and effluent limitations to ensure that these discharges do not adversely affect the beneficial uses of the receiving waters or cause degradation of their water quality and establishes numeric effluent limitations for discharges from construction sites that utilize an active treatment system. An exceedance of the active treatment system numeric effluent limitation constitutes a General Permit violation. These systems lend themselves to technology-based numeric effluent limitations for turbidity and pH because of their known reliable treatment. Advanced systems have been in use in some form since the mid-1990s. An active treatment system is considered reliable, can consistently produce a discharge of less than 10 NTU, and has been used successfully at many sites in several states since 1995 to reduce turbidity to very low levels.

This General Permit contains “compliance storm (precipitation) event” exceptions from the technology-based numeric effluent limitations for active treatment system discharges. The rationale is that technology-based requirements are developed assuming a certain design storm (precipitation) event. The industry-standard active treatment system design storm is 10-year, 24-hour (as stated in Attachment F of this General Permit), so the compliance precipitation event has been established as the 10-year, 24-hour event as well to provide consistency.

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I.T. Passive Treatment Requirements

The U.S. EPA’s 2022 NPDES General Permit for Stormwater Discharges from Construction Activities[113] requires the regulation of any chemically enhanced stormwater treatment. Chemically enhanced treatments are split into two categories: active treatment systems and passive treatment technologies (passive treatment including chemical and products). More information regarding active treatment systems can be found in the Section I.S above.

113 U.S. EPA, 2022 NPDES General Permit for Discharges from Construction Activities (January 11, 2017), <https://www.epa.gov/npdes/2022-construction-general-permit-cgp#2022cgp>

Passive treatment chemicals and products bind fine soil particles together through chemical ionic processes allowing heavy particles to settle out of solution without a fully mechanical or engineered system. Passive treatment technologies in the construction industry typically use coagulants and flocculants such as polyacrylamides (PAMs).

Construction site operators and dischargers regularly use passive treatment to reduce the turbidity levels in construction stormwater runoff. The construction industry uses passive treatment technologies because these products are a cost-effective method of reducing turbidity for compliance with turbidity numeric action levels in this General Permit, especially compared to active treatment systems. Examples of chemically enhanced BMPs used to meet General Permit turbidity numeric action levels are blocks, wattles, or water-applied products.

Many other industries use passive treatment chemicals in water purification, food production, and other industrial applications to reduce the turbidity and concentration of other pollutants in the discharge.

The types of flocculants and coagulants that can be included in passive treatment for this General Permit are non-ionic and anionic flocculants and coagulants. Cationic flocculants and coagulants can be used in an active treatment system and are regulated in Attachment F. Research on applicable chemical information indicates that many commonly used flocculants are toxic or contain toxic components, and when discharged to surface water have the potential to impact aquatic life and other beneficial uses.

Many types of passive treatment chemicals are toxic to fish and other aquatic organisms. Cationic PAM-based flocculants are acutely toxic to aquatic species in small quantities and are neurotoxins. Other flocculant products such as anionic PAM-based flocculants are chronically toxic to aquatic species in large quantities.

The California Stormwater Quality Association developed past guidance[114] on PAMs used in passive treatment technologies and included specific limitations to the use of soil binders containing PAMs:

1) Do not use PAMs on a slope that flows into a waterbody without passing through a sediment trap, sediment basin, or other sediment controls (e.g., wattles, silt fences, gravel bags);
2) The specific PAM copolymer formulation must be anionic. Cationic PAMs should not be used in any application because of known aquatic toxicity problems. Only the highest drinking water grade PAM certified for compliance with ANSI/NSF Standard 60 for drinking water treatment, should be used for soil applications;

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114 CASQA Construction BMP Handbook, 2015.

3) PAMs designated for erosion and sediment control should be “water soluble” or “linear” or “non-cross linked”; and

4) PAMs should not be used as a stand-alone BMP to protect against water-based erosion. When combined with mulch, its effectiveness increases dramatically.

Additionally, a low-turbidity discharge from a passive treatment chemical application site does not always correspond to low levels of solids in the discharge and/or an improvement in water quality downstream because:

1) Turbidity monitoring solely measures small size solids suspended in the water; turbidity monitoring does not measure particle size, weight, or bed load of sediment from flocculated solids leaving a site; and

2) Passive treatment chemicals discharged either by aerial deposition or through stormwater runoff contributes similar toxicity threats to aquatic life.

This General Permit regulates the use of passive treatment in Attachment G, however, specific technology-based and/or water quality-based numeric effluent limitations have not been implemented in this General Permit for passive treatment chemicals because there is currently no consistent and proven data to determine the level of toxicity and water quality impacts that negatively outweighs the economic benefit associated with the use of passive treatment technologies.

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I.U. Post-Construction Requirements

I.U.1. General

Past practices for new and redevelopment construction activities have resulted in modified natural watershed and stream processes. This is caused by altering the terrain, modifying the vegetation and soil characteristics, introducing impervious surfaces such as pavement and buildings, increasing drainage density through pipes and channels, and altering the condition of stream channels through straightening, deepening, and armoring. These changes result in a drainage system where sediment transport capacity is increased, and sediment supply is decreased. A receiving channel’s response is dependent on dominant channel materials and its stage of adjustment. Construction activity can lead to impairment of beneficial uses in two main ways:

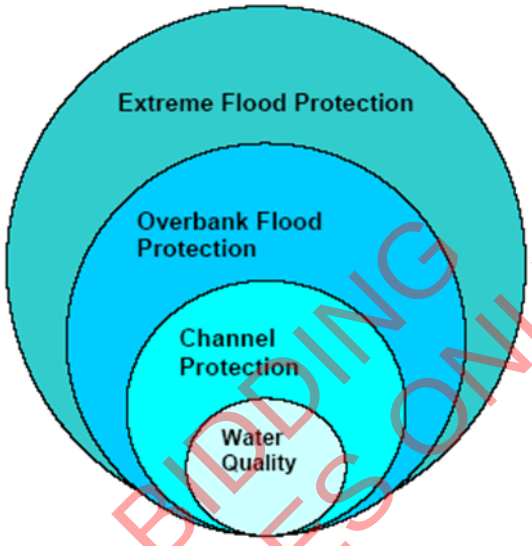
a. Stormwater discharges occurring during the actual construction process can negatively affect the chemical, biological, and physical properties of downstream receiving waters. The most likely pollutant is sediment due to the disturbance of the landscape, however pH and other non-visible pollutants are also of great concern; and

b. The finished project may result in significant modification of the site’s long-term response to precipitation after most construction activities are completed at a construction site. New development and redevelopment projects have almost

always resulted in permanent post-construction water quality impacts because more precipitation ends up as runoff and less precipitation is intercepted, evaporated, and infiltrated.

An effective stormwater management strategy must address the full suite of precipitation events (water quality, channel protection, overbank flood protection, extreme flood protection) (Figure 1).

Figure 1 – Suite of Precipitation Events



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The post-construction stormwater performance standards in this General Permit specifically address water quality and channel protection events. Overbank flood protection and extreme flood protection events are traditionally dealt with in local drainage and flood protection ordinances. However, measures in this General Permit to address water quality and channel protection also reduce overbank and extreme flooding impacts. This General Permit aims to match post-construction runoff to pre-construction runoff for the 85th percentile, 24-hour storm event, which reduces the risk of impact to the receiving water's channel morphology and provides some water quality protection.

Projects are exempt from the post-construction requirements in this General Permit if located within an area subject to post-construction standards of an active Phase I or II MS4 permit with approved post-construction requirements or if they are linear underground and overhead projects.

I.U.2. Water Quality

This General Permit requires dischargers to replicate the pre-project runoff water balance (defined as the amount of rainfall that ends up as runoff) for the smallest storms up to the 85th percentile storm event, or the smallest storm event that generates runoff, whichever is larger. Contemporary stormwater management

generally routes these flows directly to the drainage system, increasing pollutant loads and potentially causing adverse effects on receiving waters. These smaller water quality events happen much more frequently than larger events and generate much higher pollutant loads on an annual basis. There are other adverse hydrological impacts that result from not designing according to the site's pre-construction water balance. In Maryland, Klein[115] noted that baseflow decreases as the extent of urbanization increases. Ferguson and Suckling[116] noted a similar relation in watersheds in Georgia. On Long Island, Spinello and Simmons[117] noted substantial decreases in base flow in intensely urbanized watersheds.

This General Permit emphasizes runoff reduction through on-site stormwater reuse, interception, evapotranspiration, and infiltration through non-structural controls and conservation design measures (e.g., downspout disconnection, soil quality preservation/enhancement, interceptor trees). Employing these measures close to the source of runoff generation is the easiest and most cost-effective way to comply with the pre-construction water balance standard. Using low-tech runoff reduction techniques close to the source is consistent with a number of recommendations in the literature.[118] In many cases, BMPs implemented close to the source of runoff generation cost less than end-of the pipe measures.[119] Dischargers are given the option of using the SMARTS Post-Construction Calculator to calculate the required runoff volume or a watershed process-based, continuous simulation model such as the EPA's Stormwater Management Model (SWMM) or Hydrologic Simulation Program Fortran. Such methods used by the

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115 Klein 1979 as cited in Delaware Department of Natural Resources (DDNR). 2004. Green Technology: The Delaware Urban Runoff Management Approach. Dover, DE, p. 117.

116 Ferguson and Suckling 1990 as cited Delaware Department of Natural Resources (DDNR). 2004. Green Technology: The Delaware Urban Runoff Management Approach. Dover, DE, p. 117.

117 Center for Watershed Protection (CWP). 2000. The Practice of Watershed Protection: Techniques for protecting our nation's streams, lakes, rivers, and estuaries. Ellicott City, MD, p. 741.

118 Bay Area Stormwater Management Agencies Association (BASMAA). 1997. Start at the Source: Residential Site Planning and Design Guidance Manual for Stormwater Quality Protection. Palo Alto, CA;
McCuen, R.H. 2003 Smart Growth: hydrologic perspective. Journal of Professional Issues in Engineering Education and Practice. Vol (129), p. 151-154;
Moglen, G.E. and S. Kim.2007. Impervious imperviousness-are threshold-based policies a good idea? Journal of the American Planning Association, Vol 73 No.2. p. 161-171.

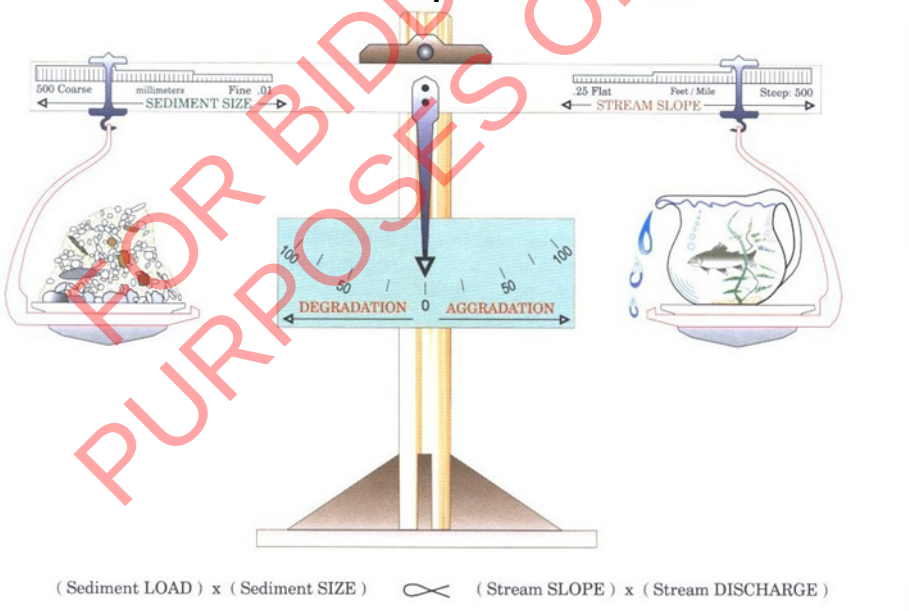
119 Delaware Department of Natural Resources (DDNR). 2004. Green technology: The Delaware Urban Runoff Management Approach. Dover, DE, p. 117.

discharger will be reviewed by the Regional Water Board upon Notice of Termination application.

I.U.3. Channel Protection

A basic understanding of fluvial geomorphic concepts is necessary to address channel protection. A dominant paradigm in fluvial geomorphology holds that streams adjust their channel dimensions (width and depth) in response to long-term changes in sediment supply and bank full discharge (1.5 to 2-year recurrence interval). The bank full stage corresponds to the discharge at which channel maintenance is the most effective (the discharge at which the moving sediment, forming or removing bars, forming or changing bends and meanders, and generally doing work that results in the average morphologic characteristics of channels).[120] Lane (1955 as cited in Rosgen 1996[121]) showed the generalized relationship between sediment load, sediment size, stream discharge, and stream slope (Figure 2). A change in any one of these variables sets up a series of mutual adjustments in the companion variables with a resulting direct change in the physical characteristics of the stream channel.

Figure 2 – Schematic of the Lane Relationship[122]



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Stream slope multiplied by stream discharge (the right side of the scale) is essentially an approximation of stream power, a unifying concept in fluvial

120 Dunne, T and L.B. Leopold. 1978. Water in Environmental Planning. San Francisco W.H. Freeman and Company.

121 Rosgen. D.L. 1996. Applied River Morphology. Pagosa Springs. Wildland Hydrology.

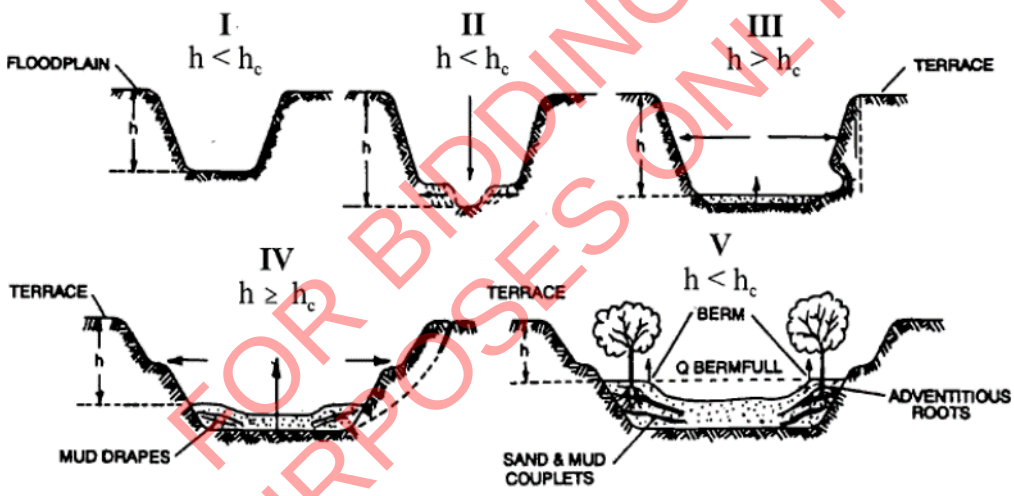
122 After Lane (1955) as cited in Rosgen (1996).

geomorphology (Bledsoe 1999). Urbanization generally increases stream power and affects the resisting forces in a channel (sediment load and sediment size represented on the left side of the scale).

Sediment loads can increase from 2 to 40,000 times over pre-construction levels during construction.[123] Most of this sediment is delivered to stream channels during large, episodic rain events.[124] This increased sediment load leads to an initial aggradation phase where stream depths may decrease as sediment fills the channel, leading to a decrease in channel capacity and increase in flooding and overbank deposition. A degradation phase initiates after construction is completed.

Schumm et. al (1984) developed a channel evolution model that describes the series of adjustments from initial downcutting, to widening, to establishing new floodplains at lower elevations (Figure 3).

Figure 3 – Channel Changes Associated with Urbanization[125]



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Channel incision (Stage II) and widening (Stages III and to a lesser degree, Stage IV) are due to a number of fundamental changes on the landscape. Connected impervious areas and compaction of pervious surfaces increase the frequency and

123 Goldman S.J., K. Jackson, and T.A. Bursztynsky. 1986. Erosion and Sediment Control Handbook. McGraw Hill. San Francisco.

124 Wolman 1967 as cited in Paul, M.P. and J.L. Meyer. 2001. Streams in the Urban Landscape. Annu. Rev. Ecol. Syst. 32, p. 333-365.

125 After incised Channel Evolution Sequence in Schumm et. al 1984.

volume of bank full discharges.[126] Increased drainage density (miles of stream length per square mile of watershed) also negatively impacts receiving stream channels.[127] Increased drainage density and hydraulic efficiency leads to an increase in the frequency and volume of bank full discharges because the time of concentration is shortened. Flows from engineered pipes and channels are also often "sediment starved" and seek to replenish their sediment supply from the channel.

Encroachment of stream channels can also lead to an increase in stream slope, which leads to an increase in stream power. In addition, watershed sediment loads and sediment size (with size generally represented as the median bed and bank particle size, or d_{50}) decrease during urbanization.[128] This means that even if pre- and post-development stream power is the same, more erosion will occur in the post-development stage because the smaller particles are less resistant (provided they are non-cohesive).

As shown in Stages II and III, the channel deepens and widens to accommodate the increased stream power[129] and decrease in sediment load and sediment size. Channels may actually narrow as entrained sediment from incision is deposited laterally in the channel. After incised channels begin to migrate laterally (Stage III), bank erosion begins, which leads to general channel widening.[130] At this point, a majority of the sediment that leaves a drainage area comes from within the channel, as opposed to the background and construction related hillslope

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126 Booth, D.B. and C.R. Jackson. 1997. Urbanization of Aquatic Systems: Degradation Thresholds, Stormwater Detection, and the Limits of Mitigation. Journal of the American Water Resources Association Vol. 33, No. 5, p. 1077-1089.

127 May, C.W. 1998. Cumulative effects of urbanization on small streams in the Puget Sound Lowland ecoregion. Conference proceedings from Puget Sound Research '98 held March 12, 13 1998 in Seattle, WA;
Santa Clara Valley Urban Runoff Pollution Prevention Program. 2002. Hydromodification Management Plan Literature Review, p. 80.

128 Finkenbine, J.K., D.S. Atwater, and D.S. Mavinic. 2000. Stream health after urbanization. J. Am. Water Resour. Assoc. 36, p. 1149-60;
Pizzuto. J.E. W.S. Hession, and M. McBride. 2000. Comparing gravel-bed rivers in paired urban rural catchments of southeastern Pennsylvania. Geology 28, p. 79-82.

129 Hammer 1973 as cited in Delaware Department of Natural Resources (DDNR). 2004. Green Technology: The Delaware Urban Runoff Management Approach. Dover, DE, p.117;
Booth, D.B. 1990. Stream Channel Incision Following Drainage Basin Urbanization. Water Resour. Bull. 26, p. 407-417.

130 Trimble, S.W. 1997. Contribution of Stream Channel Erosion to Sediment Yield from an Urbanizing Watershed. Science: Vol. 278 (21), p. 1442-1444.

contribution. Stage IV is characterized by more aggradation and localized bank instability. Stage V represents a new quasi-equilibrium channel morphology in balance with the new flow and sediment supply regime. In other words, stream power is in balance with sediment load and sediment size.

The magnitude of the channel morphology changes discussed above varies along a stream network as well as with the age of development, slope, geology (sand-bedded channels may cycle through the evolution sequence in a matter of decades whereas clay-dominated channels may take much longer), watershed sediment load and size, type of urbanization, and land use history. It is also dependent on a channel's stage in the channel evolution sequence when urbanization occurs. Management strategies must take into account a channel's stage of adjustment and account for future changes in the evolution of channel form (Stein and Zaleski 2005).[131]

Traditional structural water quality BMPs (e.g., detention basins and other devices used to store volumes of runoff) unless they are highly engineered to provide adequate flow duration control, do not adequately protect receiving waters from accelerated channel bed and bank erosion, do not address post-development increases in runoff volume, and do not mitigate the decline in benthic macroinvertebrate communities in the receiving waters,[132] and suggest that structural BMPs are not as effective in protecting aquatic communities as a continuous riparian buffer of native vegetation. This is supported by the findings of Zucker and White,[133] where instream biological metrics were correlated with the extent of forested buffers.

This General Permit requires dischargers to maintain pre-development drainage densities and times of concentration in order to protect channels and encourages dischargers to implement setbacks to reduce channel slope and velocity changes that can lead to aquatic habitat degradation.

There are a number of other approaches for modeling fluvial systems, including statistical and physical models and simpler stream power models.[134] The use of

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131 Stein, E.S. and S. Zaleski. 2005. Managing runoff to protect natural stream: the latest developments on investigation and management of hydromodification in California. Southern California Coastal Water Research Project Technical Report 475, p. 26.

132 Horner, R.R. 2006. Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices (LID) for the San Diego Region.

133 Delaware Department of Natural Resources (DDNR). 2004. Green Technology: The Delaware Urban Runoff Management Approach. Dover, DE, p. 117.

134 Finlayson, D.P. and D.R. Montgomery. 2003. Modeling large-scale fluvial erosion in geographic information systems. Geomorphology (53), p.147-164.

these models in California is described in Stein and Zaleski (2005).[135] Rather than require a specific one-size-fits-all modeling method in this permit, the State Water Board intends to develop a stream power and channel evolution model-based framework to assess channels and develop a hierarchy of suitable analysis methods and management strategies. In time, this framework may become a State Water Board water quality control policy.

I.U.4. General Permit Linkage to Overbank and Extreme Flood Protection

Site design BMPs (e.g., rooftop and impervious disconnection, vegetated swales, setbacks and buffers) filter and settle out pollutants and provide for more infiltration than is possible for traditional centralized structural BMPs placed at the site's lowest point. They provide source control for runoff and lead to a reduction in pollutant loads. When implemented, they also help reduce the magnitude and volume of larger, less frequent storm events (e.g., 10-yr, 24-hour storm and larger), thereby reducing the need for expensive flood control infrastructure. Non-structural BMPs can also be a landscape amenity, instead of a large, isolated structure requiring substantial area for ancillary access, buffering, screening, and maintenance facilities. The multiple benefits of using non-structural benefits will be critically important as the state's population increases and imposes strains upon our existing water resources.

Maintaining predevelopment drainage densities and times of concentration will help reduce post-development peak flows and volumes in areas not covered under a municipal permit. The most effective way to preserve drainage areas and maximize time of concentration is to implement landform grading, incorporate site design BMPs and implement distributed structural BMPs (e.g., bioretention cells, rain gardens, rain cisterns).

This General Permit requires dischargers to maximize sheet flow and use an "open" drainage system (e.g., swales, ditches, vegetated channels) for concentrated flows to meet the drainage density requirement. Sheet flow areas, swales, ditches, and vegetated channels are not considered streams for the purpose of calculating drainage density.

This General Permit requires dischargers to use recommended methods in the applicable local hydraulic design or flood control manual to meet the time of concentration requirements. The discharger is required to use the time of concentration calculation method contained in the Natural Resources Conservation Service's Technical Release 55: Urban Hydrology for Small Watersheds if a recommended method does not exist.

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135 Stein, E.S. and S. Zaleski. 2005. Managing runoff to protect natural stream: the latest developments on investigation and management of hydromodification in California. Southern California Coastal Water Research Project Technical Report 475, p. 26.

Dischargers with active General Permit coverage are required to use the post-construction calculator in SMARTS or the approved post-construction standards of an applicable Phase I or Phase II Municipal Separate Storm Sewer System (MS4) NPDES permit to report compliance with this General Permit post-construction requirements.

This General Permit requires the discharger to utilize the post-construction calculator in SMARTS if: (1) a construction project (other than a linear and underground and overhead project that is not subject to this General Permit's post-construction requirements) was or is approved by the local municipality prior to the municipality having post-construction standards adopted pursuant to a Phase I or Phase II MS4 permit or (2) the project was not subject to the post-construction standards of a Phase I or Phase II entity.

I.V. Stormwater Pollution Prevention Plans (SWPPPs)

U.S. EPA's Construction General Permit requires that qualified personnel conduct inspections and defines qualified personnel as "a person knowledgeable in the principles and practice of erosion and sediment controls who possesses the skills to assess conditions at the construction site that could impact stormwater quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of stormwater discharges from the construction activity."[136] U.S. EPA also suggests that qualified personnel prepare SWPPPs and points to numerous states that require certified professionals to be on construction sites at all times.

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This General Permit requires that all SWPPPs be site-specific and are written, amended, and certified by a Qualified SWPPP Developer and includes the information needed to demonstrate compliance with all requirements of this General Permit to ensure that water quality is being protected. SWPPP development and updates are required to be based on actual site conditions and maintain continued compliance with requirements of this General Permit. This General Permit also requires the current SWPPP be kept on-site, made available for review, and uploaded through SMARTS.

Although the QSD can change over the life of a project, a QSD, representing the discharger, is expected to make necessary corrections and amendments to the original SWPPP throughout the life of the project to ensure the site's compliance plan with this General Permit is documented and current. Similarly, a QSP, representing the discharger, must also oversee the implementation of the site-specific BMPs described in the corresponding site-specific SWPPP.

136 U.S. EPA, Developing Your Stormwater Pollution Prevention Plan (May 2017), <https://www3.epa.gov/npdes/pubs/sw_swppp_guide.pdf> [as of May 20, 2021]

The local municipality cannot enforce General Permit requirements; this is done by the Regional Water Board inspectors. The local municipality is typically responsible for ensuring compliance with local stormwater ordinance which prohibits sediment and other pollutants from entering the MS4, and with a local grading ordinance that typically requires an erosion and sediment control plan (typically a sheet in the construction plan set) for projects with a grading permit. The local municipality may have a condition in their MS4 stormwater permit requiring the agency to check that certain items are included in the SWPPP. This does not constitute approval of the SWPPP, and the review is typically conducted prior to issuing a grading permit.

The previous versions of the General Permit required development and implementation of a SWPPP as the primary compliance mechanism. The SWPPP has three major objectives: (1) to help identify the sources of sediment and other pollutants that affect the quality of stormwater discharges, (2) to describe and ensure the implementation of site-specific BMPs to reduce or eliminate sediment and other pollutants in stormwater and non-stormwater discharges, and (3) to convey a plan to restore erosion protection and site hydrology post-construction. The SWPPP must include site-specific BMPs that address source control, pollutant control, and treatment control.

This General Permit shifts some of the previous measures into specific General Permit requirements, each individually enforceable as a General Permit term. This General Permit emphasizes the use of appropriately selected, correctly installed, and maintained site-specific BMPs. This approach provides the flexibility necessary to establish BMPs that can effectively control sources of pollutants during changing construction activities. These specific requirements also improve both the clarity and the enforceability of the General Permit so that the dischargers understand, and the Water Boards and public can determine whether the discharges comply with this General Permit's requirements.

The SWPPP must be implemented at the appropriate level to protect water quality at all times throughout all of the construction project phases. The SWPPP must remain on the site during construction activities, commencing with the initial mobilization and ending with the termination of coverage under the General Permit. Linear underground and overhead project dischargers are required to make the SWPPP available at the construction site during site operating hours while construction is occurring and shall be made available upon request by a State, Federal, or Municipal inspector. A site-specific SWPPP may be kept in electronic format. All maps and figures must be printed, hard copy, full size, and available on the construction site. Current copies of the BMPs and maps and drawings will be left with the field crew and the original SWPPP shall be made available via a request by radio or telephone when the original SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site. The SWPPP shall be available from the SWPPP contact listed in the Permit Registration Documents until stabilization is achieved even when construction activities are complete.

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A SWPPP must be appropriate for the type and complexity of a project and will be developed and implemented to address site-specific conditions. Some projects may have similarities or complexities, yet each project is unique in its progressive state that requires specific description and selection of BMPs needed to address all possible generated pollutants.

I.W. Total Maximum Daily Loads (TMDLs)

I.W.1. Introduction

Total Maximum Daily Loads (TMDLs) are regulatory tools that provide the maximum amount of a pollutant from potential sources in the watershed that a water body can receive while attaining water quality standards. A TMDL is defined as the sum of the allowable loads of a single pollutant from all contributing point sources (waste load allocations) and non-point sources (load allocations), plus the contribution from background sources. (40 Code of Federal Regulations § 130.2, subd. (i).) Discharges covered by this General Permit are considered to be point source discharges, and therefore must comply with effluent limitations that are "consistent with the assumptions and requirements of any available waste load allocation for the discharge prepared by the State and approved by EPA pursuant to 40 Code of Federal Regulations section 130.7." (40 Code of Federal Regulations § 122.44, subd. (d)(1)(vii).) In addition, Water Code § 13263, subdivision (a), requires that waste discharge requirements implement relevant water quality control plans. Many TMDLs in existing water quality control plans include both waste load allocation and implementation requirements. Attachment H of this General Permit lists the watersheds with U.S. EPA-approved and U.S. EPA-established TMDLs that include TMDL requirements for dischargers covered by this General Permit.

TMDLs are adopted through a separate U.S. EPA and Regional Water Board public process. The previous permit included a list of potentially applicable TMDLs, and this list has been refined in this General Permit through consultation with the Regional Water Boards.

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I.W.2. General Permit Implementation Requirements

Water Board staff evaluated and developed the following information in the development of the Attachment H implementation requirements:

- TMDL-specific requirements including implementation timelines, additional monitoring and reporting requirements, compliance determination language regarding compliance with numeric action levels, applicable TMDL-specific effluent limitations, and reporting requirements consistent with the applicable TMDL(s);

- Information regarding this General Permit's TMDL-specific requirements, timelines, and deliverables consistent with the assumptions and requirements of applicable waste load allocation(s) to implement the TMDL(s);
- Information regarding the implementation of BMPs (as applicable) to comply with applicable waste load allocations;
- Concentration-based monitoring requirements and information regarding the required determination of compliance for numeric effluent limitations through concentration-based compliance monitoring, corresponding calculation methodology, and reporting; and
- Compliance deadlines, based on TMDL implementation schedules, were set for Responsible Dischargers to comply with the TMDL-specific requirements on, and after, the provided date. TMDLs that lacked or surpassed the implementation schedules prior to this issuance of this General Permit were assigned compliance deadlines set for the effective date of this General Permit.

I.W.3. TMDL Evaluation Steps

The State Water Board used the following process to evaluate and translate each TMDL in Attachment H:

- Step 1: Determined whether the TMDL applies to construction stormwater discharges and authorized non-stormwater discharges regulated by this General Permit (discharges regulated by this General Permit);
- Step 2: Identified the specific TMDL requirements that are applicable to discharges regulated by this General Permit;
- Step 3: Translated the TMDL requirements into TMDL-specific General Permit requirements, numeric action levels, or numeric effluent limitations;
- Step 4: Determined a compliance schedule that corresponds with the compliance date of the TMDL;
- Step 5: Developed monitoring and reporting requirements to determine compliance with waste load allocations;
- Step 6: Identified the existing General Permit requirements applicable to each constituent identified in the TMDLs, and evaluated if additional TMDL-specific requirements were required to implement the TMDL for discharges regulated by this General Permit; and
- Step 7: Provided explanation regarding how the State Water Board translated each TMDL into specific requirements.

I.W.4. Applicability

Responsible Dischargers are: (1) dischargers with Notice of Intent coverage under this General Permit who discharge stormwater associated with construction

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activities and authorized-non-stormwater discharges, (2) either directly or through a municipal separate storm sewer system (MS4) to impaired water bodies identified in a U.S. EPA approved TMDL with an assigned waste load allocation to construction stormwater sources listed in Attachment H, and (3) have identified one or more TMDL-pollutants in the site's construction stormwater discharges.

Responsible Dischargers must comply with applicable TMDL-specific General Permit requirements in Attachment H and all other applicable provisions of this General Permit.

Each TMDL-specific permit requirement listed in Attachment H (Table H-2 for TMDL-specific General Permit Requirements) provides the specific translation and required actions for Responsible Dischargers as discussed below. Table H-2 includes the specific watershed, water body, or water bodies and additional tributaries to ensure Responsible Dischargers know which Table H-2 TMDL requirement applies depending on the receiving water body(ies) of the site.

This General Permit's pH and turbidity numeric action levels continue to apply in addition to the TMDL-specific requirements in Table H-2. The measurement of compliance with the TMDL-specific requirements, whether TMDL-related numeric action levels or numeric effluent limits, is defined in the Glossary (Attachment B). Stormwater discharges are intermittent in nature and many of the Attachment H TMDL waste load allocations are translated to numeric action levels or numeric effluent limitations for protection against acute impacts to beneficial uses in the receiving waters.

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The following are examples to assist Responsible Dischargers in determining which water bodies are subject to the TMDLs in Table H-2:

- Watershed example: If the "Impaired Water Body/Watershed" column states "Napa River Watershed," the TMDL and its requirements are applicable to dischargers discharging directly or through an MS4 into water bodies within the Napa River Watershed.
- River and tributaries (Watershed) example: If the "Impaired Water Body/ Watershed" column states "Los Angeles River and Tributaries," this TMDL and its requirements are applicable to the dischargers discharging directly or through an MS4 into the Los Angeles River watershed.
- Lagoon example: If the "Impaired Water Body/ Watershed" column states "Colorado Lagoon," this TMDL and its requirements are applicable to dischargers discharging directly or through an MS4 into the Colorado Lagoon.

TMDL-specific General Permit requirements do not apply to dischargers with a waiver or dischargers that meet the Notice of Non-Applicability (NONA) criteria.

There are currently few environmental laboratory accredited program (ELAP)-accredited laboratories capable of analyzing the following compounds (e.g.,

chlordane, dieldrin, total PCBs, total DDTs, 4,4-DDT, PAHs) to the low concentrations for some of the numeric action levels or numeric effluent limitations in Attachment H. Attachment H, Section I.G.5 provides a modified compliance protocol for Responsible Dischargers for the Los Angeles Area Lakes TMDL that are required to comply with TMDL-related numeric effluent limitations for Chlordane, Dieldrin, DDT, and PCBs. It is the expectation that the Water Boards will provide guidance and alternative methods for a Responsible Discharger to demonstrate compliance, if the Responsible Discharger has provided the Water Boards adequate information demonstrating that:

- It is infeasible to analyze a translated waste load allocation using an ELAP-accredited laboratory;
- The sample results would invalidate federally-required sufficiently sensitive methods; or
- No method in 40 Code of Federal Regulations Part 136 can detect and quantify the amount specified for the construction stormwater.

I.W.5. General Permit Summary

The following requirements, applicable to dischargers enrolled under this General Permit, were considered in determining the necessity of additional TMDL-specific permit implementation for applicable to Responsible Dischargers:

- Storm Water Pollution Prevention Plan (SWPPP): This General Permit requires dischargers to identify construction materials handled at the site and describe all potential sources of pollutants that could be discharged from their site and describe the BMPs that will be implemented to control their discharges. This General Permit requires Responsible Dischargers to revise their SWPPP whenever a significant change in monitoring or sampling occurs.
- Non-Stormwater Discharges (NSWDs): The only NSWDs authorized by this General Permit are described in the Order, and the discharge is prohibited unless regulated by a separate NPDES permit.
- Visual Observations: Dischargers are required to conduct pre, during, and post precipitation event site visual inspections which include: 1) monitoring of authorized NSWDs, 2) identification and elimination of unauthorized NSWDs, 3) identification of potential construction pollutant sources, and 4) necessary BMP maintenance and implementation.
- Sampling and Analysis: Dischargers must sample for all construction pollutants (with the potential to discharge to a waters of the United States) identified in their SWPPP in accordance with this General Permit. Dischargers are required to collect and analyze stormwater samples from construction site discharge locations over the reporting period in accordance with the requirements of this General Permit. When this previous permit's requirements were not sufficient to

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implement the TMDL, additional monitoring and sampling requirements are set forth in Attachment H's TMDL Compliance Table (Table H-2).

I.W.6. TMDL-Specific Requirements

Attachment H, Table H-2 contains TMDL-specific requirements for each TMDL with sources from discharges regulated by this General Permit. This Fact Sheet discusses TMDLs by pollutant since many of the TMDLs with the same pollutants are translated in the same manner. Table H-2 is organized by Regional Water Board jurisdiction and watershed, allowing the Responsible Dischargers to easily identify their applicable requirements.

a. Bacteria TMDLs

Nine Indicator Bacteria TMDLs (eight established by the Los Angeles Regional Water Quality Control Board and one by the U.S. EPA) apply to construction stormwater dischargers. Each TMDL addresses bacterial pollutants by establishing bacteria water quality objectives for one or more of the following Indicator Bacteria: Enterococcus, Escherichia coli (E. Coli), Fecal Coliform, and Total Coliform. These pollutants are referred to as Indicator Bacteria for the purpose of Attachment H and this Fact Sheet.

The water quality objectives for Indicator Bacteria are specific to fresh and marine waters and designated beneficial uses such as water contact recreation (REC-1), limited water contact recreation (LREC-1), and water non-contact recreation (REC-2).

Recreating in waters exceeding indicator bacteria water quality objectives has long been associated with adverse human health effects. Specifically, local and national epidemiological studies demonstrate that there is a causal relationship between adverse health effects and recreational water quality, as measured by bacterial indicator densities.[137]

The Indicator Bacteria TMDLs and their beneficial uses are summarized below:

- Ballona Creek, Ballona Estuary, and Sepulveda Channel Bacteria TMDL[138]: Fresh Waters (LREC-1, REC-1, REC-2) and Marine Waters (REC-1)

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137 Ballona Creek, Estuary, and Tributary Bacteria TMDL, p. 2.

138 Los Angeles Regional Water Board, Ballona Creek, Estuary, and Tributary Bacteria TMDL (June 7, 2012), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/R12-008_RB_BPA.pdf> [as of May 20, 2021]

- Harbor Beaches of Ventura County Bacteria TMDL[139]: Marine Waters (REC-1)
- Long Beach City Beaches and Los Angeles River Estuary Bacteria TMDL[140]: Marine Waters (REC-1)
- Los Angeles Harbor Bacteria TMDL[141]: Marine Waters (REC-1)
- Los Angeles River Bacteria TMDL[142]: Fresh Waters (LREC-1)
- Malibu Creek Bacteria TMDL[143]: Fresh Waters (REC-1) and Marine Waters (REC-1)
- Marina del Rey Bacteria TMDL[144]: Marine Waters (REC-1)

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139 Los Angeles Regional Water Quality Control Board, Harbor Beaches of Ventura County (Kiddie Beach and Hobie Beach) Bacteria TMDL (November 1, 2007), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/2007-017_RB_BPA.pdf> [as of May 20, 2021]

140 United States Environmental Protection Agency IX, Long Beach City Beaches and Los Angeles River Estuary Total Maximum Daily Loads for Indicator Bacteria (March 26, 2012), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/Established/Longbeach/finalTMDLs-LongBeachCityBeaches-LARiverEstuaryBacteria.pdf> [as of April 28, 2022]

141 Los Angeles Regional Water Quality Control Board, Los Angeles Harbor Bacteria TMDL (Inner Cabrillo Beach Main Ship Channel) (July 1, 2004), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/2004-011_RB_BPA.pdf> [as of May 20, 2021] (Los Angeles Harbor Bacteria TMDL)

142 Los Angeles Regional Water Quality Control Board, Los Angeles River Watershed Bacteria TMDL (July 9, 2010), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/R10-007_RB_BPA1.pdf> [as of May 20, 2021] (Los Angeles Bacteria TMDL)

143 Los Angeles Regional Water Quality Control Board, Malibu Creek and Lagoon Bacteria TMDL (June 7, 2012), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/R12-009_RB_BPA.pdf> [as of May 20, 2021] (Malibu Creek Bacteria TMDL)

144 Los Angeles Regional Water Quality Control Board, Marina del Rey Harbor Mother's Beach and Back Basins Bacteria TMDL (August 7, 2003), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/2003-012_RB_BPA.pdf> [as of May 20, 2021] (Marina del Rey Bacterial TMDL)

- Santa Clara River Bacteria TMDL[145]: Fresh Waters (REC-1) and Marine Waters (REC-1)
- Santa Monica Bay Beaches Bacterial TMDL[146]: Marine Waters (REC-1)

The bacteria water quality objectives applicable to the beneficial uses associated with these water bodies are listed in Table 11 below.

Table 11 – Los Angeles Regional Water Quality Control Board Bacteria Water Quality Objectives

Beneficial Uses	E. Coli	Total Coliform	Fecal Coliform	Enterococcus	Total Coliform*
Fresh Waters REC-1	235/100 ml				
Fresh Waters LREC-1	576/100 ml				
Fresh Waters REC-2	4,000/100 ml				
Marine Waters REC-1		10,000/100 ml	400/100 ml	104/100 ml	1,000/100 ml

* If the fecal-to-total coliform ratio is greater than 0.1

- Source Analysis

  The primary sources of elevated indicator bacteria densities include dry-weather urban runoff and stormwater conveyed to the impaired waters. Although construction stormwater dischargers are not expected to be significant sources of indicator bacteria, they are considered Responsible Dischargers for these TMDLs.

- Waste Load Allocation Translation

  The Indicator Bacteria TMDLs assign the waste load allocations in two different ways:

  i. The TMDLs for the: (1) Harbor Beaches of Ventura County, (2) Santa Clara River, (3) Long Beach City Beaches, and (4) Los Angeles River

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145 Los Angeles Regional Water Quality Control Board, Santa Clara River Estuary and Reaches 3, 5, 6, and 7 Indicator Bacteria TMDL (July 8, 2010), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/R10-006_RB_BPA.pdf> [as of May 20, 2021] (Santa Clara River Bacteria TMDL)

146 Los Angeles Regional Water Quality Control Board, Santa Monica Bay Beaches Bacteria TMDL (July 2, 2014), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/R12-007_RB_BPA1.pdf>

assigns a waste load allocation of zero (0) allowable exceedance days of the Bacteria WQOs, listed in Table 11 above.

ii. The TMDLs for the: (1) Ballona Creek, Ballona Estuary, and Sepulveda Channel, (2) Malibu Creek, Lagoon, and adjacent beach, (3) Marina del Rey Harbor, Mother's Beach, and Back Basins, (4) Los Angeles Harbor (including Inner Cabrillo Beach and Main Ship Channel), and (5) Santa Monica Bay Beaches assign waste load allocations to construction stormwater dischargers equal to the Bacteria WQOs.

The two waste load allocation definitions were translated similarly and require Responsible Dischargers to "meet and not exceed" the bacteria water quality objectives listed in Table 11. Responsible Dischargers will be required to implement minimum BMPs in order to comply with the translated waste load allocations because construction stormwater dischargers are not expected to be significant sources of indicator bacteria. This General Permit requires all dischargers to perform a pollutant source assessment and implement specific BMPs to prevent or eliminate any exceedance of water quality objectives contained within applicable TMDLs, including those for indicator bacteria. Therefore, compliance with this General Permit is consistent with the requirements and assumptions of the TMDL and sufficient to achieve compliance with the waste load allocation.

- Compliance Actions and Schedule

  Responsible Dischargers with an applicable TMDL for Indicator Bacteria listed in Attachment H shall comply with the requirements of this General Permit.

  Responsible Dischargers that identify on-site sources of indicator bacteria in the required pollutant source assessment are to implement BMPs specific to preventing or controlling stormwater exposure to indicator bacteria. The minimum bacteria source control BMPs include QSP-conducted training of site staff, sanitary septic waste management, and routine housekeeping of identified bacteria sources. Structural BMPs such as retention, infiltration, or diversion of stormwater reduce bacteria loading to receiving waters. Responsible Dischargers that implement a suite of minimum BMPs to control stormwater exposure to source of indicator bacteria are expected to meet the assigned waste load allocation. If a BMP is observed failing, the Responsible Discharger is to evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the waste load allocations in the future. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site-specific information about exceedances of the waste load allocation.

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Compliance with Indicator Bacteria TMDLs shall be achieved by the effective date of this General Permit, as shown in Table H-2 in Attachment H.

b. Chloride and Salts TMDLs

Three TMDLs for chloride and other salts (Calleguas Creek, Santa Clara River Reach 3, and Upper Santa Clara River) apply to construction stormwater dischargers. Elevated levels of chloride and salts can impair a water body's beneficial uses associated with agricultural uses for irrigation of salt-sensitive crops and groundwater recharge to provide drinking water.

i. Calleguas Creek Watershed Salts TMDL[147]

The Los Angeles Regional Water Quality Control Board adopted the TMDL for Boron, Chloride, Sulfate, and TDS (salts) on October 4, 2007, to protect and restore water quality in the Calleguas Creek watershed by controlling the loading and accumulation of salts.

- Source Analysis

  Sources of salts in the watershed include water supply, water softeners that discharge to publicly treatment works (POTWS), POTW treatment chemicals, atmospheric deposition, pesticides and fertilizers, and indoor water use (e.g., chemicals, cleansers, food, etc.).[148] The salts are then transported through POTW discharges and runoff to surface water, shallow groundwater, or accumulate on the watershed within soils. Construction stormwater permittees are considered Responsible Dischargers for this TMDL.

- Waste Load Allocation Translation

  The Calleguas Creek Watershed Salts TMDL assigns interim and final waste load allocations during dry-weather conditions, when instream flow rates are below the 86th percentile flow and there has been no measurable precipitation in the previous 24 hours.[149] Both the interim and final dry-weather waste load allocations, shown in Table 12 and Table 13 below, apply in the receiving water at the base of each subwatershed.

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147 Los Angeles Regional Water Board, Calleguas Creek Watershed Salts TMDL (October 4, 2007), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/2007-016_RB_BPA.pdf> [as of May 20, 2021]

148 Calleguas Creek Watershed Salts TMDL, p.3.

149 Calleguas Creek Watershed Salts TMDL, p. 7-8.

Table 12 – Calleguas Creek Interim Dry-Weather Waste Load Allocations

Pollutant	Interim Limit (mg/L)
Boron Total	1.3
Chloride Total	230
Sulfate Total	1289
TDS Total	1720

Table 13 – Calleguas Creek Final Dry-Weather Waste Load Allocations

Receiving Water	Critical Condition Flow Rate (mgd)	Chloride Allocation (lb/day)	TDS Allocation (lb/day)	Sulfate Allocation (lb/day)	Boron Allocation (lb/day)
Simi	1.39	1,738	9,849	2,897	12
Las Posas	0.13	157	887	261	N/A
Conejo	1.26	1,576	8,931	2,627	N/A
Camarillo	0.06	72	406	119	N/A
Pleasant Valley (Calleguas)	0.12	150	850	250	N/A
Pleasant Valley (Revolon)	0.25	314	1,778	523	2

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Discharges that occur during dry-weather conditions are referred to as non-stormwater discharges (NSWDs) and are only authorized by this General Permit if dischargers meet the conditions of Order, Section IV.A to control the discharge of pollutants off-site. Section IV.B of this General Permit's Order prohibits all NSWDs not authorized under Section IV.A; therefore, all unauthorized NSWDs must be eliminated or have regulatory coverage under a separate NPDES permit. Authorized NSWDs, as defined in this General Permit, are authorized because these discharges are assumed to not commingle with stormwater associated with construction activity. The Los Angeles Regional Water Quality Control Board may impose additional requirements on NSWDs if deemed necessary per a site-specific analysis.

Wet-weather discharges are not assigned waste load allocations as flows transport a larger amount of salts at low concentrations for most construction stormwater dischargers, therefore meeting water quality objectives during wet weather.

- Compliance Actions and Schedule

  Compliance with this General Permit's requirements is consistent with the assumptions and requirements of the Calleguas Creek Salts TMDL

and is sufficient to achieve the assigned salts waste load allocations. If a BMP is observed failing, the Responsible Discharger shall evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the waste load allocations in the future. Responsible Dischargers that perform pollutant assessments and implement BMPs specific to preventing or controlling stormwater exposure with salts are expected to meet the assigned waste load allocations. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site-specific information about exceedances of the waste load allocations.

The Calleguas Creek Watershed Salts TMDL's final compliance deadline is December 2, 2023. Therefore, the interim waste load allocations are applied to Responsible Dischargers upon the effective date of this General Permit.

ii. Santa Clara River Chloride Reach 3 TMDL[150]

The U.S. EPA adopted the Santa Clara River Chloride Reach 3 TMDL on June 18, 2003, to address the chloride impairment of Santa Clara River, Reach 3. Exceedances of chloride water quality standards in the Santa Clara River can impair the water's use as agricultural irrigation supply.

The U.S. EPA's analysis of available flow and loading data concluded that exceedances of the chloride water quality objectives are most likely to occur during low-flow conditions. Therefore, setting the TMDL and associated allocations at levels sufficient to implement the objectives during low-flow conditions will also result in attainment of the objectives during higher flow conditions.[151]

- Source Analysis

  The Santa Clara River Chloride Reach 3 TMDL identifies two major point sources (the Fillmore and Santa Paula Water Reclamation Plants) as well as a number of minor point sources, including runoff from construction sites. Construction stormwater permittees are therefore considered Responsible Dischargers for this TMDL. Sources of salts in the watershed include water supply, water softeners that discharge to

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150 United States Environmental Protection Agency IX, Total Maximum Daily Load for Chloride in the Santa Clara River, Reach 3 (June 18, 2003) <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/Established/Santa%20Clara%20River%20Reach%203%20Chloride%20TMDL/final%20SCR%20R3%20Cl%20TMDL.pdf> [as of May 20, 2021] (Santa Clara River Chloride Reach 3 TMDL)

151 Santa Clara River Chloride Reach 3 TMDL, p. 14.

publicly treatment works (POTWS), POTW treatment chemicals, atmospheric deposition, pesticides and fertilizers, and indoor water use (e.g., chemicals, cleansers, food, etc.).[152] The salts are then transported through POTW discharges and runoff to surface water, shallow groundwater, or accumulate on the watershed within soils.

- Waste Load Allocation Translation

  The Santa Clara River Chloride Reach 3 TMDL assigns a concentration-based chloride waste load allocation of 80 mg/L to Responsible Dischargers at the construction site's discharge locations(s) for dry-weather discharges into Santa Clara River Reach 3.

  Discharges that occur during dry-weather conditions are referred to as non-stormwater discharges (NSWDs) and are only authorized by this General Permit if dischargers meet the conditions of Order, Section IV.A to control the discharge of pollutants off the site. Order, Section IV.B prohibits all NSWDs not authorized under Section IV.A; therefore, all unauthorized NSWDs must be eliminated or have regulatory coverage under a separate NPDES permit. Authorized NSWDs, as defined in this General Permit, are authorized because these discharges are assumed to not commingle with stormwater associated with construction activities. The Los Angeles Regional Water Quality Control Board may impose additional requirements on NSWDs if deemed necessary per a site-specific analysis.

- Compliance Actions and Schedule

  Compliance with this General Permit's requirements is consistent with the assumptions and requirements of the Santa Clara River Chloride Reach 3 TMDL and is consistent with the assigned chloride waste load allocation. If a BMP is observed failing, the Responsible Discharger shall evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the waste load allocation in the future. Responsible Dischargers that perform pollutant assessments and implement BMPs specific to preventing or controlling stormwater exposure with salts are expected to meet the assigned waste load allocation. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site-specific information about exceedances of the waste load allocation.

  The Santa Clara River Chloride Reach 3 TMDL does not have an implementation plan, nor compliance deadline, as it was established by the U.S. EPA rather than the Los Angeles Regional Water Quality

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152 Santa Clara River Chloride Reach 3 TMDL, p. 11-12.

Control Board. Therefore, the discharger shall meet the assigned waste load allocation by the effective date of this General Permit.

iii. Upper Santa Clara River Chloride TMDL[153]

The Los Angeles Regional Water Quality Control Board adopted the Revision of the Upper Santa Clara River Chloride TMDL on October 9, 2014, to address elevated chloride concentrations causing exceedances of water quality objectives for Reaches 5 and 6 of the Santa Clara River. Chloride-impaired water bodies that are used for agricultural irrigation supply can negatively impact the growth of salt-sensitive crops.

- Source Analysis

  The primary sources of chloride into Reaches 5 and 6 of the river are discharges from the Saugus and Valencia Water Reclamation Plants, contributing roughly 70 percent of the load.[154] Other NPDES dischargers, including those covered under this General Permit, are considered minor contributors of chloride to the Upper Santa Clara River. Therefore, construction stormwater dischargers are considered Responsible Dischargers for this TMDL.

- Waste Load Allocation Translation

  The Responsible Dischargers have been assigned a waste load allocation of 100 mg/L as 3-month rolling average. Compliance with the 3-month rolling average is currently beyond the scope of the monitoring and sampling requirements of this General Permit. A requirement to calculate a 3-month rolling average would put an undue burden on the Responsible Dischargers. Therefore, the rolling average limit will be translated into a numeric action level of 100 mg/L, to be met at the construction discharge location(s), as shown in Table 14 below. Translating the 3-month rolling average limit into a numeric action level with the same concentration ensures that the limit is stringent enough to achieve the surface water quality objectives.

Table 14 – Upper Santa Clara River Chloride Waste Load Allocation Translation

Pollutant	3-Month Rolling Average (mg/L)	Numeric Action Level (mg/L)
Chloride	100	100

153 Los Angeles Regional Water Quality Control Board, Upper Santa Clara River Chloride TMDL (October 9, 2014), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/R14-010_RB_BPA.pdf> [as of March 7, 2019]

154 Upper Santa Clara River Chloride TMDL, p. 4.

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Responsible Dischargers that perform the required pollutant source assessment and implement BMPs specific to preventing or controlling stormwater exposure to chloride, as is required in this General Permit, are expected to meet the translated numeric action level. Therefore, compliance with this General Permit's requirements is consistent with the assumptions and requirements of the Upper Santa Clara River Chloride TMDL and is sufficient to achieve the assigned waste load allocation.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of chloride through the required pollutant source assessment shall compare all non-visible sampling and analytical results to the chloride numeric action level. If an exceedance or failure of a BMP is observed, the Responsible Discharger shall evaluate the BMPs implemented and identify a strategy in the site's SWPPP to prevent potential exceedances of the numeric action level in the future. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site-specific information about exceedances of the numeric action level.

  The Upper Santa Clara River Chloride TMDL assigns the waste load allocation to Responsible Dischargers upon the effective date of the TMDL. Because the TMDL did not specify a final compliance deadline for construction stormwater dischargers, the numeric action level is applicable upon the effective date of this General Permit.

c. Diazinon TMDLs

   One TMDL for diazinon applies to construction stormwater dischargers. Diazinon is an organophosphate pesticide that does not sorb to sediment but is instead mobilized through soils by dissolving in water. Discharges of stormwater containing diazinon, can cause exceedances of water quality objectives for toxicity in aquatic life in inland surface and estuarine waters. Diazinon was once used in both agricultural and urban settings but has since been banned for non-agricultural uses by the California Department of Pesticide Regulation.

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i. Chollas Creek Diazinon TMDL[155]

The San Diego Regional Water Quality Control Board adopted the Chollas Creek Diazinon TMDL on August 14, 2002, to address the impairment of the Chollas Creek Watershed due to diazinon.

- Source Analysis

  The Chollas Creek Diazinon TMDL identifies urban stormwater flows as a significant source of diazinon and lists the Construction General Permit as a means of regulating discharges of diazinon.[156] Therefore, construction stormwater dischargers covered by this General Permit are considered Responsible Dischargers. However, the TMDL did not include a separate waste load allocation assigned to construction stormwater discharges.

- Compliance Actions and Schedule

  Compliance with this General Permit is consistent with the requirements and assumptions of this TMDL's waste load allocation(s). No additional requirements are incorporated into this General Permit to implement the Chollas Creek Diazinon TMDL. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site-specific information about any exceedances of the waste load allocations.

d. Nutrients TMDLs

Seven Nutrient TMDLs apply to construction stormwater discharges and incorporate waste load allocations for one or more of the following pollutants: nitrogen compounds (e.g., ammonia, nitrate, nitrite) and phosphorous (e.g., orthophosphates). Excessive nutrient loading to water bodies and watersheds can cause eutrophic effects that negatively impact beneficial uses related to recreation, wildlife, and drinking water supply.

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155 San Diego Regional Water Quality Control Board, Chollas Creek Diazinon Total Maximum Daily Load (August 14, 2002) <https://www.waterboards.ca.gov/sandiego/water_issues/programs/tmdls/chollascreekdiazinon.html> [as of May 20, 2021]. (Chollas Creek Diazinon TMDL)

156 Chollas Creek Diazinon TMDL, p. 2 and 7.

i. Pajaro River Basin Nutrients TMDL[157]

The Central Coast Regional Water Quality Control Board adopted the Pajaro River Basin Nutrients TMDL on July 30, 2015, to address the discharges of nitrogen compounds and orthophosphate within the Pajaro River Basin. These exceedances of nutrient and nutrient-related water quality objectives can have negative impacts on beneficial uses such as municipal and domestic drinking water supply (MUN, GWR) and a range of aquatic habitats uses (WILD, COLD, WARM, MIGR, SPWN, BIOL, RARE).[158]

- Source Analysis

  Industrial and construction NPDES-permitted stormwater discharges were determined to be potential sources of ammonia, nitrate, and orthophosphate loading to receiving waters in the Pajaro River Basin.

- Waste Load Allocation Translation

  This Pajaro River Basin Nutrients TMDL assigns waste load allocations as concentration-based, single sample limits to construction stormwater dischargers for ammonia, nitrate, total nitrogen, and orthophosphate, to be met in the receiving waters. Therefore, dischargers covered under this General Permit are considered Responsible Dischargers for this TMDL, if they identify sources of these pollutants on their site through the required pollutant source assessment. The waste load allocation for un-ionized ammonia is applied to all streams within the Pajaro River Basin, while waste load allocations for nitrate, total nitrogen, and orthophosphate are specific to individual water bodies in the basin. The waste load allocations are translated from single sample limits to numeric action levels, as shown in Tables 15 through 24 below.

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Table 15 – All Streams in Pajaro River Basin – Un-Ionized Ammonia Waste Load Allocation Translation

Pollutant	Waste Load Allocation Single Sample Limit (mg/L)	Numeric Action Level (mg/L)
Un-ionized Ammonia	0.025	0.025

157 Central Coast Regional Water Quality Control Board, Total Maximum Daily Loads for Nitrogen Compounds and Orthophosphate in Streams of the Pajaro River Basin (July 30, 2015), <https://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/pajaro/nutrients/basin_plan_amend.pdf> [as of April 29, 2022] (Pajaro River Basin Nutrients TMDL)

158 Pajaro River Basin Nutrients TMDL, p. 1.

Table 16 – All Streams in Pajaro River Basin (with MUN Beneficial Uses) Waste Load Allocation Translation

Pollutant	Waste Load Allocation Single Sample Limit (mg/L)	Numeric Action Level (mg/L)
Nitrate-N	10	10

Table 17 – Pajaro River (All Reaches) and Pajaro River Estuary Waste Load Allocation Translation

Pollutant	Waste Load Allocation Single Sample Limit (mg/L)	Numeric Action Level (mg/L)
Dry-Weather Nitrate-N	3.9	3.9
Dry-Weather Orthophosphate-P	0.14	0.14
Wet-Weather Nitrate-N	8.0	8.0
Wet-Weather Orthophosphate-P	0.3	0.3

Table 18 – Corralitos Creek and Salsipuedes Creek (All Reaches) Waste Load Allocation Translation

Pollutant	Waste Load Allocation Single Sample Limit (mg/L)	Numeric Action Level (mg/L)
Dry-Weather Nitrate-N	1.8	1.8
Dry-Weather Orthophosphate-P	0.14	0.14
Wet-Weather Nitrate-N	8.0	8.0
Wet-Weather Orthophosphate-P	0.3	0.3

Table 19 – Beach Road Ditch and McGowan Ditch Waste Load Allocation Translation

Pollutant	Waste Load Allocation Single Sample Limit (mg/L)	Numeric Action Level (mg/L)
Dry-Weather Nitrate-N	3.3	3.3
Dry-Weather Orthophosphate-P	0.14	0.14
Wet-Weather Nitrate-N	8.0	8.0
Wet-Weather Orthophosphate-P	0.3	0.3

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Table 20 – Llagas Creek (Downstream of Cheseboro Reservoir), Carnadero Creek, Uvas Creek, and Furlong Creek (All Reaches) Waste Load Allocation Translation

Pollutant	Waste Load Allocation Single Sample Limit (mg/L)	Numeric Action Level (mg/L)
Dry-Weather Nitrate-N	1.8	1.8
Dry-Weather Orthophosphate-P	0.05	0.05
Wet-Weather Nitrate-N	8.0	8.0
Wet-Weather Orthophosphate-P	0.3	0.3

Table 21 – San Juan Creek and West Branch of San Juan Creek (All Reaches) Waste Load Allocation Translation

Pollutant	Waste Load Allocation Single Sample Limit (mg/L)	Numeric Action Level (mg/L)
Dry-Weather Nitrate-N	3.3	3.3
Dry-Weather Orthophosphate-P	0.12	0.12
Wet-Weather Nitrate-N	8.0	8.0
Wet-Weather Orthophosphate-P	0.3	0.3

Table 22 – Tequisquita Slough Waste Load Allocation Translation

Pollutant	Waste Load Allocation Single Sample Limit (mg/L)	Numeric Action Level (mg/L)
Dry-Weather Nitrate-N	2.2	2.2
Dry-Weather Orthophosphate-P	0.12	0.12
Wet-Weather Nitrate-N	8.0	8.0
Wet-Weather Orthophosphate-P	0.3	0.3

Table 23 – Watsonville Slough, Harkins Slough, Gallighan Slough, and Struve Slough (All Reaches) Waste Load Allocation Translations

Pollutant	Waste Load Allocation Single Sample Limit (mg/L)	Numeric Action Level (mg/L)
Dry-Weather Total Nitrogen-N	2.1	2.1
Dry-Weather Orthophosphate-P	0.14	0.14
Wet-Weather Total Nitrogen-N	8.0	8.0
Wet-Weather Orthophosphate-P	0.3	0.3

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Table 24 – Millers Canal (All Reaches) Waste Load Allocation Translations

Pollutant	Waste Load Allocation Single Sample Limit (mg/L)	Numeric Action Level (mg/L)
Dry-Weather Total Nitrogen-N	1.1	1.1
Dry-Weather Orthophosphate-P	0.04	0.04
Wet-Weather Total Nitrogen-N	8.0	8.0
Wet-Weather Orthophosphate-P	0.3	0.3

The Pajaro River Basin Nutrients TMDL assigns concentration-based waste load allocation to Responsible Dischargers for dry-weather discharges into the individual water bodies listed in Tables 15 through 24. Non-stormwater discharges are authorized in this General Permit if Order, Section IV.A terms and conditions are met to control the discharge of pollutants from the construction site. Order, Section IV.B prohibits all non-stormwater dischargers not authorized under Order, Section IV.A; therefore, all unauthorized non-stormwater dischargers must be either eliminated or have regulatory coverage under a separate NPDES permit. Authorized non-stormwater dischargers, as defined in this General Permit, are authorized because these discharges do not commingle with stormwater associated with construction activity. The Regional Water Board may impose additional requirements on non-stormwater dischargers if deemed necessary per site-specific analysis.

This General Permit requires that Responsible Dischargers meet the assigned wet-weather waste load allocations as numeric action levels at the construction site's discharge locations, rather than the applicable receiving waters as stated in the Pajaro River Basin Nutrients TMDL. The decision to establish numeric action levels, instead of numeric effluent limitations, was made considering that construction stormwater discharges are not expected to contribute a significant load of nutrients to receiving waters. An exceedance of the waste load allocation in the receiving waters would likely be attributed to sources other than construction stormwater discharges. Since different sources of stormwater runoff are often comingled, it is difficult to identify where the nutrient loading originates. Monitoring at the discharge location would be more indicative of an exceedance of the nutrient-related water quality objectives that is associated with a specific construction site. Furthermore, compliance monitoring at the receiving waters can be infeasible or impractical as Responsible Dischargers may have restricted access to or be far-removed from the compliance points.

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- Compliance Actions and Schedule

  At the time the Pajaro River Basin Nutrient TMDL was written, NPDES stormwater-permitted construction sites were generally expected to be meeting the proposed waste load allocations through the requirements of the previous permit or any subsequent Construction General Permit. However, available information did not conclusively demonstrate that all construction sites were meeting the waste load allocations.[159] Therefore, in addition to complying with the requirements of this General Permit, Responsible Dischargers identifying on-site sources of ammonia, nitrate, total phosphorus, or total nitrogen shall compare all non-visible sampling and analytical results to the numeric action levels for the identified nutrients.

  If an exceedance or failure of a BMP is observed, the Responsible Discharger shall evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the numeric action levels in the future. Responsible Dischargers that perform the required pollutant source assessment and implement BMPs specific to preventing or controlling stormwater exposure to nutrient sources, are expected to meet the numeric action levels. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the numeric action levels.

  The Pajaro River Basin Nutrient TMDL's implementation schedule indicates that the waste load allocations are to be achieved within 25 years of the TMDL's effective date July 12, 2016. Therefore, the TMDL's compliance deadline is July 12, 2041. Since the compliance deadline is in the far future, compliance with this General Permit is considered compliance with the TMDL. Future reissuances of this General Permit may incorporate additional or revised compliance requirements or interim targets to progress towards the required final compliance by July 12, 2041.

ii. Los Angeles Area Lakes Nutrients TMDL[160]

The U.S. EPA adopted the Los Angeles Area Lakes TMDL on March 26, 2012, to address the impairment of Peck Road Park Lake, Echo Park, Legg

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159 Pajaro River Basin TMDL, p. 21.

160 United States EPA Region IX, Los Angeles Area Lakes Total Maximum Daily Loads for Nitrogen, Phosphorus, Mercury, Trash, Organochlorine Pesticides and PCBs (March 26, 2012),

Lakes, and Puddingstone Reservoir due to nitrogen and phosphorus. Peck Road Park Lake, Echo Park Lake, and Legg Lakes are located in the Los Angeles River watershed and Puddingstone Reservoir is located in the San Gabriel River watershed.

- Source Analysis

  Nutrient loadings into Peck Road Park Lake, Echo Park, Legg Lakes, and Puddingstone Reservoir originate from a variety of sources, including discharges from storm drain outlets containing construction stormwater discharges from sites within the watershed.

- Waste Load Allocation Translation

  The Los Angeles Area Lakes TMDL assigns concentration-based waste load allocations for nitrogen and phosphorus to Responsible Dischargers at the site's discharge location(s) for construction stormwater discharges into Peck Road Park Lake, Echo Park, Legg Lakes, and Puddingstone Reservoir. Therefore, dischargers covered under this General Permit are considered Responsible Dischargers for this TMDL. The waste load allocations for nitrogen and phosphorus differ depending on the receiving waters. The waste load allocations assigned to Responsible Dischargers for nitrogen and phosphorus are translated as shown in Table 25 and Table 26 below. The waste load allocations were set at monthly averages. The TMDL also states that "[a] three-year average will be used to evaluate compliance." Because of the variable nature of stormwater, monthly or yearly averages are not necessarily representative of pollutant loading, and the nitrogen waste load allocation was translated into a numeric action level.

  In addition to the explanation set forth in Section I.G.5.d of this Fact Sheet, implementation of the TMDL through numeric action levels is consistent with the assumptions and requirements of the waste load allocations because it is expected that compliance with this Permit will prevent exceedances of the numeric action levels. This TMDL was developed by U.S. EPA, and the Regional Board has not yet adopted an implementation plan. The TMDL also states, "if applicable water quality criteria for ammonia, dissolved oxygen and pH, and the chlorophyll-α target are met in the lake, then the total phosphorus and total nitrogen allocations are considered attained." Because an individual discharger

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<https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/Established/Lakes/LALakesTMDLsEntireDocument.pdf> [as of May 20, 2021] (Los Angeles Area Lakes Nutrients TMDL)

cannot determine whether the applicable water quality criteria were being met at the time of their discharge, the waste load allocation is more appropriately translated into an action level. As further explained in Section I.G.5.d of this Fact Sheet, dischargers must take corrective actions in response to any numeric action level exceedance and this iterative process will protect water quality consistent with the requirements and assumptions set forth in this TMDL.

Table 25 – Total Nitrogen Waste Load Allocation Translation

Water Body	Waste Load Allocation Monthly Average (mg/L)	Numeric Action Level (mg/L)
Peck Road Park Lake	3.61	3.61
Echo Park Lake	1.33	1.33
Legg Lakes	1.8	1.8
Puddingstone Reservoir	2.0	2.0

Table 26 – Total Phosphorus Waste Load Allocation Translation

Pollutant	Waste Load Allocation Monthly Average (mg/L)	Numeric Effluent Limitation (mg/L)
Peck Road Park Lake	0.37	0.37
Echo Park Lake	0.16	0.16
Legg Lakes	0.64	0.64
Puddingstone Reservoir	0.4	0.4

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This General Permit requires that Responsible Dischargers meet the assigned waste load allocations at the construction site's discharge location(s), which is consistent with requirements and assumptions of the TMDL.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of phosphorus and nitrogen shall compare all non-visible sampling and analytical results to the numeric action levels or numeric effluent limitations for the identified nutrients. If an exceedance or failure of a BMP is observed, the Responsible Discharger shall evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the numeric action levels or numeric effluent limitations in the future. Responsible Dischargers that perform the required pollutant source assessment and implement BMPs specific to preventing or controlling stormwater exposure to nutrient sources, are expected to meet the numeric action levels or numeric effluent

limitations. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the numeric action levels or numeric effluent limitations.

The Los Angeles Regional Water Quality Control Board has not adopted an Implementation Plan or a compliance schedule for the Los Angeles Area Lakes TMDL. The numeric action levels and numeric effluent limitations described above are applicable upon the effective date of this General Permit.

iii. Los Angeles River Nutrients TMDL[161]

The Los Angeles Regional Water Quality Control Board adopted the Los Angeles River Nutrients TMDL on December 6, 2012, to address impairment of the Los Angeles River due to nitrogen compounds (ammonia, nitrite, and nitrate) and related effects (algae, pH, odor, and scum).

- Source Analysis

  The TMDL lists urban runoff as a point source which includes stormwater runoff from construction sites and other urban runoff sources such as industrial, municipal, and the California Department of Transportation.[162]

- Waste Load Allocation Translation

  The Los Angeles River Nutrients TMDL assigns concentration-based waste load allocations for nitrogen compounds to minor point sources, including construction stormwater runoff. Therefore, construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for this TMDL. The waste load allocations for ammonia are given as one-hour averages and thirty-day averages, for discharges into the Los Angeles River above LA-Glendale Water Reclamation Plant, Los Angeles River below LA-Glendale Water Reclamation Plant, or to tributaries discharging into the Los Angeles River above or below the LA-Glendale Water Reclamation Plant. Because stormwater is an intermittent discharge, only the acute one-hour averages are appropriate to apply to Responsible Dischargers. The waste load allocation translations from one-hour averages to numeric

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161 Los Angeles Regional Water Quality Control Board, Los Angeles River Nitrogen Compounds and Related Effects TMDL (July 10, 2003), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/R12-010_RB_BPA.pdf> [as of May 20, 2021] (Los Angeles River Nutrients TMDL)

162 Los Angeles River Nutrients TMDL, p. 5.

action levels for the three different reaches of the Los Angeles River are shown in Tables 27 through 29 below. The one-hour averages are appropriate to translate into action levels because of the variable nature of stormwater, and when the non-visible sampling requirements are triggered, the effluent sampling results are not averaged.

The Los Angeles River Nutrients TMDL assigns concentration-based waste load allocations for nitrate-nitrogen, nitrite-nitrogen, and nitrate-nitrogen plus nitrite-nitrogen as thirty-day averages to Responsible Dischargers into all reaches and tributaries of the Los Angeles River. The waste load allocations are translated to numeric action levels as shown in Table 30 below, since compliance with monthly averages is not appropriate to monitor stormwater due to its intermittent and variable nature.

The May 2021 draft of the Construction Stormwater General Permit reissuance proposed a translation of the ammonia, nitrate-nitrogen, nitrite-nitrogen, and nitrate-nitrogen plus nitrite-nitrogen waste load allocations into numeric effluent limitations as the waste load allocations were concentration-based and assigned at the point of discharge. However, the Permit was revised to implement nitrogen-based nutrient waste load allocations as numeric action levels because numeric action levels are consistent with the assumptions and requirements of the waste load allocations.

Implementation of the TMDL through numeric action levels is consistent with the assumptions and requirements of the waste load allocation because it is expected that compliance with this Permit will prevent exceedances of the waste load allocations. Consistent with the explanation set forth in Section I.G.5.d of this Fact Sheet, the critical condition identified in the TMDL is low flow conditions (p.8). The TMDL also indicates that a majority of nutrient loading originates from major point sources such as water reclamation plants and other publicly owned treatment works,[163] while sources in stormwater runoff requires further evaluation.

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163 For example, the principal source of nitrogen compounds identified in this TMDL are the water reclamation plants, which contribute 84.1 percent of the total dry weather nitrogen load (p.3). The TMDL states that stormwater may also contribute nitrate loads and that further evaluation of these sources is set forth in the implementation plan, but the implementation plan does not provide further detail about stormwater as a source.

Table 27 – Los Angeles River above LA-Glendale WRP Waste Load Allocation Translation

Pollutant	Waste Load Allocation One-Hour Average (mg/L)	Numeric Action Level (mg/L)
Ammonia	4.7	4.7

Table 28 – Los Angeles River below LA-Glendale WRP Waste Load Allocation Translation

Pollutant	Waste Load Allocation One-Hour Average (mg/L)	Numeric Action Level (mg/L)
Ammonia	8.7	8.7

Table 29 – Los Angeles River Tributaries Waste Load Allocation Translation

Pollutant	Waste Load Allocation One-Hour Average (mg/L)	Numeric Action Level (mg/L)
Ammonia	10.1	10.1

Table 30 – Los Angeles River Tributaries Waste Load Allocation Translation

Pollutant	Translated Numeric Action Level (mg/L)
Nitrate-Nitrogen	8.0
Nitrite-Nitrogen	1.0
Nitrate plus Nitrite-Nitrogen	8.0

This General Permit requires that Responsible Dischargers meet the numeric action levels at the construction site's discharge location(s), which is consistent with requirements and assumptions of the Los Angeles River Nutrients TMDL.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of ammonia, nitrate, or nitrite shall compare all non-visible sampling and analytical results to the numeric action levels for the identified nutrients. If an exceedance or failure of a BMP is observed, the Responsible Discharger shall evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the numeric action levels in the future. Responsible Dischargers that perform the required pollutant source assessment and implement BMPs specific to preventing or controlling stormwater exposure to nitrogen compound sources, are expected to meet the assigned numeric action levels. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the numeric action levels.

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The Los Angeles River Nutrients TMDL's final compliance deadline for the waste load allocations was March 23, 2004. Since this compliance deadline has already passed, the numeric action levels are applicable upon the effective date of this General Permit.

iv. Machado Lake Nutrients TMDL[164]

The Los Angeles Regional Water Quality Control Board adopted the Machado Lake Nutrients TMDL on May 1, 2008, to address the impairment of Machado Lake due to eutrophication, algae, ammonia, and odors caused by an excess of nutrient loadings. These pollutants can have negative impacts on the beneficial uses of Machado Lake including recreation (REC-1 and REC-2), aquatic wildlife (WARM, WILD, RARE, and WET) and water supply (MUN).

- Source Analysis

  Stormwater discharges from the municipal separate storm sewer system (MS4), California Department of Transportation, and general construction and industrial discharges are identified has point sources of nutrients into Machado Lake.

- Waste Load Allocation Translation

  The Machado Lake Nutrients TMDL assigns waste load allocations as concentration-based monthly averages to construction stormwater dischargers for total phosphorus and total nitrogen based on in-lake concentrations. Therefore, dischargers covered under this General Permit are considered Responsible Dischargers for this TMDL. The waste load allocations apply to discharges to Machado Lake or through the following subdrainage systems: Drain 553, Wilmington Drain, Project 77/510, and Walteria Lake. The waste load allocations are translated to numeric action levels, as shown in Table 31 below, because this TMDL assigned these waste load allocations in the receiving water (in-lake) instead of at the point of discharge from the construction site. This TMDL assigned the waste load allocations as monthly averages; however, precipitation events are intermittent and variable. Compliance with the waste load allocations based on monthly averages is inconsistent with the monitoring and reporting requirements in this General Permit.

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164 Los Angeles Regional Water Quality Board, Total Maximum Daily Load for Eutrophic, Algae, Ammonia, and Odors (Nutrient) in Machado Lake (May 1, 2008), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/2008-006_RB_BPA.pdf> [as of May 20, 2021] (Machado Lake Nutrients TMDL)

Table 31 – Machado Lake Nutrient Waste Load Allocations Translation

Pollutant	Waste Load Allocation Monthly Average (mg/L)	Numeric Action Level (mg/L)
Total Phosphorus	0.1	0.1
Total Nitrogen	1.0	1.0

This General Permit requires Responsible Dischargers to meet the numeric action levels at the construction site's discharge location(s), which is consistent with requirements and assumptions of the TMDL.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of phosphorus and nitrogen shall compare all non-visible sampling and analytical results to the numeric action levels for the identified nutrients. If an exceedance or failure of a BMP is observed, the Responsible Discharger shall evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the numeric action levels in the future. Responsible Dischargers that perform the required pollutant source assessment and implement BMPs specific to preventing or controlling stormwater exposure to nutrient sources, are expected to meet the numeric action levels. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the numeric action levels.

  The Machado Lake Nutrients TMDL's effective date was March 11, 2009, with a final compliance deadline set for September 11, 2018. Since the compliance deadline for this TMDL has passed, the discharger shall comply with the numeric action levels by the effective date of this General Permit.

v. Santa Clara River Nitrogen Compounds TMDL[165]

The Los Angeles Regional Water Quality Control Board adopted the Santa Clara River Nitrogen Compounds TMDL on August 7, 2003, to address nutrient-related impairment of Santa Clara River Reach 3 and Reach 7. In specific, biostimulatory substances such as ammonia, nitrate, and nitrite can lead to excessive algae growth and low dissolved oxygen in the receiving water body.

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165 Los Angeles Regional Water Quality Control Board, Santa Clara River Nitrogen Compounds TMDL (August 7, 2003), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/2003-011_RB_BPA.pdf> [as of April 28, 2022]

- Source Analysis

  The primary sources of these nitrogen compounds in the Santa Clara River can be attributed to local water reclamation and treatment plants. However, stormwater discharges were also identified as potential point sources of the nitrogen compounds.

- Waste Load Allocation Translation

  The Santa Clara River Nitrogen Compounds TMDL assigns concentration-based waste load allocations for ammonia and nitrate plus nitrite as nitrogen to construction stormwater sources regulated under NPDES permits. Therefore, construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for this TMDL.

  Ammonia and nitrate plus nitrite as nitrogen waste load allocations are established to address both acute effects (one-hour average concentration) and chronic effects (30-day average concentration) on aquatic life. Because stormwater is an intermittent discharge, only the acute one-hour average waste load allocations for ammonia are appropriate to apply to Responsible Dischargers. The translation of one-hour average waste load allocations to numeric action levels for the two reaches of the Santa Clara River are shown in Table 32 and Table 33 below. The one-hour average waste load allocations appropriately translate into numeric action levels due to the variable nature of stormwater. Nitrate plus nitrite as nitrogen waste load allocations were not translated as they were only established as 30-day averages.

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Table 32 – Santa Clara River Reach 3 Ammonia as Nitrogen Waste Load Allocation Translation

Pollutant	Waste Load Allocation One-Hour Average (mg/L)	Numeric Action Level (mg/L)
Ammonia	4.2	4.2

Table 33 – Santa Clara River Reach 7 Ammonia as Nitrogen Waste Load Allocation Translation

Pollutant	Waste Load Allocation One-Hour Average (mg/L)	Numeric Action Level (mg/L)
Ammonia	5.2	5.2

This General Permit requires that Responsible Dischargers comply with the numeric action levels at the construction site discharge location(s), consistent with requirements and assumptions of the TMDL.

The May 2021 draft of the Construction Stormwater General Permit reissuance proposed a translation for the ammonia waste load

allocations into numeric effluent limitations as the waste load allocations were concentration-based and assigned at the point of discharge. However, the Permit was revised to implement nitrogen-based nutrient waste load allocations as numeric action levels because numeric action levels are consistent with the assumptions and requirements of the waste load allocations.

As set forth in Section I.G.5.d of this Fact Sheet, the source analysis found that the principal source of ammonia, nitrite, and nitrate to the Santa Clara River is discharges from water reclamation plants and publicly owned public treatment works (BPA, p.2). The TMDL also acknowledged that stormwater discharge may contribute nitrate loads. But the allocations were set at the water quality objectives for receiving waters. The most critical conditions for water quality in the Santa Clara River are low-flow conditions, in particular at the end of the dry season (p. 72).

The TMDL also noted that "mass emission monitoring data conducted for MS4 NPDES Permit compliance indicate that the MS4 discharges are below the waste load allocation in both wet and dry weather samples."[166] (p.62) CGP dischargers subject to this TMDL are located within a MS4.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of ammonia, nitrate, and nitrite shall compare all non-visible sampling and analytical results to the numeric action levels for the identified nutrients. If an exceedance or failure of a BMP is observed, the Responsible Discharger shall evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the numeric action levels in the future. Responsible Dischargers that perform the required pollutant source assessment and implement BMPs specific to preventing or controlling stormwater exposure to nitrogen compound sources, are expected to meet the numeric action levels. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the numeric action levels.

  The Santa Clara River Nitrogen Compounds TMDL's compliance deadline for the waste load allocations was March 23, 2004. Since this

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166 Staff Report, p. 62, available at https://www.waterboards.ca.gov/losangeles/board_decisions/basin_plan_amendments/technical documents/2003-011/03_0523/StaffReport06-16.pdf.

compliance deadline has passed, the numeric effluent limitations are applicable upon the effective date of this General Permit.

vi. Ventura River Algae TMDL[167]

The Los Angeles Regional Water Quality Control Board adopted the Ventura River Algae TMDL on December 6, 2016, to address nutrient-related impairments in the Ventura River and its tributaries. Nutrient-related listings negatively impact beneficial uses such as water contact recreation, non-water contact recreation, warm and cold freshwater habitat, wetland habitat, rare/threated/endangered species habitat, migration of aquatic organisms, and spawning.

- Source Analysis

  Discharges conveyed via the municipal separate storm sewer (MS4), including stormwater and non-stormwater discharges, are estimated to contribute 21.3 percent of nutrient loading in dry weather and 28.3 percent in wet weather.

- Waste Load Allocation Translation

  The Ventura River Algae TMDL assigns concentration-based waste load allocations for nitrogen and phosphorus to construction stormwater dischargers during dry and wet-weather discharges. Therefore, construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for this TMDL. No translation is necessary for the dry and wet-weather waste load allocations as they were already expressed as concentration-based limitations.

  1) Dry-Weather Waste Load Allocations

     The Ventura River Algae TMDL assigns concentration-based waste load allocations for dry-weather total nitrogen and total phosphorus, shown in Table 34 below, with compliance assessed by averaging two grab samples.

     Discharges that occur during dry-weather conditions are referred to as non-stormwater and only are authorized in this General Permit if the conditions in Order Section IV.A are met to control the discharge of pollutants from the construction site. Authorized non-stormwater discharges, as defined in this General Permit, are authorized

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167 Los Angeles Regional Water Quality Control Board, Total Maximum Daily Load for Algae, Eutrophic Conditions, and Nutrients in the Ventura River and its Tributaries (December 6, 2012) <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/R12-011_RB_BPA.pdf> [as of April 28, 2022] (BPA)

because these discharges do not commingle with stormwater associated with construction activity. Order Section IV.B prohibits all NSWDs not authorized under Section IV.A; therefore, all unauthorized NSWDs must be either eliminated or have regulatory coverage under a separate NPDES permit. A dry-weather discharge to the Ventura River watershed with concentrations greater than the total nitrogen and total phosphorus waste load allocations would therefore be prohibited. The Regional Water Board may impose additional requirements on NSWDs if deemed necessary per site-specific analysis.

Table 34 – Ventura River Algae Dry-Weather Waste Load Allocations

Pollutant	Total Nitrogen Waste Load Allocation (mg/L)	Total Phosphorus Waste Load Allocation (mg/L)
Dry weather	1.15	0.115

2) Wet-Weather Waste Load Allocations

The wet-weather waste load allocations for nitrate plus nitrite as nitrogen, or total nitrogen where indicated, in Table 35 below are expressed as event mean concentrations or the average concentration for all samples taken per precipitation event resulting in discharge.

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Table 35 – Ventura River Algae Wet-Weather Waste Load Allocations

Reach	Nitrate Plus Nitrate as Nitrogen Numeric Action Levels (mg/L)
Estuary	*
Reach 1	*
Reach 2	10
Cañada Larga	10
Reach 3	5
San Antonio Creek	5
Reach 4	5
Reach 5	5

* The waste load allocations for the Estuary and Reach 1 are for total nitrogen at a concentration of 7.4 mg/L

The May 2021 draft of the Construction Stormwater General Permit reissuance proposed a translation for nitrate-nitrogen plus nitrite-nitrogen and total nitrogen waste load allocations into numeric effluent limitations as the waste load allocations were concentration-based and assigned at the point of discharge. However, the Permit was revised to implement nitrogen-based nutrient waste load

allocations as numeric action levels because numeric action levels are consistent with the assumptions and requirements of the waste load allocations.

The TMDL states that, "[t]he discharges from the general NPDES permits are intermittent and considered negligible for the purposes of this source assessment." (Staff Report, p.40)[168] Accordingly, "[t]he loadings from the general NPDES permits [were] not quantified" in the source assessment. (Staff Report, p.40) According to the TMDL, the critical condition for the TMDL is dry weather, "and it is the dry-weather loading that results in water quality impairments." (BPA, p.5) "The watershed nutrient wet-weather loads are generally delivered directly to the ocean and thus do not contribute to exceedance of the biostimulatory substances…") (BPA, p.8) "Based on the linkage analysis, wet-weather loads do not have a significant impact on receiving water quality in the Ventura River and its tributaries or the Estuary and biostimulatory objectives are attained." (Staff Report, p.79) The TMDL acknowledged that maintaining existing discharge quality would ensure that no further loading would occur in the receiving water. (BPA, p.8) The wet-weather loads were set to attain site-specific water quality objectives, (Staff Report, p.79) but "[f]or Reach 1 and Estuary, Wet-weather waste load allocations for stormwater sources are equal to existing water quality in stormwater discharges." (BPA, p.6) This suggests that the TMDL assumed that reductions in stormwater discharges were not necessary. Dry-weather waste load allocations were set at in-stream nutrient concentrations to meet biomass numeric targets. (Staff Report, p.76) All these statements support implementation of the TMDL through numeric action levels.

Although the implementation language specifies that the TMDL should be implemented as numeric water quality-based effluent limitations, the underlying assumptions contained in the TMDL support implementation via numeric action levels.

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168 Los Angeles Regional Water Quality Control Board, Algae, Eutrophic Conditions, and Nutrients Total Maximum Daily Loads for Ventura River and Its Tributaries (December 6, 2012) <https://www.waterboards.ca.gov/losangeles/board_decisions/basin_plan_amendments/technical_documents/73_New/Docs/Mar%202013/Staff%20report_Final%20120612.pdf> [as of June 28, 2022] (Staff Report)

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of nitrogen and/or phosphorus shall compare all non-visible sampling and analytical results to the numeric action level for the identified nutrients, when a wet-weather discharge occurs. If an exceedance or failure of a BMP is observed, the Responsible Discharger shall evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the numeric action levels the future. Responsible Dischargers that perform the required pollutant source assessment and implement BMPs specific to preventing or controlling stormwater exposure to nitrogen and phosphorous sources, are expected to meet the assigned numeric action levels. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the numeric action levels.

  The Ventura River Algae TMDL's compliance deadline for the waste load allocations was June 28, 2013. Since the compliance deadline has passed, the numeric action levels are applicable upon the effective date of this General Permit.

vii. San Diego Creek and Newport Bay Watershed Nutrients TMDL[169]

The Santa Ana Regional Water Quality Control Board adopted the San Diego Creek and Newport Bay Watershed Nutrients TMDL in 1998 to address nutrient-related impairments in Newport Bay, San Diego Creek, and its tributaries. Nutrients contribute to seasonal algal blooms that negatively impact recreational, aesthetic, and wildlife habit beneficial uses in these waters.

- Source Analysis

  The predominant source of nutrients are the tailwaters from agricultural crops and from commercial nurseries, however, runoff from construction sites can also contribute to nutrient loading through the erosion of sediment containing phosphorus.

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169 Santa Ana Regional Water Quality Control Board, Nutrient TMDL for the Newport Bay/San Diego Creek Watershed (1998) <https://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/> [as of May 20, 2021] (San Diego Creek and Newport Bay Watershed Nutrients TMDL)

- Waste Load Allocation Translation

  Construction stormwater dischargers are assigned an annual, mass-based waste load allocation for total phosphorus, aiming to reduce the loading of phosphorus by 50 percent. Therefore, construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for this TMDL if they identify sources of phosphorus on their site via the required pollutant source assessment. All construction sites were expected to achieve compliance with the annual waste allocation of 12,810 lbs/year total phosphorus by 2007.

  Requiring Responsible Dischargers to directly implement the waste load allocation and sample for the pollutants(s) would be impractical, costly, and not aligned with the requirements of this General Permit. It is infeasible to translate a mass-based annual waste load allocation applicable to all construction stormwater discharges to an effluent limitation that is applicable to an individual site. As mentioned in the source analysis, phosphorus loadings from construction stormwater discharges are in particulate form and associated with wet weather. Therefore, the following will address this TMDL:

  1) Comply with the site-specific erosion and sediment control, and post-construction requirements in this General Permit.

  2) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of phosphorus through the required pollutant source assessment are to implement BMPs specific to preventing or controlling stormwater exposure to the sources of phosphorus. Furthermore, Responsible Dischargers are to comply with the RUSLE2 modeling requirements in Attachment H, Section I.D.2. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations.

  The San Diego Creek and Newport Bay Watershed Nutrients TMDL has waste load allocation compliance deadline set in 2007 for construction sites. Since this compliance deadline has passed, the compliance

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actions are applicable to the Responsible Dischargers upon the effective date of this General Permit.

e. Sediment TMDLs

Twenty-five (25) sediment TMDLs are translated for this General Permit. Sediment is the loose sand, clay, silt, and other soil particles that settle at the bottom of a body of water. Sediment can be detrimental to aquatic life by interfering with photosynthesis, respiration, growth, reproduction, and oxygen exchange in water bodies.[170] Sediment can be transported in construction site discharges due to excessive erosion.[171] At construction sites, the rate of erosion is increased due to increased amount of exposed and disturbed soil. Therefore, construction sites that discharge into the watersheds of these water bodies are considered Responsible Dischargers and shall comply with the requirements set forth in these TMDLs.

i. Albion River Sediment TMDL[172]

The United States Environmental Protection Agency (U.S. EPA) established the Albion River Sediment TMDL on December 20, 2001, to address the impairment on the Albion River and its tributaries due to sediment.

The implementation requirements for the Albion River Sediment TMDL in this General Permit are based on the North Coast Sediment TMDL Implementation Policy[173] adopted on November 29, 2004. The North Coast Sediment TMDL Implementation Policy requires the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[174] Construction

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170 California Stormwater Quality Association, Construction Stormwater Best Management Practice Handbook (August 2011), <http://www.casqa.org/> [as of May 20, 2021] (CASQA Construction BMP Handbook)

171 CASQA Construction BMP Handbook, p. 1-7.

172 United States Environmental Protection Agency Region IX, Albion River Sediment TMDL for Sediment (December 2001), <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/albion_river/pdf/albionfinaltmdl.pdf> [as of May 20, 2021] (Albion River Sediment TMDL)

173 North Coast Regional Water Quality Control Board, Total Maximum Daily Load Implementation Policy Statement for Sediment-Impaired Receiving Waters in the North Coast Region (November 29, 2004). <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/sediment_tmdl_implementation/> [as of May 20, 2021] (North Coast Sediment TMDL Implementation Policy)

174 North Coast Sediment TMDL Implementation Policy, p. 3.

stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Albion River Sediment TMDL.

- Waste Load Allocation Translation

  This TMDL set the sediment waste load allocation for point sources at zero (0) because there are no significant point sources of sediment in the Albion River watershed.[175]

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H. The Regional Water Quality Control Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

ii. Big River Sediment TMDL[176]

The U.S. EPA established the Big River Sediment TMDL on December 20, 2001, to address the impairment of Big River Sediment TMDL and its tributaries due to sediment.

The implementation requirements for the Big River Sediment TMDL in this General Permit are based on the North Coast Sediment TMDL Implementation Policy adopted on November 29, 2004. The Sediment TMDL Implementation Policy requires the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[177] Construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Big River Sediment TMDL.

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175 Albion River Sediment TMDL, p. 35.

176 United States Environmental Protection Agency Region IX, Big River Total Maximum Daily Load for Sediment (December 2001) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/big_river/pdf/bigfinaltmdl.pdf> [as of May 20, 2021] (Big River Sediment TMDL)

177 North Coast Sediment TMDL Implementation Policy, p. 3.

- Waste Load Allocation Translation

  This TMDL set the sediment waste load allocation for point sources at zero (0) because there are no significant point sources of sediment in the Big River Sediment TMDL watershed.[178]

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

iii. Eel River – Lower Main Sediment TMDL[179]

The U.S. EPA established the Eel River – Lower Main Sediment TMDL on December 18, 2007, to address the impairment of the Lower Eel River and its tributaries due to sediment.

The implementation requirements for the Eel River – Lower Main Sediment TMDL in this General Permit are based on the North Coast Sediment TMDL Implementation Policy[180] adopted on November 29, 2004. The North Coast Sediment TMDL Implementation Policy requires the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[181] Construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Eel River – Lower TMDL.

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178 Big River Sediment TMDL, p. 36.

179 United States Environmental Protection Agency Region IX, Lower Eel River Total Maximum Daily Loads for Temperature and Sediment (December 18, 2007) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/eel_river_lower/pdf/LER-TMDL-final-121807-signed.pdf> [as April 28, 2022] (Eel River-Lower Main Sediment TMDL)

180 North Coast Regional Water Quality Control Board, Total Maximum Daily Load Implementation Policy Statement for Sediment-Impaired Receiving Waters in the North Coast Region (November 29, 2004) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/sediment_tmdl_implementation/> [as of May 20, 2021] (North Coast Sediment TMDL Implementation Policy)

181 North Coast Sediment TMDL Implementation Policy, p. 3.

- Waste Load Allocation Translation

  The source analysis supporting the allocations in Table 36 evaluated sediment loading at a subwatershed scale. The source analysis did not attempt to distinguish sediment loading at the scale of specific land ownerships nor did the analysis distinguish loading between land areas subject to NPDES regulation, or land areas not subject to NPDES regulation. Therefore, this TMDL includes separate but identical load allocations for non-point sources and waste load allocations for diffuse NPDES-permitted sources for each subarea. The diffuse NPDES-permitted pollutant sources are addressed in the statewide NPDES municipal stormwater permit for the California Department of Transportation, this statewide Construction Stormwater General Permit, the statewide Industrial Stormwater General Permit, and the City of Fortuna NPDES municipal stormwater permit.[182]

Table 36 – Sediment Load Allocations for the Lower Eel River Watershed and its Tributaries

Sediment Source	Load Allocation (tons/mi^2/year)	1955-2003 Loading (tons/mi^2/year)	Percent Reduction
Road (Episodic)	9	43	80 percent
Road (Chronic)	17	115	85 percent
Bank Erosion	6	21	70 percent

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Construction sites covered by this General Permit are considered to be human related sources of sediment to the watershed and therefore, Responsible Dischargers. Responsible Dischargers are not to exceed the load allocations assigned to roads (episodic and chronic) and bank erosion, as the allocations assigned to timber harvest and skid trails do not typically apply to construction sites. Responsible Dischargers calculate their annual loading by multiplying the area of the site with these load allocations.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Therefore, Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

182 Eel River – Lower Main Sediment TMDL, p. 64.

iv. Eel River – Middle Fork Sediment TMDL[183]

The U.S. EPA established the Eel River – Middle Fork Sediment TMDL in December 2003 to address the impairment of the Middle Fork Eel River and tributaries due to sediment.

The implementation requirements for the Eel River – Middle Fork Sediment TMDL in this General Permit are based on the North Coast Sediment TMDL Implementation Policy adopted on November 29, 2004. The North Coast Sediment TMDL Implementation Policy requires the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[184] Construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Eel River – Middle Fork Sediment TMDL.

- Waste Load Allocation Translation

  This TMDL identified discharges under the Construction General Permit and Caltrans Statewide Permit as current and prospective point sources that may discharge sediment in the watershed. Discharges from these point sources cannot be readily determined and possible loading from these sources is not distinguished from general management-related loading in the source analysis. Therefore, this TMDL set the load allocations for nonpoint sources to also represent waste load allocations for point sources that would be covered by general NPDES permits.[185]

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Table 37 – Sediment Load Allocations for the Middle Fork Eel River Watershed and its Tributaries (tons/mi^2/yr)

Sediment Source	Black Butte	Elk Creek	Round Valley	Upper Middle Fork	Williams/ Thatcher	Basin-wide Load
Small Management Sources	7	41	9	9	19	23
Percent Reduction	0 percent	32 percent	95 percent	0 percent	89 percent	70 percent

183 United States Environmental Protection Agency Region IX, Final Middle Fork Eel River Total Maximum Daily Loads for Temperature and Sediment (December 2003) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/eel_river_middle_fork/pdf/tmdl.pdf> [as of April 28, 2022] (Eel River – Middle Fork Sediment TMDL)

184 North Coast Sediment TMDL Implementation Policy.

185 Eel River – Middle Fork Sediment TMDL, p. 45.

The construction sites covered by this General Permit are considered to be human related sources of sediment to the watershed. Responsible Dischargers are not to exceed the load allocations or reductions assigned to "small management sources." These allocations vary by subwatershed, as noted in Table 37 above. Responsible Dischargers calculate their annual loading by multiplying the area of the site with the appropriate load allocation.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Therefore, Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

v. Eel River – Middle Main Sediment TMDL[186]

The U.S. EPA established the Eel River – Middle Main Sediment TMDL on December 31, 2005, to address the impairment of the Middle Main Eel River (from Dos Rios to the South Fork Eel River) and its tributaries due to sediment. A portion of the watershed is part of the Round Valley Indian Country. This TMDL does not apply to lands under tribal jurisdiction.

The implementation requirements for the Eel River – Middle Main Sediment TMDL in this General Permit are based on the North Coast Sediment TMDL Implementation Policy adopted on November 29, 2004. The Sediment TMDL Implementation Policy requires the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[187] Construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Eel River – Middle Main Sediment TMDL.

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186 United States Environmental Protection Agency Region IX, Final Middle Main Eel River and Tributaries Total Maximum Daily Loads for Temperature and Sediment (December 31, 2005) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/eel_river_middle_main/pdf/mainmdl-eel-final.pdf> [as of April 28, 2022] (Eel River – Middle Main Sediment TMDL)

187 North Coast Sediment TMDL Implementation Policy.

- Waste Load Allocation Translation

  This TMDL set the sediment waste load allocation for point sources at zero (0) for construction sites because this source is not significant.[188]

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Therefore, Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

vi. Eel River – North Fork Sediment TMDL[189]

The U.S. EPA established the Eel River – North Fork Sediment TMDL on December 30, 2002, to address the impairment of the North Fork Eel River and its tributaries due to sediment. These TMDLs do not apply to lands under tribal jurisdiction.

The implementation requirements for the Eel River – North Fork Sediment TMDL in this General Permit are based on the North Coast Sediment TMDL Implementation Policy adopted on November 29, 2004. The North Coast Sediment TMDL Implementation Policy requires the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[190] Construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Eel River – North Fork Sediment TMDL.

- Waste Load Allocation Translation

  This TMDL set the sediment waste load allocation for point sources at zero (0) because there are no significant point sources of sediment in the North Fork Eel River watershed.[191]

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188 Eel River – Middle Main Sediment TMDL, p. 45.

189 United States Environmental Protection Agency Region IX, Final North Fork Eel River Total Maximum Daily Loads for Sediment and Temperature (December 30, 2002) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/eel_river_north_fork/pdf/final.pdf> [as of April 28, 2022] (Eel River – North Fork Sediment TMDL)

190 North Coast Sediment TMDL Implementation Policy.

191 Eel River – North Fork Sediment TMDL, p. 23.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Therefore, Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

vii. Eel River – Upper Main Sediment TMDL[192]

The U.S. EPA established the Eel River – Upper Main Sediment TMDL on December 29, 2004, to address the Impairment of the Upper Main Eel River (including Tomki Creek, Outlet Creek, and Lake Pillsbury) and its tributaries due to sediment.

The implementation requirements for the Eel River – Upper Main Sediment TMDL in this General Permit are based on the North Coast TMDL Implementation Policy adopted on November 29, 2004. The North Coast Sediment Implementation Policy requires the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[193] Construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Eel River – Upper Main Sediment TMDL.

- Waste Load Allocation Translation

  This TMDL identified discharges under the Construction General Permit and Caltrans Statewide Permit as current and prospective point sources that may discharge sediment in the watershed and are therefore Responsible Dischargers. Discharges from these point sources cannot be readily determined and possible loading from these sources is not distinguished from general management-related loading in the source analysis. Therefore, this TMDL set the load allocations for nonpoint

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192 United States Environmental Protection Agency Region IX, Final Upper Main Eel River and Tributaries (including Tomki Creek, Outlet Creek and Lake Pillsbury) Total Maximum Daily Loads for Temperature and Sediment (December 29, 2004) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/eel_river_upper_main/pdf/uer-tmdl-final-12-28.pdf> [as of May 20, 2021] (Eel River – Upper Main Sediment TMDL)

193 North Coast Sediment TMDL Implementation Policy.

sources to also represent waste load allocations for point sources that would be covered by general NPDES permits.[194]

Table 38 – Sediment Load Allocations for the Upper Main Eel River Watershed and its Tributaries

Sediment Source	Load Allocation (tons/mi^2/year)	1940-2004 Loading (tons/mi^2/year)	Percent Reduction
Large Features (>3,000 yds^3)	36	71	49 percent
Road Related (Small Features)	14	28	50 percent

Construction sites covered by this General Permit are considered to be human (land management) related sources of sediment to the watershed. Responsible Dischargers are not to exceed the load allocations assigned to road related projects or "large features" as this General Permit regulates projects that disturb an acre or greater of land. Responsible Dischargers calculate their annual loading by multiplying the area of the site with these load allocations.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Therefore, Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

viii. Eel River – South Fork Sediment TMDL[195]

The U.S. EPA established the Eel River – South Fork TMDL on December 16, 1999, to address the impairment of the South Fork Eel River and its tributaries due to sediment. These TMDLs do not apply to lands under tribal jurisdiction.

The implementation requirements for the Eel River – South Fork Sediment TMDL in this General Permit are based on the North Coast Sediment TMDL Implementation Policy adopted on November 29, 2004. The North Coast Sediment TMDL Implementation Policy requires the use of existing

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194 Eel River – Upper Main Sediment TMDL, p. 54.

195 United States Environmental Protection Agency Region IX, South Fork Eel River Total Maximum Daily Loads for Sediment and Temperature (December 16, 1999) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/eel_river_south_fork/pdf/eel.pdf> [as of April 28, 2022] (Eel River – South Fork Sediment TMDL)

permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[196] Construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Eel River – South Fork Sediment TMDL.

- Waste Load Allocation Translation

  This TMDL set the sediment waste load allocation for point sources at zero (0) because there are no significant point sources of sediment in the North Fork Eel River watershed.[197]

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Therefore, Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

ix. Gualala River Sediment TMDL[198]

The U.S. EPA established the Gualala River Sediment TMDL in December 2001 to address the impairment of the Gualala River and its tributaries due to sediment.

The implementation requirements for the Gualala River Sediment TMDL in this General Permit are based on the North Coast TMDL Implementation Policy adopted on November 29, 2004. The Sediment TMDL Implementation Policy requires the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[199] Construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Gualala River Sediment TMDL.

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196 North Coast Sediment TMDL Implementation Policy.

197 Eel River – North Fork Sediment TMDL, p. 23

198 United States Environmental Protection Agency Region IX, Gualala River Total Maximum Daily Load for Sediment (December, 2001) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/gualala_river/110707/gualalafinaltmdl.pdf> [as of May 20, 2021] (Gualala River Sediment TMDL)

199 North Coast Sediment TMDL Implementation Policy.

- Waste Load Allocation Translation

  This TMDL set the sediment waste load allocation for point sources at zero (0) because there are no significant individual point sources of sediment in the Gualala River watershed.[200]

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Therefore, Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

x. Mad River Sediment TMDL[201]

The U.S. EPA established the Mad River Sediment TMDL on December 21, 2007, to address the impairment of the Mad River and its tributaries due to sediment.

The implementation requirements for the Mad River Sediment TMDL in this General Permit are based on the North Coast TMDL Implementation Policy adopted on November 29, 2004. The Sediment TMDL Implementation Policy requires the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[202] Construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Mad River Sediment TMDL.

- Waste Load Allocation Translation

  The source analysis evaluated sediment loading at a subwatershed scale. The source analysis did not attempt to distinguish sediment loading at the scale of specific land ownerships nor did it distinguish loading between land areas subject to NPDES regulation and land areas not subject to NPDES regulation. Therefore, this TMDL includes separate but identical load allocations for nonpoint sources and waste

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200 Gualala River Sediment TMDL, p. 17.

201 United States Environmental Protection Agency Region IX, Mad River Total Maximum Daily Loads for Sediment and Turbidity (December 21, 2007) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/mad_river/pdf/Mad-TMDL-122107-signed.pdf> [as of May 20, 2021] (Mad River Sediment TMDL)

202 North Coast Sediment TMDL Implementation Policy.

load allocations for diffuse point sources. Construction activities permitted under this General Permit are considered diffuse point sources and are therefore Responsible Dischargers for this TMDL. This TMDL assigns a waste load allocation for permitted construction activities equivalent to the load allocation for roads.[203]

Table 39 – Sediment Load Allocations for the Mad River Watershed

Sediment Source	Load Allocation (tons/mi^2/year)	1940-2004 Loading (tons/mi^2/year)	Percent Reduction
Roads (Total Sediment)	174	1,540	89 percent

Responsible Dischargers are not to exceed the load allocations for total sediment. Responsible Dischargers are required to calculate their project site annual loading by multiplying the area of the site with this load allocation.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocation. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Therefore, Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

xi. Mattole River Sediment TMDL[204]

The U.S. EPA established the Mattole River Sediment TMDL on December 30, 2002, to address the impairment of the Mattole River and its tributaries due to sediment.

The implementation requirements for the Mattole River Sediment TMDL in this General Permit are based on the North Coast TMDL Implementation Policy adopted on November 29, 2004. The Sediment TMDL Implementation Policy requires the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[205] The discharge of soil, silt, bark,

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203 Mad River Sediment TMDL, p. 91.

204 United States Environmental Protection Agency Region IX, Mattole River Total Maximum Daily Loads for Sediment and Temperature (December 30, 2002) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/mattole_river/110707/mattole.pdf> [as of May 20, 2021] (Mattole River Sediment TMDL)

205 North Coast Sediment TMDL Implementation Policy.

sawdust, or other organic and earthen material from construction activities in quantities deleterious to fish, wildlife, or other beneficial uses is prohibited.[206] Construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Mattole River Sediment TMDL.

- Waste Load Allocation Translation

  This TMDL set the sediment waste load allocation for point sources at zero (0) because there are no point sources of sediment in the Mattole River watershed.[207]

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Therefore, Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

xii. Navarro River Sediment TMDL[208]

The U.S. EPA established the Navarro River Sediment TMDL in December 2000 to address the impairment of the Navarro River and its tributaries due to sediment.

The implementation requirements for the Navarro River Sediment TMDL in this General Permit are based on the North Coast TMDL Implementation Policy adopted on November 29, 2004. The Sediment TMDL Implementation Policy requires the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[209] The discharge of soil, silt, bark, sawdust, or other organic and earthen material from construction activities in quantities deleterious to fish, wildlife, or other beneficial uses is

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206 Mattole River Sediment TMDL p. 9.

207 Mattole River Sediment TMDL, p. 41.

208 United States Environmental Protection Agency Region IX, Navarro River Total Maximum Daily Loads for Temperature and Sediment (December 2000) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/navarro_river/110708/navarro.pdf> [as of May 20, 2021] (Navarro River Sediment TMDL)

209 North Coast Sediment TMDL Implementation Policy.

prohibited.[210] Construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Navarro River Sediment TMDL.

- Waste Load Allocation Translation

  This TMDL set the sediment waste load allocation for point sources at zero (0) because there are no known point sources of sediment in the Navarro River and its tributaries.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Therefore, Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

xiii. Noyo River Sediment TMDL[211]

The U.S. EPA established the Noyo River Sediment TMDL on December 16, 1999, to address the impairment of Noyo River due to sediment.

The implementation requirements for the Noyo River Sediment TMDL in this General Permit are based on the North Coast TMDL Implementation Policy adopted on November 29, 2004. The Sediment TMDL Implementation Policy requires the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[212] The discharge of soil, silt, bark, sawdust, or other organic and earthen material from construction activities in quantities deleterious to fish, wildlife, or other beneficial uses is prohibited.[213] Construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Noyo River Sediment TMDL.

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210 Navarro River Sediment TMDL, p. 3.

211 United States Environmental Protection Agency Region IX, Noyo River Total Maximum Daily Load for Sediment (December 16, 1999) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/noyo_river/pdf/noyo.pdf> [as of May 20, 2021] (Noyo River Sediment TMDL)

212 North Coast Sediment TMDL Implementation Policy.

213 Noyo River Sediment TMDL, p. 10.

- Waste Load Allocation Translation

  This TMDL set the sediment waste load allocation for point sources equal to zero (0) because there are no point sources of sediment in Noyo River.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Therefore, Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

xiv. Scott River Sediment TMDL[214]

The North Coast Regional Water Quality Control Board adopted the Scott River Sediment TMDL on December 7, 2005, to address the impairment of Scott River due to sediment.

The implementation requirements for the Scott River Sediment TMDL in this General Permit are based on the Scott River TMDL Action Plan[215] which describes the specific implementation actions necessary to fulfill the obligations of the Sediment TMDL Implementation Policy. The Sediment TMDL Implementation Policy requires the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[216] Construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Scott River Sediment TMDL.

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214 United States Environmental Protection Agency Region IX, Scott River Total Maximum Daily Load for Sediment (December 7, 2005) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/scott_river/ > [as of May 20, 2021] (Scott River Sediment TMDL)

215 North Coast Regional Water Quality Control Board, Action Plan for the Scott River Sediment and Temperature TMDLs (August 11, 2006) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/scott_river/060307/bpl/Basin_Plan_Language.pdf> [as of May 20, 2021] (Scott River TMDL Action Plan)

216 North Coast Sediment TMDL Implementation Policy.

- Waste Load Allocation Translation

  Construction sites covered by this General Permit are considered to be anthropogenic related sources of sediment to the watershed. Responsible Dischargers are not to exceed the sum of load allocations assigned to road surface erosion and large or small discrete streamside features, which totals to 69 tons/mi^2/year.[217] Responsible Dischargers calculate their annual loading by multiplying the area of the site with this load allocation.

- Compliance Actions and Schedule

  The Scott River TMDL Action Plan describes the implementation actions necessary to achieve the TMDL within 40 years of U.S. EPA approval of the action plan or September 8, 2046. Since the compliance deadline is in the far future, compliance with this General Permit is considered compliance with the TMDL. Future reissuances of this General Permit may incorporate additional or revised compliance requirements or interim targets to progress towards the required final compliance by September 8, 2046. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocation.

xv. Ten Mile River Sediment TMDL[218]

The U.S. EPA established the Ten Mile River Sediment TMDL in December 2000 to address the impairment of Ten Mile River due to sediment.

The implementation requirements for the Ten Mile River Sediment TMDL in this General Permit are based on the North Coast TMDL Implementation Policy adopted on November 29, 2004. The Sediment TMDL Implementation Policy requires the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[219] Construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Ten Mile River Sediment TMDL.

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217 Scott River TMDL Action Plan, p. 4-5.00.

218 United States Environmental Protection Agency Region IX, Ten Mile River Total Maximum Daily Load for Sediment (December 2000) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/ten_mile_river/pdf/tenmile.pdf> [as of May 20, 2021] (TMDL Mile River Sediment TMDL)

219 North Coast Sediment TMDL Implementation Policy.

- Waste Load Allocation Translation

  This TMDL set a sediment waste load allocation for point sources at zero (0) as there are no point sources of discharge in the basin.[220]

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H. The Regional Water Quality Control Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Therefore, Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

xvi. Trinity River Sediment TMDL[221]

The U.S. EPA established the Trinity River Sediment TMDL on December 20, 2001, to address the impairment of the Trinity River and its tributaries due to sediment. This TMDL does not apply to lands under tribal jurisdiction and South Fork Trinity River.

The implementation requirements for the Trinity River Sediment TMDL in this General Permit are based on the Sediment TMDL Implementation Policy adopted on November 29, 2004. The Sediment TMDL Implementation Policy directs the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[222]

- Waste Load Allocation Translation

  This TMDL identified discharges under the Construction General Permit from construction sites larger than 5 acres as current and prospective point sources that may discharge sediment in the watershed and are therefore considered Responsible Dischargers. The source analysis evaluated sediment loading at a subarea scale. The source analysis did not attempt to distinguish sediment loading at the scale of specific land ownerships nor did it distinguish between land areas subject to NPDES

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220 Ten Mile River Sediment TMDL, p. 5.

221 United States Protection Agency Region IX, Trinity River Total Maximum Daily Load for Sediment (December 20, 2001) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/trinity_river/pdf/finaltrinitytmdl.pdf> [as of September 7, 2018] (Trinity River Sediment TMDL)

222 North Coast Sediment TMDL Implementation Policy.

regulation and land areas not subject to NPDES regulation. Therefore, this TMDL includes separate but identical load allocations for nonpoint sources and waste load allocations for each subarea.[223]

Table 40 – TMDL and Allocations by Source Category for Upper Area (tons/mi²/year)

Source Categories	Reference Subwatersheds[1]	Westside Tributaries[2]	Upper Trinity[3]	East Fork Tributaries[4]	Eastside Tributaries[5]
Total Management	281	105	690	65	60
Percent Reduction	25 percent	33 percent	46 percent	83 percent	37 percent

[1] Stuarts Fork, Swift Creek, Coffee Creek
[2] Stuart Arm Area, Stoney Creek, Mule Creek, East Fork Stuart Fork, West Side Trinity Lake, Hatchet Creek, Buckeye Creek
[3] Upper Trinity River, Tangle Blue, Sunflower, Graves, Bear Upper Trinity Mainstem Area, Ramshorn Creek, Ripple Creek, Minnehaha Creek, Snowslide Gulch Area, Scorpion Creek
[4] East Fork Trinity, Cedar Creek, Squirrel Gulch Area
[5] East Side Tributaries, Trinity Lake

Table 41 – TMDL and Allocations by Source Category for Upper Middle Area (tons/mi²/year)

Source Categories	Weaver and Rush Creeks	Deadwood Creek, Hoadley Gulch, and Poker Bar Area	Lewiston Lake Area	Grass Valley Creek[1]	Indian Creek	Reading and Browns Creek
Total Management	169	68	49	44	81	66
Percent Reduction	41 percent	88 percent	74 percent	97 percent	96 percent	82 percent

[1] The rate in Grass Valley Creek do not account for the amount of sediment trapped by Buckhorn Dam and Hamilton Ponds

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223 Trinity River Sediment TMDL, p. 58.

Table 42 – TMDL and Allocations by Source Category for Lower Middle Area (tons/mi²/year)

Source Categories	Reference Subwatersheds[1]	Canyon Creek[2]	Upper Tributaries[3]	Middle Tributaries[4]	Lower Tributaries[5]
Total Management (tons/mi²/year)	24	326	67	53	55
Percent Reduction	0 percent	87 percent	50 percent	35 percent	39 percent

[1] New River, Big French, Manzanita, North Fork, East Fork, North Fork
[2] Canyon Creek
[3] Dutch, Soldier, Oregon Gulch, Conner Creek Area
[4] Big Bar Area, Prairie Creek, Little French Creek
[5] Swede, Italian, Canadian, Cedar Flat, Mill, McDonald, Hennessy, Quinby Creek Area, Hawkins, Sharber

Table 43 – TMDL and Allocations by Source Category for Lower Area (tons/mi²/year)

Source Categories	Reference Subwatersheds[1]	Mill Creek and Tish Tang	Willow Creek	Campbell Creek and Supply Creek	Lower Mainstem Area and Coon Creek[2]
Total Management (tons/mi²/year)	528	210	94	1961	63
Percent Reduction	11 percent	74 percent	91 percent	87 percent	44 percent

[1] Horse Linto Creek
[2] Since background rates for Lower Mainstem Area and Coon Creek were not available from GMA (2001), EPA used the same rate as was calculated for the Quinby Creek Area, which is immediately upstream, because Quinby Creek Area is comparable in size and underlain by the same geology type (Galice Formation).

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The U.S. EPA expects the waste load allocations to be evaluated on a ten-year rolling average basis because of the natural variability in sediment delivery rates and does not expect the load allocation to be met for every square mile within a source category.[224] Responsible Dischargers are not to exceed the load allocations or reductions assigned to the "Total Management" source category, provided in tons/mi²/yr. These allocations vary by subwatershed, as noted in Table 40 through Table 43 above. Responsible Dischargers calculate their

224 Trinity River Sediment TMDL, p. 63.

annual loading by multiplying the area of the site with the appropriate load allocation.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Therefore, Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

xvii. Van Duzen River Sediment TMDL[225]

The U.S. EPA established the Van Duzen River Sediment TMDL on December 16, 1999, to address the impairment of the Van Duzen River and its tributaries due to sediment. These TMDLs do not apply to lands under tribal jurisdiction.

The implementation requirements for the Van Duzen River Sediment TMDL in this General Permit are based on the North Coast Sediment TMDL Implementation Policy adopted on November 29, 2004. The North Coast Sediment TMDL Implementation Policy requires the use of existing permitting and enforcement tools to pursue compliance with sediment-related standards by all dischargers of sediment waste.[226] Construction stormwater dischargers covered under this General Permit are considered Responsible Dischargers for the Van Duzen River Sediment TMDL.

- Waste Load Allocation Translation

  This TMDL set the sediment waste load allocation for point sources at zero (0) because there are no point sources of sediment in the Van Duzen River watershed.[227]

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and the Sediment TMDL Requirements in Attachment H.

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225 United States Environmental Protection Agency Region IX, Van Duzen River and Yager Creek Total Maximum Daily Load for Sediment (December 16, 1999) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/vanduzen_river/pdf/vanduzen.pdf> [as of May 20, 2021] (Van Duzen River Sediment TMDL)

226 North Coast Sediment TMDL Implementation Policy.

227 Van Duzen River Sediment TMDL, p. 46.

The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocation. The North Coast Sediment TMDL Implementation Policy does not include an implementation date for this TMDL. Therefore, Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

xviii. Lagunitas Creek Sediment TMDL[228]

The San Francisco Bay Regional Water Quality Control Board adopted the Lagunitas Creek Sediment TMDL on June 11, 2014, to address the impairment of Lagunitas Creek due to sediment. Point sources of sediment in the watershed contribute minimal sediment loading and are associated with municipal and construction stormwater runoff, which are regulated through NPDES permits. Construction sites that discharge into the Lagunitas Creek watershed are therefore considered Responsible Dischargers.

- Waste Load Allocation Translation

  The Lagunitas Creek Sediment TMDL set the sediment waste load allocation for construction stormwater runoff at 30 tons/year, which is equivalent to the current load from construction sites. Per the implementation measures of this TMDL, complying with the requirements of this General Permit is appropriate in addressing this waste load allocation.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit upon its effective date. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocation.

  The final compliance deadline for the Lagunitas Creek Sediment TMDL is June 11, 2034. Future reissuances of this General Permit may incorporate additional or revised compliance requirements or interim targets to progress towards the required final compliance by June 11, 2034.

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228 San Francisco Bay Regional Water Quality Control Board, Lagunitas Creek Fine Sediment Reduction and Habitat Enhancement Plan (March 10, 2014), <https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/lagunitascrksediment/LagunitasSedimentHabitat%20StaffReportPublicReviewDraft.pdf> [as of April 28, 2022] (Lagunitas Creek Sediment TMDL)

xix. Napa River Sediment TMDL[229]

The San Francisco Bay Regional Water Quality Control Board adopted the Napa River Sediment TMDL on September 9, 2009, to address the impairment of Napa River due to sediment. Point sources of sediment that were identified as contributors of sediment to the watershed are associated with urban stormwater runoff, including construction stormwater runoff, and wastewater treatment plants, which are regulated by NPDES permits. Construction sites that discharge into the Napa River watershed are therefore considered Responsible Dischargers.

- Waste Load Allocation Translation

  The Napa River Sediment TMDL set the sediment waste load allocation for construction stormwater runoff at 500 tons/year, which is equivalent to the current load from construction sites. Per the implementation measures of this TMDL, complying with the requirements of this General Permit is appropriate in addressing this waste load allocation.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit upon its effective date. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocation.

  The final compliance deadline for the Napa River Sediment TMDL is September 9, 2029. Future reissuances of this General Permit may incorporate additional or revised compliance requirements or interim targets to progress towards the required final compliance by September 9, 2029.

xx. Pescadero and Butano Creek Sediment TMDL[230]

The San Francisco Bay Regional Water Quality Control Board adopted the Pescadero and Butano Creek Sediment TMDL on June 13, 2018, to

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229 San Francisco Bay Regional Water Quality Control Board, Napa River Sediment Reduction and Habitat Enhancement Plan (September 15, 2009), <https://www.waterboards.ca.gov/rwqcb2/water_issues/programs/TMDLs/napariversedimenttmdl.html#:~:text=The%20Napa%20River%20Sediment%20TMDL,healthy%20fishery%20in%20this%20watershed.> [as of April 28, 2022] (Napa River Sediment TMDL)

230 San Francisco Bay Regional Water Quality Control Board, Pescadero-Butano Watershed Sediment TMDL and Habitat Enhancement Plan (December 11, 2018),

address the impairment of Pescadero and Butano Creek due to sediment. The only known point sources of sediment to the watershed are associated with stormwater runoff from state highways, municipalities, and construction sites; which are regulated by NPDES permits. Construction sites that discharge into the Pescadero-Butano Creek watershed are therefore considered Responsible Dischargers.

- Waste Load Allocation Translation

  The Pescadero and Butano Creek Sediment TMDL set the sediment waste load allocation for construction stormwater runoff at 150 tons/year, which is equivalent to the current load from construction sites. Per the implementation measures of this TMDL, complying with the requirements of this General Permit is appropriate in addressing this waste load allocation.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit upon its effective date. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations.

  The final compliance deadline for the Pescadero and Butano Creek Sediment TMDL is June 13, 2038. Future reissuances of this General Permit may incorporate additional or revised compliance requirements or interim targets to progress towards the required final compliance by June 13, 2038.

xxi. Sonoma Creek Sediment TMDL[231]

The San Francisco Bay Regional Water Quality Control Board adopted the Sonoma Creek Sediment TMDL on December 10, 2008, to address the impairment of Sonoma Creek due to sediment. The only known point sources of sediment to the watershed are associated with urban stormwater runoff from state highways, municipalities, industrial facilities, and construction sites; which are regulated by NPDES permits. Construction

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<https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/pescadero/BPA%20FINAL.pdf> [as of May 20, 2021] (Pescadero and Butano Creek Sediment TMDL)

231 San Francisco Bay Regional Water Quality Control Board, Sonoma Creek Watershed Sediment TMDL and Habitat Enhancemnt Plan (December 12, 2008), <https://www.waterboards.ca.gov/rwqcb2/water_issues/programs/TMDLs/napariversedimenttmdl.html> [April 28, 2022] (Sonoma Creek Sediment TMDL)

sites that discharge into the Sonoma Creek watershed are therefore considered Responsible Dischargers.

- Waste Load Allocation Translation

  The Sonoma Creek Sediment TMDL set the sediment waste load allocation for construction stormwater runoff at 300 tons/year, which is equivalent to the current load from construction sites. Per the implementation measures of this TMDL, complying with the requirements of this General Permit is appropriate in addressing this waste load allocation.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit upon its effective date. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocation.

  The final compliance deadline for the Sonoma Creek Sediment TMDL is December 10, 2028. Future reissuances of this General Permit may incorporate additional or revised compliance requirements or interim targets to progress towards the required final compliance by December 10, 2028.

xxii. San Lorenzo River Sediment TMDL[232]

The Central Coast Regional Water Quality Control Board adopted the San Lorenzo River Sediment TMDL on May 16, 2003, to address the sediment related impairment of San Lorenzo River which is accelerated by anthropogenic watershed disturbances. The source analysis did not distinguish sediment loading between point and nonpoint sources, but rather assigned load allocations to water bodies within the San Lorenzo River watershed. Construction activities were included under the load allocation for Other Urban and Rural Lands sediment category. Therefore, construction sites covered under this General Permit are considered Responsible Dischargers.

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232 Central Coast Regional Water Quality Control Board, San Lorenzo River Total Maximum Daily Load and Implementation Plan for Sediment Including Carbonera Creek, Lompico Creek, and Shingle Mill Creek (May 16, 2003), <https://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/san_lorenzo/sediment/index.html> [as of May 20, 2021] (San Lorenzo River Sediment TMDL)

- Waste Load Allocation Translation

  The San Lorenzo River Sediment TMDL did not establish a waste load allocation for construction sites, as it is included in the load allocation for the Other Urban and Rural Lands sediment category as indicated in Table 44 below.

Table 44 – Other Urban and Rural Land Load Allocations for San Lorenzo River Sediment TMDL

Water Body	Allocation (tons/yr)
Carbonara Creek	2,622
Lompico Creek	965
Shingle Mill Creek	310
San Lorenzo River	43,368

Per the San Lorenzo River Sediment TMDL implementation plan, complying with the requirements of this General Permit is appropriate to meet the load allocations.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit upon its effective date. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about excessive sediment loading. The final compliance deadline for the San Lorenzo River Sediment TMDL is May 16, 2028. Future reissuances of this General Permit may incorporate additional or revised compliance requirements or interim targets to progress towards the required final compliance by May 16, 2028.

xxiii. Squaw Creek Sediment TMDL[233]

The Lahontan Regional Water Quality Control Board adopted the Squaw Creek Sediment TMDL in April 2006 to address the impairment of Squaw Creek due to sediment. Accelerated hillslope erosion from land disturbances related to development in natural erosion-prone areas contribute to excess sediment delivery to the creek. Therefore, construction sites covered under this General Permit are considered Responsible Dischargers.

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233 Lahontan Regional Water Quality Control Board, Total Maximum Daily Load for Sediment, Squaw Creek, Placer County (April 2006), <https://www.waterboards.ca.gov/lahontan/water_issues/programs/tmdl/squaw_creek/docs/basin_plan_amendment_final.pdf> [as of May 20, 2021] (Squaw Creek Sediment TMDL)

- Waste Load Allocation Translation

  There are currently no NPDES-regulated point sources in the watershed; therefore, the waste load allocation is zero (0).[234] Additionally, the load allocations are not viewed as appropriate for discharge specifications in permits as they are broad estimates. Based on the assumptions for assigning the requirements of this TMDL, complying with the requirements of this General Permit is appropriate in addressing this waste load allocation.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit upon its effective date. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about excessive sediment loading.

  The final compliance deadline for the Squaw Creek Sediment TMDL was estimated to be 20 years, or April 2026. Future reissuances of this General Permit may incorporate additional or revised compliance requirements or interim targets to progress towards the required final compliance by April 2026.

xxiv. Truckee River Sediment TMDL[235]

The Lahontan Regional Water Quality Control Board adopted the Truckee River Sediment TMDL in May 2008 to address the impairment of the Middle Truckee River Watershed due to sediment discharges during high-flow events such as those caused by thunderstorms. Primary sources of sediment include runoff from urban areas, dirt roads, legacy erosion sites, and graded ski runs. Although not explicitly stated, construction sites within urban areas or that utilize dirt roads, covered under this General Permit, can contribute to sediment loading in the Truckee River watershed and are therefore considered Responsible Dischargers.

- Waste Load Allocation Translation

  This TMDL set a total waste load allocation for all sediment point sources at 4,936 tons/yr. The source analysis did not attempt to distinguish sediment loading at the scale of specific land ownerships.

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234 Squaw Creek Sediment TMDL, p. 2.

235 Lahontan Regional Water Quality Control Board, Total Maximum Daily Load for Sediment Middle Truckee River Watershed (May 2008), <https://www.waterboards.ca.gov/lahontan/water_issues/programs/tmdl/truckee/docs/adopted_basinplan_amendment.pdf> [as of May 20, 2021] (Truckee River Sediment TMDL)

NPDES-regulated point sources are expected to achieve compliance through the requirements of their respective NPDES permits. Per the implementation plan of the Truckee River Sediment TMDL, compliance with this General Permit is appropriate in addressing this waste load allocation.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit upon its effective date. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about excessive sediment loading.

  The final compliance deadline for the Truckee River Sediment TMDL was estimated to be 20 years, or May 2028. Future reissuances of this General Permit may incorporate additional or revised compliance requirements or interim targets to progress towards the required final compliance by May 2028.

xxv. San Diego Creek and Newport Bay Sediment TMDL[236]

The Santa Ana Regional Water Quality Control Board adopted the San Diego Creek and Newport Bay Sediment TMDL on April 16, 1999, to address the erosion in the San Diego Creek watershed and resultant siltation in Newport Bay. Anthropogenic activities such as extensive grading for development and increased runoff due to urbanization contribute to sediment loading in this watershed. Construction sites covered under this General Permit are considered Responsible Dischargers for this TMDL.

- Load Allocation Translation

  The San Diego Creek and Newport Bay Sediment TMDL assigns a load allocation of 13,000 tons/yr to construction sites that discharge to Newport Bay and 13,000 tons/yr to construction sites that discharge into the San Diego Creek watershed. The load allocations are shared amongst all construction sites within the Newport Bay/San Diego Creek watershed and are implemented as a 10-year running annual average. The primary implementation measure for this TMDL is complying with the requirements of this General Permit which is expected to be appropriate to address this load allocation.

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236 Santa Ana Regional Water Quality Control Board, Basin Plan Amendment Total Maximum Daily Load for Sediment in the Newport Bay/San Diego Creek Watershed (April 16, 1999) <https://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/docs/tmdl02.pdf> [as of May 20, 2021] (San Diego Creek and Newport Bay Sediment TMDL)

Responsible Dischargers shall comply with the requirements of this General Permit upon its effective date. The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about excessive sediment loading.

The San Diego Creek and Newport Bay Sediment TMDL does not include a deadline to achieve compliance. Therefore, Responsible Dischargers are required to comply with this TMDL upon the effective date of this General Permit.

xxvi. Los Peñasquitos Lagoon Sediment TMDL[237]

The San Diego Regional Water Quality Control Board adopted the Los Peñasquitos Lagoon Sediment TMDL on June 13, 2012, to address the impairment of Los Peñasquitos Lagoon due to sediment.

The watershed sources of sediment consist of point and non-point source discharges in the watershed draining into Los Peñasquitos Lagoon. Anthropogenic activities such as land development exacerbate erosive processes by exposing sediment and creating more impervious surfaces which increases the velocity and volume of runoff. The Los Peñasquitos Lagoon Sediment TMDL identifies construction stormwater discharges as contributing sediment to the Lagoon and are therefore considered Responsible Dischargers.[238] According to the Los Peñasquitos Lagoon Sediment TMDL staff report, the potential contribution of pollutant loadings from construction stormwater is low because non-stormwater discharges are prohibited or authorized under strict permit circumstances.[239]

- Waste Load Allocation Translation

  The Los Peñasquitos Lagoon Sediment TMDL assigns a final waste load allocation of 2,580 tons/year to the combined responsible parties for discharges into the Los Peñasquitos Lagoon Watershed.[240] Responsible

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237 San Diego Regional Water Quality Control Board, Amendment to the Water Quality Control Plan for the San Diego Basin (9) to Incorporate the Sediment Total Maximum Daily Load (TMDL) for Los Peñasquitos Lagoon (June 13, 2012) <https://www.waterboards.ca.gov/sandiego/board_decisions/adopted_orders/2012/R9-2012-0033_Attach_A.pdf> [as of May 20, 2021] (Los Peñasquitos Lagoon Sediment TMDL)

238 Los Peñasquitos Lagoon Sediment TMDL, p. A-5.

239 San Diego Regional Water Quality Control Board, Sediment TMDL for Los Peñasquitos Lagoon Staff Report (June 13, 2012), <https://www.waterboards.ca.gov/sandiego/water_issues/programs/tmdls/docs/los_penasquitos_lagoon/updates071212/Staff_Report.pdf> [as of May 20, 2021]

240 Los Peñasquitos Lagoon Sediment TMDL, p. A-6.

parties include: Phase I Municipal Separate Storm Sewer Systems (MS4s) co-permittees (the County of San Diego, City of San Diego, City of Del Mar, and City of Poway), Phase II MS4 permittees, the California Department of Transportation, and general construction and industrial stormwater NPDES permittees. The Phase I MS4 co-permittees and the California Department of Transportation are responsible for assuming the lead role in coordinating and carrying out the necessary actions, compliance monitoring requirements, and successful implementation of the adaptive management framework required as part of this TMDL. Responsible Dischargers are expected to cooperate with all responsible parties to reduce their collective sediment load.

Responsible Dischargers are required to monitor sediment discharges from their sites to demonstrate progress towards compliance with final waste load allocations.[241] Monitoring flow rates for construction stormwater discharges is not required for all dischargers in this General Permit and is specific to Responsible Dischargers located in the Los Peñasquitos Lagoon Watershed to assess the correlation between flow and sediment deposition in this water body.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit and are required to provide an estimate of a representative flow rate from their construction site for at least one precipitation event that generates discharge within the reporting year. Monitoring flow rate values should be consistent with the monitoring, calculation, and reporting methods and framework used by the Phase I MS4 co-permittees. Responsible Dischargers shall submit the representative flow estimate as a PDF attachment to the Annual Report required in this General Permit.[242] The Regional Water Board may assign additional monitoring, reporting, and BMP requirements upon obtaining site specific information about exceedances of the waste load allocations.

  Compliance actions will be required upon the effective date of this General Permit. The final compliance deadline for the Los Peñasquitos Lagoon TMDL is July 14, 2034. Future reissuances of this General Permit may incorporate additional or revised compliance requirements or

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241 Los Peñasquitos Lagoon Sediment TMDL, p. A-8.

242 Unless another alternative electronic method in SMARTS is provided by the Water Boards.

interim targets to progress towards the required final compliance by July 14, 2034.

f. Temperature TMDLs

Seven Temperature TMDLs, established by the U.S. EPA, are applicable to construction stormwater dischargers. These include the Temperature TMDLs for the Mattole River,[243] Navarro River,[244] Scott River[245] and the Lower Main,[246] Middle Main,[247] North Fork,[248] and Upper Main[249] extents of the Eel River.

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243 United States Environmental Protection Agency Region IX, Mattole River TMDL for Sediment and Temperature (December 30, 2002), <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/mattole_river/110707/mattole.pdf> [as of May 20,2021] (Mattole River Temperature TMDL)

244 United States Environmental Protection Agency Region IX, Navarro River TMDL for Sediment and Temperature (November 2004), <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/navarro_river/110708/navarro.pdf> [as of May 20, 2021] (Navarro River Temperature TMDL)

245 North Coast Regional Water Quality Control Board, Scott River TMDL (June 2018), Ch. 4, p. 65, <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/scott_river> [as of April 28,2022] (Scott River Temperature TMDL)

246 United States Environmental Protection Agency Region IX, Lower Eel River Total Maximum Daily Loads for Temperature and Sediment (December 18, 2007) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/eel_river_lower/pdf/LER-TMDL-final-121807-signed.pdf> [as of April 28, 2022] (Eel River – Lower Main Temperature TMDL)

247 United States Environmental Protection Agency Region IX, Final Middle Main Eel River and Tributaries (from Dos Rios to the South Fork) Total Maximum Daily Loads for Temperature and Sediment (December 31, 2005) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/eel_river_middle_main/pdf/mainmdl-eel-final.pdf> [April 28, 2022] (Eel River – Middle Main Temperature TMDL)

248 United States Environmental Protection Agency Region IX, North Fork Eel River Total Maximum Daily Loads for Sediment and Temperature (December 30, 2002) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/eel_river_north_fork/pdf/final.pdf> [as of April 28, 2022] (Eel River – North Fork Temperature TMDL)

249 United States Environmental Protection Agency Region IX, Final Upper Main Eel River and Tributaries (including Tomki Creek, Outlet Creek and Lake Pillsbury) Total Maximum Daily Loads for Temperature and Sediment (December 29, 2004) <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/eel_river_uper_main/pdf/uer-tmdl-final-12-28.pdf> [as of April 28, 2022] (Eel River – Upper Main Temperature TMDL)

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Stream temperature is a critical physical characteristic of aquatic habitats that directly impacts salmonid species. Metabolism, food requirements, growth rates, timing of adult migration upstream, timing of juvenile migration downstream, and sensitivity to diseases are all affected by stream temperature. Although stream temperatures in Northern California naturally provide a wide range of summer conditions for rearing salmonids, the removal of riparian vegetation from road building and urbanization are amongst the sources observed to increase stream temperatures. Excessive sediment input also raises stream temperature by widening stream channels, filling pools, and eliminating riparian vegetation during flood events.[250]

The requirements set forth in these TMDLs apply to all point sources within the watersheds of these water bodies, which was assumed to include construction stormwater discharges. Therefore, dischargers covered under this General Permit are considered Responsible Dischargers for the Temperature TMDLs.

The Temperature TMDLs for the Klamath River, Shasta River, and the Middle Fork of the Eel River were not translated for this General Permit. These TMDLs had no known point sources that increase stream temperature and therefore did not assign any waste load allocations.

- Waste Load Allocation Translation

  The Temperature TMDLs define the waste load allocations in two different ways:

  1. The TMDL for the Lower Main Eel River assigns a waste load allocation of “zero (0) net increase in receiving water temperature” to construction sites subject to this General Permit.
  2. The TMDLs for the Mattole River, Navarro River, Scott River and the Middle Main, North Fork, and Upper Main extents of the Eel River set the waste load allocation at zero (0), as no point sources are considered to contribute to the total loading of the respective water bodies.

  The two waste load allocation definitions will be translated similarly and require that the Responsible Dischargers do not produce discharges that result in elevated stream temperatures.

  The implementation requirements for the Temperature TMDLs in this General Permit are based on the Temperature Implementation Policy adopted by the North Coast Regional Water Quality Control Board on March 13, 2014. The North Coast Temperature Implementation Policy requires the use of existing permitting and enforcement tools such as NPDES permits to pursue compliance with the water quality objectives for temperature.

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250 Eel River – Upper Main Temperature TMDL, p. 7.

Additionally, the Temperature Implementation Policy[251] relies on the Sediment TMDL Implementation Policy[252] as a means of addressing elevated water temperatures associated with excess sediment discharges.[253] The effective implementation of erosion and sediment controls, as well as meeting post-construction standards, required by this General Permit are expected to achieve the waste load allocation. Therefore, complying with the requirements of this General Permit is consistent with the assumptions and requirements of the Temperature and Sediment TMDL Implementation Policies.

- Compliance Actions and Schedule

  Compliance with this General Permit's requirements is consistent with the assumptions and requirements of the Temperature Implementation Policy and is sufficient to achieve the assigned waste load allocation. Responsible Dischargers that implement BMPs specific to preventing or controlling stormwater exposure with sediment and comply with post-construction standards are expected to meet the assigned waste load allocation. If a BMP is observed failing, the Responsible Discharger shall evaluate the BMPs being used and implement a strategy in the site's SWPPP to prevent potential exceedances of the waste load allocation in the future. The Regional Water Quality Control Boards may assign additional monitoring, reporting, and BMP requirements upon obtaining site-specific information about exceedances of the waste load allocation.

  The North Coast Temperature Implementation Policy does not include an implementation deadline for Temperature TMDLs. Therefore, Responsible Dischargers are required to comply with the Temperature TMDLs upon the effective date of this General Permit, as listed in Table H-2 of Attachment H.

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251 North Coast Regional Water Quality Control Board, Policy for the Implementation of the Water Quality Objectives for Temperature (March 13, 2014), <https://www.waterboards.ca.gov/northcoast/water_issues/programs/basin_plan/temperature_amendment/> [as of May 20, 2021], (North Coast Temperature Implementation Policy)

252 North Coast Regional Water Quality Control Board, Total Maximum Daily Load Implementation Policy Statement for Sediment-Impaired Receiving Waters in the North Coast Region (November 29, 2004), <https://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/sediment_tmdl_implementation/> [as of May 20, 2021] (North Coast Sediment TMDL Implementation Policy)

253 North Coast Temperature Implementation Policy, p.4.200.

g. Metals and Toxics TMDLs

Seventeen (17) Metals and/or Toxics TMDLs are translated for this General Permit. Metals can be toxic to aquatic life and cause impairments of beneficial uses within water bodies. Many of the artificial surfaces of the urban environment (e.g., galvanized metal, paint, automobiles, or preserved wood) contain metals, which enter stormwater as the surfaces corrode, flake, dissolve, decay, or leach.[254]

Other toxic pollutants in stormwater include organochlorine (OC) pesticides (chlordane, DDD, DDE, DDT, dieldrin, and toxaphene), polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs), which can contribute to the impairment of beneficial uses within water bodies. The use of these pollutants has been banned for many years because of potential human health and environmental harm, however, the physio-chemical properties of the pollutants allow them to persist in the environment, bioaccumulate through the food web, and pose risks to aquatic life, wildlife, and human health.

The primary transport mechanism for the metals and toxics is the mobilization of fine sediment via stormwater and authorized NSWDs. OC pesticides, PAHs, PCBs, and metals have an affinity for organic matter and will partition from water and sorb to organic substances such as sediment. Sediment and particulates transported through construction stormwater discharges eventually settle in the bed of the receiving water.

Some of the TMDLs addressed in this Section have receiving water sediment numeric targets translated to dry-weight sediment concentration waste load allocations to be met by Responsible Dischargers at the site's discharge location(s). The sediment targets address receiving waterbed-toxicity. Because these TMDLs associate receiving waterbed-toxicity targets to discharges of metals, OC pesticides, PAHs, and PCBs bound to sediment particulates, these TMDLs are addressed by implementing sediment control measures so that sediment-bound particulates do not leave a construction site's area and settle in the receiving waterbed via stormwater discharges and authorized NSWDs.

This General Permit currently requires implementation of site-specific erosion and sediment controls to minimize sediment in construction runoff. The site-specific erosion control requirements address erosion in downstream channels and banks, upgradient run-on flow diversion conveyances, and cut and fill slopes.

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254 CASQA, California Stormwater Best Management Practice Handbook: Construction (July 2015). <https://www.casqa.org/resources/bmp-handbooks/construction>. [as of May 20, 2021]. (CASQA Construction BMP Handbook).

In addition, Responsible Dischargers with the potential to discharge into a TMDL watershed, water body, or reach are required to install erosion controls that will result in predicted erosion rates that are as protective as pre-construction conditions (e.g., undisturbed vegetation for the area) for each phase of the construction project. The Responsible Discharger shall use RUSLE2 to calculate the predicted erosion rates, as described in Attachment H.

Sediment produced by erosion occurring in channels is not estimated by RUSLE2[255]. This General Permit controls channel erosion by requiring engineered conveyance of up gradient run-on water, channel and streambank erosion control, and peak flowrate and volume controls.

Other TMDLs addressed in this Section assign waste load allocations to Responsible Dischargers in one of the following ways:

- A fixed concentration-based waste load allocation as a solution of effluent, where a concentration-based waste load allocation is assigned directly to Responsible Dischargers at the point of discharge;
- A fixed concentration-based waste load allocation as dry-weight sediment, where a concentration-based waste load allocation is assigned directly to Responsible Dischargers at the point of discharge;
- A hardness-based floating concentration waste load allocation, where the waste load allocation is hardness dependent on receiving water; or
- A waste load allocation that assigned both a mass-based waste load allocation and a concentration-based waste load allocation

Concentration-based waste load allocations, where applicable, were translated into numeric action levels or numeric effluent limitations for Responsible Dischargers to comply with.

i. Ballona Creek Metals TMDL[256]

The Los Angeles Water Quality Control Board (Los Angeles Regional Water Quality Control Board) adopted the Ballona Creek Metals TMDL on

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255 USDA-Agricultural Research Service, DRAFT User's Reference Guide Revised Universal Soil Loss Equation Version 2 (May 2008), p. 22-23 <http://fargo.nserl.purdue.edu/rusle2_dataweb/userguide/RUSLE2_User_Ref_Guide_2008.pdf> [as of May 20, 2021]

256 Los Angeles Regional Water Quality Control Board, Proposed Amendment to the Water Quality Control Plan – Los Angeles Region to incorporate the Ballona Creek Metals TMDL <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/Ballona20Metals/R13-010M_RB_BPA.pdf> [as of April 28, 2022] (Ballona Creek Metals TMDL)

September 6, 2007, to address the impairment of Ballona Creek and Sepulveda Canyon Channel due to copper, lead, and zinc.

- Source Analysis

  Storm drains convey a large percentage of metals loadings during dry weather. During wet weather, most of the metals loadings in Ballona Creek are in particulate form and are associated with wet-weather storm flows.[257]

- Waste Load Allocation Translation

  1) Dry-Weather Waste Load Allocation

     The Ballona Creek Metals TMDL assigns a dry-weather waste load allocation of zero (0) for Responsible Dischargers. Non-Stormwater Discharges (NSWDs) are authorized in this General Permit if Order, Section IV.A terms and conditions are met to control the discharge of pollutants from the construction site. Order, Section IV.B prohibits all NSWDs not authorized under Order, Section IV.A; therefore, all unauthorized NSWDs must be either eliminated or have regulatory coverage under a separate NPDES permit. Authorized NSWDs, as defined in this General Permit, are authorized because these discharges do not comingle with stormwater associated with construction activity. The Regional Water Board may impose additional requirements on NSWDs if deemed necessary per site-specific analysis.

  2) Wet-Weather Waste Load Allocations

     The Ballona Creek Metals TMDL assigns mass-based waste load allocations per construction area in grams per day per acre (g/day/acre) for copper, lead, and zinc. The waste load allocations for metals are shown in Table 45 below.

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Table 45 – Ballona Creek and Sepulveda Channel Waste Load Allocations

Pollutant	Waste Load Allocation (g/day/acre)
Copper	1.673×10^{-10} x Daily storm volume (L)
Lead	9.369×10^{-10} x Daily storm volume (L)
Zinc	1.279×10^{-9} x Daily storm volume (L)

Directly implementing the copper, lead, and zinc waste load allocations will result in a unique mass load for each Responsible Discharger dependent on the area of the construction site. Requiring

257 Ballona Creek Metals TMDL, p. 3.

Responsible Dischargers to calculate the construction site's specific mass loading of a pollutant(s) would be impractical, costly, and not aligned with the requirements of this General Permit. However, as mentioned in the source analysis, most metal loadings in this watershed are in particulate form and associated with wet-weather flows. Therefore, the following will address this TMDL:

a) Comply with the site-specific erosion and sediment control, and post-construction requirements in this General Permit.

b) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of the copper, lead, and zinc, through the required pollutant source assessment, are to implement BMPs specific to preventing or controlling stormwater exposure to the identified metals. Furthermore, Responsible Dischargers are to comply with the RUSLE2 modeling requirements in Attachment H, Section I.G.2.

  The TMDL's final compliance deadline was January 11, 2015. Since this compliance deadline has passed, the Responsible Dischargers shall comply with the requirements of this General Permit and the RUSLE2 modeling requirements in Attachment H, Section I.G.2, upon the effective date of this General Permit.

ii. Ballona Creek Estuary Toxics TMDL[258]

The Los Angeles Regional Board adopted the Ballona Creek Estuary Toxics TMDL on July 7, 2005, to address the impairment of Ballona Creek and Ballona Creek Estuary (Ballona Watershed) due to cadmium, chlordane, copper, DDT, lead, polychlorinated biphenyls (PCBs), polyaromatic hydrocarbons (PAHs), silver, toxicity in sediment, and zinc. Chlordane and DDT are organochlorine (OC) pesticides. The Ballona Creek Estuary Toxics

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258 Los Angeles Regional Water Quality Control Board, Proposed Amendment to the Water Quality Control Plan – Los Angeles Region to incorporate the Ballona Creek Estuary Toxic Pollutants TMDL <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/Ballona%20Toxics/R13-010T_RB_BPA.pdf> [as of May 20, 2021] (Ballona Creek Estuary Toxics TMDL)

does not include a TMDL for PAHs because recent data does not show PAH levels exceeding the numeric targets.[259]

- Source Analysis

  The Ballona Creek Estuary Toxics TMDL identifies urban stormwater as a substantial source of metals and the most prevalent metals in urban stormwater are consistently associated with particulates. As a result, metals have the potential to accumulate in estuarine sediments where they may pose a toxicity risk. A majority of organic constituents in stormwater such as PAHs, phthalates, and OC compounds are also associated with particulates.[260]

- Waste Load Allocation Translation

  The Ballona Creek Estuary Toxics TMDL assigns grouped mass-based waste load allocations per construction area in grams per year per acre (g/yr/ac) for cadmium, chlordane, copper, DDT, lead, PAHs, PCBs, silver, toxicity in sediment, and zinc. The waste load allocations for are shown in Table 46 below.

Table 46 – Ballona Creek Estuary Waste Load Allocations

Pollutant	Waste Load Allocation (g/yr/ac)
Cadmium	0.1
Copper	3
Lead	4
Silver	0.1
Zinc	13
Chlordane	0.00011
DDTs	0.00016
Total PCBs	0.00028

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Directly implementing the waste load allocations will result in a unique mass load for each Responsible Discharger dependent on the area of construction site. Requiring Responsible Dischargers to calculate the construction site's specific mass loading of a pollutant(s) would be impractical, costly, and not aligned with the requirements of this General Permit. However, as mentioned in the source analysis, most metal and toxic pollutant loadings in this watershed are in particulate form and associated with wet-weather flows. Therefore, the following will address this TMDL:

259 Ballona Creek Estuary Toxics TMDL, p. 2.

260 Ballona Creek Estuary Toxics TMDL, p. 3.

1) Comply with the site-specific erosion and sediment control, and post-construction requirements in this General Permit.

2) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of the metals and toxic pollutants, through the required pollutant source assessment, are to implement BMPs specific to preventing or controlling stormwater exposure to the identified metals and toxic pollutants. Furthermore, Responsible Dischargers are to comply with the RUSLE2 modeling requirements in Attachment H, Section I.G.2.

  The TMDL's final compliance deadline was January 11, 2015. Since this compliance deadline has passed, the Responsible Dischargers shall comply with the requirements of this General Permit and the RUSLE2 modeling requirements in Attachment H, Section I.G.2, upon the effective date of this General Permit.

iii. Calleguas Creek Metals and Selenium TMDL[261]

The Los Angeles Water Quality Control Board (Los Angeles Water Board) adopted the Calleguas Creek Metals and Selenium TMDL on October 13, 2016, to address the impairment of Calleguas Creek, Mugu Lagoon, and Revolon Slough due to copper, mercury, nickel, and selenium.

- Source Analysis

  The significant sources of metals and selenium in the watershed include urban runoff, agricultural runoff, POTW effluent, and groundwater. Open space was also a significant source for mercury. Higher loads were delivered during wet weather for all constituents due to the association between metals and particulate matter. The source analysis indicates that naturally occurring metals and selenium may be contributing sources in soil. The Calleguas Creek Metals and Selenium

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261 Los Angeles Regional Water Quality Control Board, Total Maximum Daily Load for Metals and Selenium in the Calleguas Creek, its Tributaries and Mugu Lagoon <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/R16-007_RB_BPA.pdf> [as of May 20, 2021] Calleguas Creek Metals and Selenium TMDL)

TMDL includes plans for special studies to further assess natural sources of metals in soil.[262]

- Waste Load Allocation Translation

  1) Dry-weather Waste Load Allocations

     The Calleguas Creek Metals and Selenium TMDL assigns concentration-based waste load allocations for dry-weather. Non-Stormwater Discharges (NSWDs) are authorized in this General Permit if Order, Section IV.A terms and conditions are met to control the discharge of pollutants from the construction site. Order, Section IV.B prohibits all NSWDs not authorized under Order, Section IV.A; therefore, all unauthorized NSWDs must be either eliminated or have regulatory coverage under a separate NPDES permit. Authorized NSWDs, as defined in this General Permit, are authorized because these discharges do not commingle with stormwater associated with construction activity. The Regional Water Board may impose additional requirements on NSWDs if deemed necessary per site-specific analysis.

  2) Wet-weather Interim Waste Load Allocations for Copper

     The Calleguas Creek Metals and Selenium TMDL assigns an interim concentration-based wet-weather waste load allocation for copper to "Permitted Stormwater Dischargers (PSDs)" to be met at the receiving water. Responsible Dischargers are identified as a PSDs as defined in the Calleguas Creek Metals and Selenium TMDL.[263] The interim wet daily maximum concentration-based waste load allocation will be translated into a numeric action level for Responsible Dischargers until the final waste load allocations apply. The interim waste load allocations were translated into numeric action levels as shown in Table 47 below. The numeric action levels are in mg/L to be consistent with the reporting units in SMARTS.

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Table 47 – Calleguas Creek, Conejo Creek, and Revolon Slough Interim Wet-Weather Waste Load Allocations

Water body	Waste Load Allocation for Copper (ug/L)	Total Copper Numeric Action Level (mg/L)
Calleguas and Conejo Creek	204	0.204
Revolon Slough	204	0.204

262 Calleguas Creek Metals and Selenium TMDL, p. 4, p. 13.

263 Calleguas Creek Metals and Selenium TMDL, p. 19.

3) Wet-weather Final Waste Load Allocations Copper, Nickel, and Selenium

The Calleguas Creek Metals and Selenium TMDL assigns a final mass-based wet-weather waste load allocations for copper, nickel, and selenium in pounds per day to "Permitted Stormwater Dischargers (PSDs)" to be met in the water column of Calleguas Creek or Revolon Slough. The waste load allocation for copper, nickel, and selenium are shown in Table 48 below.

Table 48 – Calleguas Creek, Conejo Creek, and Revolon Slough Interim Wet-Weather Waste Load Allocations

Pollutant	Waste Load Allocation for Calleguas Creek and Conejo Creek (lbs/d)	Waste Load Allocation for Revolon Slough (lbs/d)
Copper*	(0.00054*Q^2*0.032*Q – 0.17)*WER – 0.06	(0.0002*Q2+0.0005*Q)*WER
Nickel**	0.014*Q^2+0.82*Q	0.027*Q^2+0.47*Q
Selenium**	(a)	0.027*Q^2+0.47*Q

*The approved site-specific WER of 1.51 for Mugu Lagoon is used to calculate the assigned waste load allocations for discharges to Calleguas and Conejo Creek to ensure the downstream standard is achieved. Permitted stormwater dischargers may apply a WER of up to 3.69 for discharges to upstream reaches, with the exception of Reaches 4 and 5, to calculate the assigned waste load allocations. If a WER of greater than 1.51 is applied, permitted stormwater dischargers shall be required to provide detailed quantitative analysis to demonstrate that the waste load allocations as modified by the WER are protective of downstream reaches. No site specific WER for Revolon Slough was approved so default WER value of 1 is applied. Regardless of the final WERs, total copper loading shall not exceed current loading.
**Current loads do not exceed loading capacity during wet weather. Sum of all loads cannot exceed loads presented in the table. Q: Daily storm volume (cfs). (a) Selenium allocations have not been developed for this reach as it is not on the 303(d) list.

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Directly implementing the final copper, nickel, and selenium waste load allocations will result in a unique mass load for each Responsible Discharger dependent on the daily stormwater flows and area of construction site. Requiring Responsible Dischargers to calculate the construction site's specific mass loading of a pollutant(s) would be impractical, costly, and not aligned with the requirements of this General Permit. However, as mentioned in the source analysis, most metal loadings in this watershed are in particulate form and associated with wet-weather flows. Therefore, the following will address this TMDL:

a) Comply with the site-specific erosion and sediment control, and post-construction requirements in this General Permit.

b) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

4) Wet-weather Interim Limits and Final Waste Load Allocations for Mercury

The Calleguas Creek Metals and Selenium TMDL assigns mass-based interim and final waste load allocations for mercury pounds per year (lbs/yr) to "Permitted Stormwater Dischargers (PSDs)" to be met at the receiving water. The waste load allocations for mercury are shown in Table 49 below.

Table 49 – Interim Limits and Final Waste Load Allocations for Mercury in Suspended Sediment for Calleguas Creek and Revolon Slough

Flow Range	Calleguas Creek Interim (lb/yr)	Calleguas Creek Final (lb/yr)	Revolon Slough Interim (lb/yr)	Revolon Slough Final (lb/yr)
0-15,000 Million Gallons per Year	3.3	0.4	1.7	0.1
15,000-25,000 Million Gallons per Year	10.5	1.6	4	0.7
Above 25,000 Million Gallons per Year	64.6	9.3	10.2	1.8

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Directly implementing the copper and nickel waste load allocations will result in a unique mass load for each Responsible Discharger dependent on the range of stormwater flows and area of construction site. Requiring Responsible Dischargers to calculate the construction site's specific mass loading of a pollutant(s) would be impractical, costly, and not aligned with the requirements of this General Permit. However, as mentioned in the source analysis, most metal loadings in this watershed are in particulate form and associated with wet-weather flows. Therefore, the following will address this TMDL:

a) Comply with the site-specific erosion and sediment control, and post-construction requirements in this General Permit.

b) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

- Compliance Actions and Schedule

  The TMDL's interim compliance deadline was March 27, 2007. Since this compliance deadline has passed, the interim waste load allocations shall be met by the effective date of this General Permit. Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers shall compare all non-visible sampling and analytical results to the numeric action level for copper. If an exceedance or failure of a BMP is observed, the Responsible Discharger shall evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the waste load allocations in the future. Responsible Dischargers that perform the required pollutant source assessment and implement BMPs specific to preventing or controlling stormwater exposure to copper, nickel, selenium, and mercury sources are expected to meet the assigned waste load allocations.

  The TMDL's final compliance deadline was March 27, 2022. Since this compliance deadline has passed, the Responsible Dischargers shall comply with the erosion and sediment control requirements of this General Permit and RUSLE2 modeling requirements in Attachment H, Section I.G.2, upon the effective date of this General Permit.

iv. Calleguas Creek OC Pesticide and PCBs TMDL[264]

The Los Angeles Regional Water Quality Control Board adopted the Calleguas Creek OC Pesticide and PCBs TMDL on June 9, 2006, to address the impairment of Calleguas Creek Watershed due to organochlorine (OC) pesticides and polychlorinated biphenyls (PCBs). Eleven of fourteen reaches in the watershed are identified as impaired for these toxic pollutants on the 2002 303(d) list.

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264 Los Angeles Regional Water Quality Control Board, Total Maximum Daily Loads (TMDLs) for Organochlorine (OC) Pesticides, Polychlorinated Biphenyls (PCBs) and Siltation in Calleguas Creek, its Tributaries, and Mugu Lagoon (July 7, 2005), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/2005-010_RB_BPA.pdf> [as of May 20, 2021] (Calleguas Creek OC Pesticides and PCBs TMDL)

- Source Analysis

  The largest sources of OC pesticides and PCBs in the watershed were estimated to be agricultural runoff and residues from past uses, respectively. Urban runoff is considered a minor source of OC pesticides and PCBs. Both impairing contaminants are known to bind to sediments and fine particles, which are transported to the watershed through runoff and erosion.

- Waste Load Allocation Translation

  The Calleguas Creek OC Pesticide and PCBs TMDL assigns interim and final waste load allocations for pollutants in sediment for stormwater permittees, shown in Table 50 and Table 51 below. Although not specifically identified in the TMDL, waste load allocations were interpreted as applicable to construction stormwater dischargers due to the sediment and erosion intensive activities associated with construction. Therefore, construction stormwater dischargers are considered Responsible Dischargers for the Calleguas Creek OC Pesticide and PCBs TMDL.

Table 50 – Interim Sediment Waste Load Allocations (ng/g) for Stormwater Permittees

Constituent	Mugu Lagoon*	Calleguas Creek	Revolon Slough	Arroyo Las Posas	Arroyo Simi	Conejo Creek
Chlordane	3.3	3.3	0.9	3.3	3.3	3.3
4,4-DDD	2.0	2.0	2.0	2.0	2.0	2.0
4,4-DDE	2.2	1.4	1.4	1.4	1.4	1.4
4,4-DDT	0.3	0.3	0.3	0.3	0.3	0.3
Dieldrin	4.3	0.2	0.1	0.2	0.2	0.2
PCBs	180.0	120.0	130.0	120.0	120.0	120.0
Toxaphene	360.0	0.6	1.0	0.6	0.6	0.6

* Mugu Lagoon subwatershed includes Duck Pond/Agricultural Drain/Mugu/Oxnard Drain #2

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Table 51 – Final Sediment Waste Load Allocations (ng/g) for Stormwater Permittees

Constituent	Mugu Lagoon*	Calleguas Creek	Revolon Slough	Arroyo Las Posas	Arroyo Simi	Conejo Creek
Chlordane	3.3	3.3	0.9	3.3	3.3	3.3
4,4-DDD	2.0	2.0	2.0	2.0	2.0	2.0
4,4-DDE	2.2	1.4	1.4	1.4	1.4	1.4
4,4-DDT	0.3	0.3	0.3	0.3	0.3	0.3
Dieldrin	4.3	0.2	0.1	0.2	0.2	0.2
PCBs	180.0	120.0	130.0	120.0	120.0	120.0
Toxaphene	360.0	0.6	1.0	0.6	0.6	0.6

* Mugu Lagoon subwatershed includes Duck Pond/Agricultural Drain/Mugu/Oxnard Drain #2

Compliance with the sediment-based waste load allocations is measured as an in-stream annual average at the base of each subwatershed where the dischargers are located. Requiring Responsible Dischargers to sample for the pollutant(s) within the receiving waters would be impractical, costly, and not aligned with the requirements of this General Permit. However, as mentioned in the source analysis, OC pesticide and PCB loading are associated with sediment and fine particles transported by runoff. Therefore, the following will address this TMDL:

1) Comply with the site-specific erosion and sediment control, and post-construction requirements in this General Permit.

2) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of organochlorine compounds associated with the impaired water body, through the required pollutant source assessment, are to implement BMPs specific to preventing or controlling stormwater exposure to the organochlorine compounds. Furthermore, Responsible Dischargers are to comply with the RUSLE 2 modeling requirements in Attachment H, Section I.G.2.

  The Calleguas Creek OC Pesticide and PCBs TMDL's interim compliance deadline for the TMDLs was March 26, 2007. Since the deadline has already passed, Responsible Dischargers shall comply with

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the interim waste load allocations through the requirements of this General Permit and the RUSLE2 modeling requirements in Attachment H, Section I.G.2, upon the effective date of this General Permit. Compliance with the final waste load allocations shall be achieved by March 26, 2027.

v. Colorado Lagoon Toxics TMDL[265]

The Los Angeles Regional Water Quality Control Board adopted the Colorado Lagoon Toxics TMDL on October 1, 2009, to address the impairment of Colorado Lagoon due to metals, organochlorine (OC) pesticides (chlordane, DDT, and dieldrin), polyaromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and sediment toxicity.

- Source and Linkage Analysis

  The Colorado Lagoon watershed is divided into five sub-basins that discharge stormwater and urban dry weather runoff to Colorado Lagoon.[266] The impairing contaminants in sediment are associated with fine-grained particles that are primarily delivered to the sediments through suspended solids in stormwater and urban runoff.[267] Therefore, construction sites covered under this General Permit are considered Responsible Dischargers for the Colorado Lagoon Toxics TMDL.

- Waste Load Allocation Translation

  The Colorado Lagoon Toxics TMDL assigns concentration-based waste load allocations for lead, zinc, OC pesticides, PAHs, and PCBs to be met at the construction site's discharge point(s) for discharges into Colorado Lagoon.[268] The waste load allocations are shown in Table 52 below.

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265 Los Angeles Regional Water Quality Control Board, Total Maximum Daily Load for Organochlorine (OC) Pesticides, Polychlorinated Biphenyls (PCBs), Sediment Toxicity, Polycyclic Aromatic Hydrocarbons (PAHs), and Metals for Colorado Lagoon (October 1, 2009), <https://www.waterboards.ca.gov/water_issues/programs/tmdl/docs/coloradolagoontoxicity/signedresolutionr09_005_amendments.pdf> [as of April 29, 2022] (Colorado Lagoon Toxics TMDL)

266 Colorado Lagoon Toxics TMDL, p. 3.

267 Colorado Lagoon Toxics TMDL, p. 4.

268 Colorado Lagoon Toxics TMDL, p. 5, 10.

Table 52 – Colorado Lagoon Waste Load Allocations

Pollutants	Waste Load Allocation Suspended Sediment-Associated Contaminants (ug/dry kg)
Chlordane	0.50
Dieldrin	0.02
Lead	46,700.00
Zinc	150,000.00
PAHs	4,022.00
PCBs	22.70
DDT	1.58

Requiring Responsible Dischargers to sample for the pollutant(s) would be impractical, costly, and not aligned with the requirements of this General Permit. However, as mentioned in the source analysis, most metal loadings in this watershed are in particulate form and associated with wet-weather flows. Therefore, the following will address this TMDL:

1) Comply with the site-specific erosion and sediment control, and post-construction requirements in this General Permit.

2) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of the toxic pollutants associated with the impaired water body, through the required pollutant source assessment, are to implement BMPs specific to preventing or controlling stormwater exposure to the organochlorine compounds. Furthermore, Responsible Dischargers are to comply with the RUSLE2 modeling requirements in Attachment H, Section I.G.2.

  The final compliance deadline for the Colorado Lagoon Toxics TMDL was July 28, 2018. Since the deadline has already passed, Responsible Dischargers shall comply with the waste load allocations through the requirements of this General Permit and the RUSLE2 modeling requirements in Attachment H, Section I.G.2, upon the effective date of this General Permit.

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vi. Los Angeles Area Lakes Waters Toxics TMDL[269]

The U.S. EPA adopted the Los Angeles Area Lakes Toxics TMDL on March 26, 2012, to address the impairment in three of the nine assessed lakes in the Los Angeles Region due to organochlorine (OC) pesticides (chlordane, dieldrin, DDT) and polychlorinated biphenyls (PCBs). The three identified lakes for OC pesticides and PCBs impairments are Peck Road Park Lake, Echo Park Lake, and Puddingstone Reservoir. Peck Road Park Lake and Echo Park Lake are located in the Los Angeles River watershed. Puddingstone Reservoir is located in the San Gabriel River watershed.

- Source Analysis

  The manufacturing and use of OC pesticides and PCBs are currently banned and no additional allowances for new sources of discharges are expected in the Los Angeles Area Lakes Toxics TMDL. Source control BMPs and pollutant removal are the most suitable courses of action to reduce OC pesticides and PCBs. The TMDL identified many historic and current loadings of pollutants into Peck Road Park Lake, Echo Park Lake, and Puddingstone Reservoir including construction sites that would be covered under this General Permit. Therefore, construction stormwater dischargers are considered Responsible Dischargers for the Los Angeles Area Lakes Toxics TMDL.

- Waste Load Allocation Translation

  The Los Angeles Area Lakes TMDL assigns concentration-based waste load allocations for OC pesticides and PCBs in the water column to be met at the construction site's discharge location(s) into Peck Road Park Lake, Echo Park Lake, and Puddingstone Reservoir, summarized in Table 53 through Table 55 below.

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Table 53 – Peck Road Park Lake Toxics Waste Load Allocation

Pollutant	Waste Load Allocation – Water Column (mg/L)
Chlordane	5.9×10^{-7}
Dieldrin	1.4×10^{-7}
Total DDTs	5.9×10^{-7}
Total PCBs	1.7×10^{-7}

269 Los Angeles Regional Water Quality Control Board, Los Angeles Area Lakes Waters Toxics TMDL (May 2011) <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/Established/Lakes/LALakesTMDLsEntireDocument.pdf> [as of April 28, 2022] (Los Angeles and Long Beach Harbor Water TMDL)

Table 54 – Echo Park Lake Toxics Waste Load Allocation

Pollutant	Waste Load Allocation – Water Column (mg/L)
Chlordane	5.9×10^{-7}
Dieldrin	1.4×10^{-7}
Total PCBs	1.7×10^{-7}

Table 55 – Puddingstone Reservoir Toxics Waste Load Allocation

Pollutant	Waste Load Allocation – Water Column (mg/L)
Chlordane	5.7×10^{-7}
Dieldrin	1.4×10^{-7}
Total DDTs	5.9×10^{-7}
Total PCBs	1.7×10^{-7}

The May 2021 draft of the Construction Stormwater General Permit reissuance proposed a translation of the waste load allocations into numeric effluent limitations. However, the translated numeric effluent limitations for chlordane, DDT, dieldrin, and PCBs in the Los Angeles Area Lakes Toxics TMDL were below the respective reporting limits for the constituents and would render determining compliance at the point of discharge infeasible.

Dischargers that discharge to the applicable Los Angeles Area Lakes waterbodies are to conduct a soil screening investigation for chlordane, DDT, dieldrin, and PCBs (as applicable) as part of the pollutant source assessment to determine whether they are Responsible Dischargers per Attachment H, Section I.G.5. Dischargers are considered Responsible Dischargers if the TMDL analytes are measured above their respective reporting limits and will be required to comply with a numeric effluent limitation of 100 mg/L total suspended solids (TSS) as the applicable limitation for each of the applicable TMDL-pollutants identified through the soil screening investigation.

State Water Board staff reviewed literature[270] and concluded that measurements of total suspended solids at the point of discharge,

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270 Nasrabadi T, Ruegner H, Schwientek M, Bennett J, Fazel Valipour S, Grathwohl P (2018) “Bulk metal concentrations versus total suspended solids in rivers: Time-invariant & catchment-specific relationships.”;
Washington Department of Ecology (2004) “A Total Maximum Daily Load Evaluation for Chlorinated Pesticides and PCBs in the Walla Walla River.”;
Angela Gorgoglione, Fabián A. Bombardelli, Bruno J. L. Pitton, Lorence R. Oki, Darren L. Haver and Thomas M. Young (2018) “Role of Sediments in Insecticide Runoff from Urban Surfaces: Analysis and Modeling.”

following a non-visible pollutant monitoring trigger, are the most reasonable way to assess presence of chlordane, DDT, dieldrin, and PCBs, as these organic pollutants are readily sorbed to sediment.

The measurement of total suspended solids at or above of 100 mg/L is an appropriate indicator of the presence of chlordane, DDT, dieldrin, and PCBs in runoff, if the pre-project soil analysis (described in Attachment H, Section I.G.5) demonstrated these pollutants are present in the soil. There is a strong positive correlation between total suspended solids and chlordane, DDT, dieldrin, and PCBs, indicating that concentrations of pollutants increase and decline proportionally with the TSS concentrations. If the constituents were measured in the soil at or above the reporting limit, a small fraction will be in the TSS sample as well.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of toxic pollutants associated with the impaired water bodies, through the required pollutant source assessment, are to implement BMPs specific to preventing or controlling stormwater exposure to the metals. Furthermore, the Responsible Discharger shall compare all non-visible sampling and analytical results to the TSS numeric effluent limitation to address toxic pollutants associated with the impairment of the water body. Exceedances of the TSS numeric effluent limitation equates to an exceedance of each applicable TMDL-specific pollutant identified in the soil screening investigation.

  The Los Angeles Regional Water Quality Control Board has not adopted an Implementation Plan or a compliance schedule for the toxic pollutants addressed by the Los Angeles Area Lakes Toxics TMDL. Therefore, Responsible Dischargers are required to achieve compliance with the TSS numeric effluent limitation by the effective date of this General Permit.

vii. Los Angeles and Long Beach Harbor Waters TMDL[271]

The Los Angeles Regional Water Quality Control Board adopted the Los Angeles and Long Beach Harbor Waters TMDL on May 5, 2011, to address

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271 Los Angeles Regional Water Quality Control Board, Total Maximum Daily Load for Toxic Pollutants in Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters (May 2011) <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/R11-008_RB_BPA.pdf> [as of May 20, 2021] (Los Angeles and Long Beach Harbor Waters TMDL)

the impairment and affected benthic communities of the Dominguez Channel, Greater Los Angeles, and Long Beach Harbor Waters due to cadmium, certain polyaromatic hydrocarbon (PAH) compounds, chlordane, chromium, copper, DDT, dieldrin, lead, mercury, polychlorinated biphenyls (PCBs), toxaphene, toxicity, and zinc.

- Source Analysis

  Chromium, copper, lead, mercury, PAHs, and zinc are currently deposited into the watershed via urban runoff and then washed into storm drains and channels that discharge to the Dominguez Channel and Greater Harbor Waters. Organochlorine (OC) pesticides (chlordane, DDT, dieldrin) and PCBs are legacy pollutants and remain present in the environment. Urban runoff and rainfall mobilize OC pesticides, PAHs, and PCBs bound to fine-grained particles, which are then washed into storm drains and channels that discharge to the Dominguez Channel and Greater Harbor Waters. Runoff from construction sites covered under this General Permit has the potential to transport these toxic pollutants into the waters. Therefore, construction stormwater dischargers are considered Responsible Dischargers for the Los Angeles and Long Beach Harbor Waters Toxics TMDL.

- Waste Load Allocation Translation

  1) Dominguez Channel and Torrance Lateral Freshwater Wet Weather Interim Waste Load Allocations

     This TMDL assigns interim concentration-based waste load allocations for copper, lead, and zinc to Responsible Dischargers to be met at the construction site's discharge location(s) for discharges into the Dominguez Channel or Torrance Lateral. The interim concentration-based waste load allocations will be translated to numeric action levels as an interim target for Responsible Dischargers until the final waste load allocations apply. The compliance deadline of the interim waste load allocations is upon effective date of the TMDL and therefore, apply at that time. The interim numeric action levels are shown in Table 56 below.

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Table 56 – Dominguez Channel and Torrance Lateral Interim Waste Load Allocation Translation

Pollutant	Waste Load Allocation (ug/L)	Interim Numeric Action Level (mg/L)
Total Copper	207.51	0.20751
Total Lead	122.88	0.12288
Total Zinc	898.87	0.89887

2) Dominguez Channel and Torrance Lateral Wet-Weather Final Waste Load Allocations

This TMDL assigns wet-weather final concentration-based waste load allocations for copper, lead, and zinc to Responsible Dischargers to be met at the construction site's discharge location(s) for discharges into the Dominguez Channel (above Vermont Avenue).

Exxon Mobil Torrance Refinery and "all other dischargers" are assigned concentration-based waste load allocations of copper, lead, and zinc equal to the sediment targets to be met at the construction site's discharge location(s) for discharges into the Dominguez Channel and Torrance Lateral, shown in Table 57 below. Responsible Dischargers are assumed to be included in the "all other dischargers" definition. The concentration-based waste load allocations are translated into numeric effluent limitations. However, the numeric effluent limitations are not immediately effective because the compliance deadline for attaining the waste load allocation for dischargers into Dominguez Channel and Torrance Lateral is beyond this General Permit's term.

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Table 57 – Dominguez Channel and Torrance Lateral Final Waste Load Allocation

Pollutant	Waste Load Allocation* (mg/L)
Total Copper	0.0097
Total Lead	0.0427
Total Zinc	0.0697

*Hardness used = 50 mg/L. Recalculated concentration-based allocations using ambient hardness at the time of sampling are considered consistent with the assumptions and requirements of these waste load allocations. In addition to the waste load allocations above, samples collected during flow conditions less than the 90th percentile of annual flow rates must demonstrate that the acute and chronic hardness dependent water quality criteria provided in the CTR are achieved.

The May 2021 draft of the Construction Stormwater General Permit reissuance proposed a translation for the final total copper, lead, and zinc waste load allocations into numeric effluent limitations as the waste load allocations were concentration-based and assigned at the point of discharge. However, this General Permit incorporates a soil screening investigation and a total suspended solids numeric effluent limitation to assess compliance with the final waste load allocations for total copper, lead, and zinc.

Starting at the effective date of the final waste load allocations, March 23, 2032, dischargers that discharge to the Dominguez Channel and Torrance Lateral are to conduct a soil screening investigation for

copper, lead, and zinc as part of the pollutant source assessment to determine whether they are Responsible Dischargers per Attachment H Section I.G.5. Dischargers are considered Responsible Dischargers if the TMDL analytes are measured above the analytical reporting limit and will be required to comply with a numeric effluent limitation of 100 mg/L total suspended solids (TSS) as the applicable limitation for each of the applicable TMDL-pollutants identified through the soil screening investigation, instead of the numeric effluent limitations for total copper, lead, and zinc.

State Water Board staff reviewed literature[272] and concluded that measurements of TSS at the point of discharge, following a non-visible pollutant monitoring trigger, are the most reasonable way to assess the presence of copper, lead, and zinc, as these metals are a readily sorbed to sediment, which is the most common pollutant discharged from construction sites and can be managed effectively with BMPs.

Staff determined the measurement of TSS at or above 100 mg/L is an appropriate indicator of the presence of copper, lead, and zinc in runoff, if the pre-project soil monitoring (described in Attachment H, Section I.G.5) demonstrated these pollutants are present in the soil. There is a strong positive correlation between TSS and metals, indicating that concentrations of pollutants increase and decline proportionally with the TSS concentrations. If the constituents were measured in the soil at or above the analytical reporting limit, a small faction will be in the TSS sample as well.

3) Dominguez Channel Estuary and Greater Los Angeles and Long Beach Harbor Waters Interim Sediment Waste Load Allocations

This TMDL assigns concentration-based interim sediment waste load allocations for copper, lead, zinc, DDT, PAHs, and PCBs to Responsible Dischargers for discharges into the Dominguez Channel Estuary and Greater Harbor Waters, shown in Table 58 below.

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272 Nasrabadi T, Ruegner H, Schwientek M, Bennett J, Fazel Vailpour S, Grathwohl P (2018) “Bulk metal concentrations versus total suspended solids in rivers: Time-invariant & catchment-specific relationships.”

Table 58 – Dominguez Channel Estuary and Greater Harbor Waters Interim Sediment Waste Load Allocations in mg/kg sediment

Water Body	Copper	Lead	Zinc	DDT	PAHs	PCBs
Dominguez Channel Estuary	220.0	510.0	789.0	1.727	31.60	1.490
Long Beach Inner Harbor	142.3	50.4	240.6	0.070	4.58	0.060
Los Angeles Inner Harbor	154.1	145.5	362.0	0.341	90.30	2.107
Long Beach Outer Harbor (inside breakwater)	67.3	*46.7	150	0.075	*4.022	0.248
Los Angeles Outer Harbor (inside breakwater)	104.1	*46.7	150	0.097	*4.022	0.310
Los Angeles River Estuary	53.0	*46.7	183.5	0.254	4.36	0.683
San Pedro Bay Near/Offshore Zones	76.9	66.6	263.1	0.057	*4.022	0.193
Los Angeles Harbor – Cabrillo Marina	367.6	72.6	281.8	0.186	36.12	0.199
Los Angeles Harbor – Consolidated Slip	1470.0	1100.0	17050	1.724	386.00	1.920
Los Angeles Harbor – Inner Cabrillo Beach	129.7	*46.7	163.1	0.145	*4.022	0.033
Fish Harbor	558.6	116.5	430.5	40.5	2102.7	36.6

*Values are also the final allocation

Directly implementing the final waste load allocations would be impractical, costly, and not aligned with the monitoring requirements in this General Permit. As mentioned above, this TMDL associates bed toxicity with discharges of metals, OC pesticides, PAHs, and PCBs bound to sediment particulates. Therefore, the following will address this TMDL:

a) Comply with the site-specific erosion and sediment control, and post-construction requirements in this General Permit.

b) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

4) Dominguez Channel Estuary and Greater Harbor Waters Final Water-Column Waste Load Allocations

This TMDL assigns concentration-based final waste load allocations for the metals and organic compounds identified in Table 57 and Table 58 below. The waste load allocations are to be met in the water column for discharges to Dominguez Channel Estuary and the Greater Harbor Waters. Greater Harbor Waters include Inner and

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Outer Harbor, Main Channel, Consolidated Slip, Southwest Slip, Fish Harbor, Cabrillo Marina, Inner Cabrillo Beach, Los Angeles River Estuary, and San Pedro Bay. The concentration-based waste load allocations are translated to numeric action levels because the waste load allocations are assigned to be met in the receiving waters and not at the point of discharge. The assigned waste load allocations of copper, lead, and zinc are based on the Criteria Chronic Concentration, and are inappropriate to assign to stormwater discharges. Therefore, the California Toxics Rule (CTR) Criterion Maximum (acute) Concentration is applied to Responsible Dischargers. The units are converted from ug/L to mg/L to be consistent with the reporting units in SMARTS. The numeric action levels assigned to Responsible Dischargers are shown in Table 59 and Table 60 below.

Table 59 – Dominguez Channel Estuary Final Water Column Waste Load Allocation Translations

Pollutant	Waste Load Allocation (ug/L)	Dissolved Saltwater Criterion Maximum Concentration (ug/L)	Total Saltwater Criterion Maximum Concentration (ug/L)	Numeric Action Level (mg/L)
4,4-DDT	0.00059			$5.9 X10^{-7}$
Chlordane	0.00059			$5.9 X10^{-7}$
Dieldrin	0.00014			$1.4 X10^{-7}$
Total Copper	3.73	4.8	5.8**	0.0058
Total Lead	8.53	210	221**	0.221
PAHs	0.049			$4.9 X10^{-5}$
Total PCBs	0.00017			$1.7 X10^{-7}$
Total Zinc	85.6	90	95**	0.095

* CTR human health criteria were not established for total PAHs. Therefore, the CTR criterion for individual PAHs of 0.049 µg/L is applied individually to benzo(a)anthracene, benzo(a)pyrene, and chrysene. The CTR criterion for Pyrene of 11,000 µg/L is assigned as an individual waste load allocation to Pyrene. Other PAH compounds in the CTR shall be screened as part of the TMDL monitoring.
**Values were rounded to match Criterion significant figures.

Table 60 – Greater Harbor Final Water Column Waste Load Allocation Translations

Pollutant	Waste Load Allocation (ug/L)	Dissolved Saltwater Criterion Maximum Concentration (ug/L)	Total Saltwater Criterion Maximum Concentration (ug/L)	Numeric Action Level (mg/L)
4,4-DDT	0.00059			$5.9 X10^{-7}$
Total Copper	3.73	4.8	5.8**	0.0058

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Pollutant	Waste Load Allocation (ug/L)	Dissolved Saltwater Criterion Maximum Concentration (ug/L)	Total Saltwater Criterion Maximum Concentration (ug/L)	Numeric Action Level (mg/L)
Total Lead	8.53	210	221**	0.221
Total PCBs	0.00017			$1.7 X10^{-7}$
Total Zinc	85.6	90	95**	0.095

**Values were rounded to match Criterion significant figures.

5) Dominguez Chanel Estuary, Consolidated Slip, and Fish Harbor Final Sediment Waste Load Allocations

This TMDL assigns concentration-based final sediment waste load allocations for cadmium, chromium, and mercury to be met at the construction site's discharge point(s) for discharges into Consolidated Slip and Fish Harbor, cadmium discharges into Dominguez Channel Estuary and Consolidated Slip, and chromium discharges into Consolidated Slip.

Table 61 – Dominguez Channel Estuary, Consolidated Slip and Fish Harbor Final Sediment Waste Load Allocations

Pollutant	Waste Load Allocation (mg/kg sediment)
Cadmium*	1.2
Chromium**	81
Mercury***	0.15

* Applies to Dominguez Channel Estuary and Consolidated Slip
** Applies to Consolidated Slip
*** Applies to Consolidated Slip and Fish Harbor

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Directly implementing the final waste load allocations would be impractical, costly, and not aligned with the monitoring requirements in this General Permit. As mentioned above, this TMDL associates bed toxicity with discharges of metals bound to sediment particulates. Therefore, the following will address this TMDL:

a) Comply with the site-specific erosion and sediment control, and post-construction requirements in this General Permit.

b) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

- Compliance Actions and Schedule

Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that discharge into the

Dominguez Channel or the Torrance Lateral, and identify on-site sources of copper, lead, and zinc through the required pollutant source assessment, shall compare all non-visible sampling and analytical results to the applicable interim numeric action levels for the metals. Responsible Dischargers that discharge into the Dominguez Channel Estuary or the Greater Harbor waters, and that identify on-site sources of the metals and toxic pollutants listed in Table 60 and Table 61 are to implement BMPs specific to preventing or controlling stormwater contact with those metals and toxic pollutants. Furthermore, Responsible Dischargers are to comply with the RUSLE2 modeling requirements in Attachment H, Section I.G.2, in order to address applicable interim sediment-based waste load allocations.

If an exceedance or failure of a BMP is observed, the Responsible Discharger shall evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the interim numeric action levels and TSS numeric effluent limitations in the future. Responsible Dischargers that perform the required pollutant source assessment and implement BMPs specific to preventing or controlling stormwater exposure to the metals and toxic pollutant sources are expected to meet the assigned numeric action levels and TSS numeric effluent limitations.

The effective date of the TMDL, March 23, 2012, is the interim compliance deadline. Since this compliance deadline has passed, the requirements to meet the interim numeric action levels shall be met by the effective date of this General Permit. Responsible Dischargers are to comply with the final numeric action levels and TSS numeric effluent limitations by March 23, 2032, the final compliance deadline for the Los Angeles and Long Beach Harbor. Future reissuances of this General Permit may incorporate additional or revised compliance requirements or interim targets to progress towards the required final compliance when a final numeric action level or TSS numeric effluent limitation applies.

viii. Los Angeles River Metals TMDL[273]

The Los Angeles Regional Water Quality Control Board adopted the Los Angeles River Metals TMDL on April 9, 2015, to address the impairment of

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273 Los Angeles Regional Water Quality Control Board, Amendment to the Water Quality Control Plan for the Los Angeles Region to Revise the Los Angeles River and Tributaries Metals TMDL (April 2015) <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/R15-004_BPA_CH_7.pdf> [as of May 20, 2021] (Los Angeles River Metals TMDL)

Los Angeles River and its tributaries due to cadmium, copper, lead, selenium, and zinc.

- Source Analysis

  Dry weather loading from storm drains contributes a large percentage of the loading because of low flows but high concentration of dissolved metals. During wet weather most metals loadings are in the particulate form where stormwater flows contribute a large percentage of cadmium, copper, lead, and zinc loading. Studies are underway to evaluate whether selenium levels represent a "natural condition" for this watershed.[274]

- Waste Load Allocation Translation

  1) Dry-weather Waste Load Allocations

     The Los Angeles River Metals TMDL assigns concentration-based waste load allocations for dry-weather. Non-Stormwater Discharges (NSWDs) are only authorized in this General Permit if the terms and conditions in Order, Section IV.A are met to control the discharge of pollutants from the construction site. Order, Section IV.B prohibits all NSWDs not authorized under Order, Section IV.A; therefore, all unauthorized NSWDs must be either eliminated or have regulatory coverage under a separate NPDES permit. Authorized NSWDs, as defined in this General Permit, are authorized because these discharges do not commingle with stormwater associated with construction activity. The Regional Water Board may impose additional requirements on NSWDs if deemed necessary per site-specific analysis.

  2) Wet-weather Waste Load Allocations

     The Los Angeles River Metals TMDL assigns a mass-based waste load allocation per construction area in grams per day per acre (g/d/ac) for cadmium, copper, lead, and zinc at the construction site's discharge point(s) for discharges into the Los Angeles River or tributaries (Los Angeles River Watershed).[275] In addition, daily storm volume flows are required to calculate the waste load allocation for each metal. The waste load allocations are shown in Table 62 below.

     Directly implementing the copper, lead, and zinc waste load allocations would result in a unique mass load for each Responsible Discharger depended on the daily stormwater flows and the

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274 Los Angeles River Metals TMDL, p. 4.

275 Los Angeles River Metals TMDL, p. 13.

construction site's acreage. Requiring Responsible Dischargers to calculate the site-specific mass load of a pollutant would be impractical, costly, and not aligned with the monitoring requirements in this General Permit.

The Los Angeles River Metals TMDL Staff Report allows for compliance to be assessed based on concentration. Additionally, the TMDL Staff Report states, "the wet-weather mass-based waste load allocations for the general construction and industrial stormwater permittees (Table 6-12) will be incorporated into watershed specific general permits. Concentration-based permit conditions may be set to achieve the mass-based waste load allocations. These concentration-based conditions would be equal to the concentration-based waste load allocations assigned to the other NPDES permits."

This TMDL states "each general construction stormwater permit holder will be subject to site-specific BMPs and monitoring requirements to demonstrate compliance with the final waste load allocations."[276] Therefore, it is consistent with the requirements and assumptions of the waste load allocation to apply the Los Angeles River Metals TMDL Numeric Targets as concentration-based numeric action levels (permit conditions).

The numeric action level iterative process in this General Permit requires dischargers to implement and evaluate performance of site-specific BMPs to demonstrate compliance with applicable waste load allocations. The units are converted from ug/L to mg/L to be consistent with the reporting units in SMARTS. The translated numeric action levels are shown in Table 62 below and a WER of 3.97 is used for copper.

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276 Los Angeles River Metals TMDL, p. 23.

Table 62 – Los Angeles River Waste Load Allocations Translation for Total Recoverable Metals

Pollutant	Waste Load Allocation (g/d/ac)	Numeric Target (ug/L)	Numeric Action Level (mg/L)
Cadmium*	WER x (7.6×10^{-12}) x daily volume (L) – (4.8×10^{-6})	WER x 3.1	0.0031
Copper**	WER x (4.2×10^{-11}) x daily volume (L) – (2.6×10^{-5})	WER x 17	0.06749
Lead*	WER x (4.2×10^{-11}) x daily volume (L) – (8.7×10^{-5})	WER x 94	0.094
Zinc*	WER x (3.9×10^{-10}) x daily volume (L) – (2.2×10^{-4})	WER x 159	0.159

* WER(s) have a default value of 1.0 unless site-specific WER(s) are approved.
**The WER for this constituent is 3.97.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that discharge into the Los Angeles River or its tributaries, and that identify on-site sources of cadmium, copper, lead, and/or zinc through the required pollutant source assessment, shall compare all non-visible sampling and analytical results to the applicable numeric action levels for the identified metals.

  Responsible Dischargers shall install, operate, and maintain site-specific BMPs to address identified on-site sources of cadmium, copper, lead, and/or zinc.

  If an exceedance or failure of a BMP is observed, the Responsible Discharger shall evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the numeric action levels in the future. Responsible Dischargers that perform the required pollutant source assessment and implement BMPs specific to preventing or controlling stormwater exposure to the sources of metals are expected to meet the numeric action levels.

  The final compliance deadline for the Los Angeles River Metals TMDL was January 11, 2016. Since this compliance deadline has passed, the numeric action levels are applicable upon the effective date of this General Permit.

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ix. Los Cerritos Channel Metals TMDL[277]

The U.S. EPA adopted the Los Cerritos Metals TMDL on March 17, 2010, to address the impairment of Los Cerritos Channel due to copper, lead, and zinc.

- Source Analysis

  Sources of metals from construction sites include sediment-bound metals, construction materials, and equipment used on construction sites. Additionally, in highly urbanized Los Cerritos Channel freshwater watershed, re-development of former industrial sites has a higher potential to discharge sediments laden with metals. During wet-weather, runoff from construction sites has the potential to contribute metals loadings to the Channel. Building materials and construction waste exposed to stormwater can leach and contribute metals to waterways.[278] Therefore, construction sites covered under this General Permit are considered Responsible Dischargers for the Los Cerritos Channel Metals TMDL.

- Waste Load Allocation Translation

  1) Dry-weather Waste Load Allocation

     The Los Cerritos Channel Metals TMDL assigns a concentration-based waste load allocation for dry-weather. Non-Stormwater Discharges (NSWDs) are authorized in this General Permit if Order, Section IV.A terms and conditions are met to control the discharge of pollutants from the construction site. Order, Section IV.B prohibits all NSWDs not authorized under Order, Section IV.A; therefore, all unauthorized NSWDs must be either eliminated or have regulatory coverage under a separate NPDES permit. Authorized NSWDs, as defined in this General Permit, are authorized because these discharges do not commingle with stormwater associated with construction activity. The Regional Water Board may impose additional requirements on NSWDs if deemed necessary per site-specific analysis.

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277 U.S. Environmental Protection Agency Region IX, Los Cerritos Channel Total Maximum Daily Loads for Metals (March 2010) <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/Established/Los%20Cerritos%20Channel%20Metals%20TMDL/03-18-10LosCerritosChannel-metalsTMDLs.pdf> [as of April 28, 2022]

278 Los Cerritos Channel Metals TMDL, p. 20.

2) Wet-weather Waste Load Allocations

The Los Cerritos Channel Metals TMDL assigns a mass-based waste load allocation per construction area in grams per day per acre (g/day/ac) for copper, lead, and zinc for discharges into the Los Cerritos Channel. In addition, daily storm volume flows are required to calculate the waste load allocation for each metal. The mass-based waste load allocations are shown in Table 63 below.

Table 63 – Los Cerritos Mass-based Waste Load Allocations

Pollutant	Waste Load Allocation (g/day/ac)
Copper	0.497×10^{-3} x daily volume(L)
Lead	2.835×10^{-3} x daily volume(L)
Zinc	4.860×10^{-3} x daily volume(L)

Directly implementing the copper, lead, and zinc mass-based waste load allocations would result in a unique mass load for each Responsible Discharger, dependent on the daily stormwater flows and the construction site's acreage. Requiring Responsible Dischargers to calculate the site-specific mass loading of a pollutant(s) is impractical, costly, and not aligned with the monitoring requirements of this this General Permit. The Los Cerritos Channel TMDL Implementation Plan[279] requires incorporation of the waste load allocations in this General Permit as wet-weather permit limitations expressed as event mean concentrations.

The term permit limitation in the TMDL implementation plan is defined as "a water-quality based effluent limitation or a receiving water limitation…permittees may demonstrate compliance with wet-weather waste load allocations in any one of three ways. First, general industrial and construction storm water permittees may be deemed in compliance with permit limitations if they demonstrate that there are no exceedances of the permit limitations at their discharge points or outfalls. Second, general industrial and construction storm water permittees may be deemed in compliance with permit limitations if they demonstrate that there are no exceedances of the permit limitations in the receiving water at, or downstream of, the

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279 Los Angeles Regional Water Quality Control Board, Amendment to the Water Quality Control Plan – Los Angeles Region to Incorporate the Implementation Plan for the Total Maximum Daily Loads for Metals in the Los Cerritos Channel <https://www.waterboards.ca.gov/losangeles/board_decisions/basin_plan_amendments/technical_documents/99_New/Los%20Cerritos%20Metals%20implementation%20plan%20and%20schedule%20BPA_rev%20053013.pdf> [as of April 28, 2022] (Los Cerritos Channel Metals TMDL Implementation Plan)

permittee's outfalls. Third, if permittees provide a quantitative demonstration that control measures and best management practices (BMPs) will achieve wet-weather waste load allocations consistent with the schedule in Table 7-20.2, then compliance may be demonstrated by implementation of those control measures and BMPs, subject to Executive Officer approval."[280] The assigned mass-based waste load allocations require site-specific calculations that are incompatible with the monitoring and reporting requirements in this General Permit. Therefore, it is consistent with the requirements and assumptions of the waste load allocations to implement the Los Cerritos Channel Metals TMDL Numeric Targets as concentration-based numeric action levels to align the mass-based waste load allocations to the requirements in this General Permit. The TMDL implementation plan provided Responsible Dischargers the above-stated three options for demonstrating waste load allocation compliance. The option implemented in this General Order is to implement the TMDL-specific numeric action levels at the point of discharge for the Responsible Discharger's construction site. The assigned concentration based numeric action levels are shown in Table 64 below. The units are converted from ug/L to mg/L to be consistent with the reporting units in SMARTS.

Table 64 – Los Cerritos Channel Waste Load Allocations (Concentration-based, Total Recoverable)

Pollutant	Numeric Targets (ug/L)	Numeric Action Levels (mg/L)
Copper	9.8	0.0098
Lead	55.8	0.0558
Zinc	95.6	0.0956

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- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that discharge into the Los Cerritos Channel and that identify on-site sources of copper, lead, and zinc through the required pollutant source assessment, shall compare all non-visible sampling and analytical results to the applicable numeric action levels for the identified metals.

  If an exceedance or failure of a BMP is observed, the Responsible Discharger shall evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the numeric action levels in the future. Responsible

280 Los Cerritos Channel Metals TMDL Implementation Plan, p. 4-5.

Dischargers that perform the required pollutant source assessment and implement BMPs specific to preventing or controlling stormwater exposure to the metals' sources are expected to meet the assigned numeric action levels.

The TMDL's final compliance deadline was September 30, 2017. Since this compliance deadline has passed, the numeric action levels are applicable upon the effective date of this General Permit.

x. Machado Lake Toxics TMDL[281]

The Los Angeles Regional Water Quality Control Board adopted the Machado Lake Toxics TMDL on September 2, 2010, to address the impairment of Machado Lake due to chemical group organochlorine (OC) pesticides (chlordane, DDT, dieldrin) and polychlorinated biphenyls (PCBs).

- Source Analysis

  The point sources of OC pesticides and PCBs into Machado Lake are stormwater and urban runoff discharges from the municipal separate storm sewer system (MS4), the California Department of Transportation, and general construction and industrial dischargers. Therefore, construction sites covered under this General Permit are considered Responsible Dischargers for the Machado Lake Toxics TMDL.

  OC pesticides are no longer legally sold or used, but remain ubiquitous in the environment, bound to fine-grained particles. The chemicals are transported to new locations when these particles become waterborne. The more recent small discharges of OC pesticides and PCBs to Machado Lake most likely come from the erosion of pollutant-laden sediment further up in the watershed. Urban runoff and rainfall higher in the watershed mobilize the particles, which are then washed into storm drains and channels that discharge to the lake. Stormwater and urban runoff discharges to Machado Lake occur through the Wilmington Drain, Project 77, and Project 510 subdrainage systems. The estimated contributions of OC pesticides and PCBs from point sources is much smaller than the estimated contribution from internal lake sediments. However, a waste load allocation is assigned to ongoing point source discharges to the lake.

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281 Los Angeles Regional Water Quality Control Board, Machado Lake Pesticides and PCBs TMDL (September 2, 2010), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/R10-008_RB_BPA.pdf> [as of May 20, 2021] (Machado Lake Toxics TMDL)

- Waste Load Allocation Translation

  The Machado Lake Toxics TMDL assigns a suspended sediment concentration-based waste load allocations for OC pesticides and PCBs to be met at the construction site's discharge location(s) for discharges into Machado Lake, shown in Table 65 below.

Table 65 – Machado Lake Toxics Waste Load Allocations

Pollutant	Waste Load Allocation of Suspended Sediment-Associated Contaminants (ug/kg dry weight)
Chlordane	3.24
DDD (all congeners)	4.88
DDE (all congeners)	3.16
DDT (all congeners)	4.16
Dieldrin	1.9
Total DDTs	5.28
Total PCBs	59.8

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Requiring Responsible Dischargers to directly implement the waste load allocation and sample for the pollutant(s) would be impractical, costly, and not aligned with the requirements of this General Permit. However, as mentioned in the source analysis, most toxic pollutants loadings in this watershed are in particulate form and associated with wet-weather flows. Therefore, the following will address this TMDL:

1) Comply with the site-specific erosion and sediment control, and post-construction requirements in this General Permit.
2) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of the toxic pollutants associated with the impaired water body, through the required pollutant source assessment, are to implement BMPs specific to preventing or controlling stormwater exposure to the toxic pollutants. Furthermore, Responsible Dischargers are to comply with the RUSLE2 modeling requirements in Attachment H, Section I.G.2.

  The Machado Lake Toxics TMDL's final compliance deadline was September 30, 2019. Since this compliance deadline has passed,

compliance with the waste load allocations shall be met upon the effective date of this General Permit.

xi. Marina del Rey Toxics TMDL[282]

The Los Angeles Regional Water Quality Control Board adopted the Marina del Rey Toxics TMDL on February 6, 2014, to address the impairment of Marina del Rey Harbor due to chlordane, copper, DDT, dieldrin, fish consumption advisory, lead, polychlorinated biphenyls (PCBs), sediment toxicity, and zinc. During the development of this TMDL, review of available data indicated that dieldrin is no longer a cause of impairment, and that there is a dissolved copper impairment in the water column and sediment.

- Source Analysis

  Urban stormwater has been recognized as a substantial source of metals. Numerous researchers have documented that the most prevalent metals in urban stormwater (i.e., copper, lead, and zinc) are consistently associated with suspended solids. Because metals are typically associated with fine particles in stormwater runoff, they have the potential to accumulate in marine sediments where they may pose a toxicity risk. A majority of organic constituents in stormwater are also associated with particulates. Once the particles accumulate in the sediments in the harbor, the sediments themselves can become a source through re-suspension and are thus assigned load allocations. Therefore, construction sites covered under this General Permit are considered Responsible Dischargers for the Marina del Rey Toxics TMDL.

  In addition to stormwater runoff, copper-based anti-fouling paints are recognized as substantial sources of dissolved copper in the water column and sediments. Site-specific modeling indicated that 100 percent of copper loading came from copper-based anti-fouling hull paint and hull cleaning activities. Direct deposition of airborne particles to the water surface may be a minor source responsible for contributing metals and organic pollutants to the Marina del Rey Harbor.[283]

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282 Los Angeles Regional Water Quality Control Board, Amendment to the Water Quality Control Plan – Los Angeles Region to incorporate the Marina del Rey Harbor Toxic Pollutants TMDL (February 6, 2014), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/R14-004_RB_BPA.pdf> [as of May 20, 2021] (Marina del Rey Harbor Toxics TMDL)

283 Marina del Rey Harbor Toxics TMDL, p. 3-4.

- Waste Load Allocation Translation

  The Marina del Rey Toxics TMDL assigns a mass-based waste load allocation per construction area in grams per day per acre (g/day/ac) or milligrams per day per acre (mg/day/ac) for chlordane, copper, total DDTs, Dichlorodiphenyldichloroethylene (p,p'-DDE), lead, total PCBs, and zinc for discharges into the Marina del Rey Harbor. The mass-based waste load allocations are shown in Table 66 and Table 67 below.

Table 66 – Marina del Rey Toxics Metals Waste Load Allocations

Pollutant	Waste Load Allocation (g/yr/ac)
Copper	1.9
Lead	2.6
Zinc	8.5

Table 67 – Marina del Rey Toxics OC Pesticides Waste Load Allocations

Pollutant	Waste Load Allocation (mg/yr/ac)
Chlordane	0.03
Total PCBs	1.3
Total DDTs	0.09
p,p'-DDE	0.12

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Requiring Responsible Dischargers to directly implement the waste load allocation and sample for the pollutant(s) would be impractical, costly, and not aligned with the requirements of this General Permit. However, as mentioned in the source analysis, most toxic pollutants loadings in this watershed are in particulate form and associated with wet-weather flows. Therefore, the following will address this TMDL:

1) Comply with the site-specific erosion and sediment control, and post-construction requirements in this General Permit.
2) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

100 percent of the copper loadings into the Marina del Rey Harbor comes from the leaching of antifouling hull paint and from hull cleaning operations. Therefore, the copper numeric target will not be assigned to Responsible Dischargers and compliance with this waste load allocation shall be through compliance with this General Permit.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of the metals and toxic pollutants associated with the impaired water body, through the required pollutant source assessment, are to implement BMPs specific to preventing or controlling stormwater exposure to the metals and toxic pollutants. Furthermore, Responsible Dischargers are to comply with the RUSLE2 modeling requirements in Attachment H, Section I.G.2.

  The Marina del Rey Toxics TMDL's final compliance deadline was March 22, 2016. Since this compliance deadline has passed, the waste load allocations shall be met upon the effective date of this General Permit.

xii. Oxnard Drain No. 3 Toxics TMDL[284]

The U.S. EPA adopted the Oxnard Drain No. 3 Toxics TMDL on October 6, 2011, to address the impairment of the Oxnard Drain No. 3 due to bifenthrin, chlorpyrifos, organochlorine (OC) pesticides (chlordane, DDT, dieldrin, and toxaphene), polychlorinated biphenyls, and sediment toxicity.

- Source Analysis

  The Oxnard Drain No. 3 Toxics TMDL identifies historic and current loadings of toxic pollutants, including construction sites that would be covered under this General Permit. During wet weather, discharges from construction sites have the potential to contribute toxic pollutant loadings. However, dry weather discharges have less potential to contribute to toxic pollutant loadings as non-stormwater discharges authorized by this General Permit are only authorized when they do not cause or contribute to a violation of any water quality standard. Therefore, construction sites covered under this General Permit are considered Responsible Dischargers for the Oxnard Drain No. 3 Toxics TMDL.

- Waste Load Allocation Translation

  The Oxnard Drain No. 3 Toxics TMDL assigns a concentration-based waste load allocation to construction stormwater discharges for 4,4'-

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284 United States EPA Region IX, Total Maximum Daily Loads for Pesticides, PCBs, and Sediment Toxicity in Oxnard Drain No.3 (October 6, 2011), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/Established/Oxnard%20Drain%20No.%203%20Pesticides%20PCBs%20and%20Sediment%20Toxicity%20TMDL/oxnard-drain-3-tmdl-10-2011.pdf> [as of April 28, 2022] (Oxnard Drain No. 3 Toxics TMDL)

DDD, 4,4'-DDE, 4,4'-DDT, bifenthrin, chlorpyrifos, dieldrin, total chlordane, total PCBs, and toxaphene expressed as water, bed sediment and suspended sediment concentrations in ug/kg to be met at the construction site's discharge location(s) for discharges into the Oxnard Drain No. 3. OC pesticides and PCBs have an affinity for organic matter and will partition from water to organic substances such as sediment, benthic organisms, and fish, so the sediment allocations are applied, shown in Table 68 below.

Table 68 – Oxnard Drain No. 3 Waste Load Allocations

Pollutant	Waste Load Allocation of Suspended Sediment-Associated Contaminants (ug/kg dry weight)
4,4'-DDD	2.0
4,4'-DDE	2.2
4,4'-DDT	0.3
Bifenthrin	-
Chlordane, Total	3.3
Chlorpyrifos	-
Dieldrin	4.3
PCBs, Total	180
Sediment Toxicity	-
Toxaphene	360

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Requiring Responsible Dischargers to directly implement the waste load allocation and sample for the pollutant(s) would be impractical, costly, and not aligned with the requirements of this General Permit. However, as mentioned in the source analysis, most toxic pollutants loadings in this watershed are in particulate form and associated with wet-weather flows. Therefore, the following will address this TMDL:

1) Comply with the site-specific erosion and sediment control, and post-construction requirements in this General Permit.

2) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of the toxic pollutants associated with the impaired water body, through the required pollutant source assessment, are to implement BMPs specific to preventing or controlling stormwater exposure to the toxic pollutants.

Furthermore, Responsible Dischargers are to comply with the RUSLE2 modeling requirements in Attachment H, Section I.G.2.

The Los Angeles Regional Water Quality Control Board has not adopted an Implementation Plan or a compliance schedule for the toxic pollutants addressed by the Oxnard Drain No. 3 Toxics TMDL. Therefore, Responsible Dischargers are required to achieve compliance with the waste load allocations upon the effective date of this General Permit.

xiii. San Gabriel River Metals and Selenium TMDL[285]

The U.S. EPA adopted the San Gabriel River Metals TMDL on March 26, 2007, to address the impairment of San Gabriel River, estuary, and tributaries due to copper, lead, selenium, and zinc. A TMDL was not developed for the elevated levels of selenium in Reach 6 during dry weather conditions because the sources of selenium appear to be related to natural levels of selenium in the soils.

- Source Analysis

  Sources of metals from construction sites include sediment-bound metals, construction materials, and equipment used on construction sites. Building materials and construction waste exposed to stormwater can leach and contribute metals to waterways. During dry weather, the potential contribution of metals loading from Responsible Dischargers is low.[286]

- Waste Load Allocation Translation

  1) Dry-weather Waste Load Allocation

     The San Gabriel River Metals TMDL assigns concentration-based and mass-based waste load allocations for dry-weather discharges of copper and selenium. Non-Stormwater Discharges (NSWDs) are authorized in this General Permit if Order, Section IV.A terms and conditions are met to control the discharge of pollutants from the construction site. Order, Section IV.B prohibits all NSWDs not authorized under Order, Section IV.A; therefore, all unauthorized NSWDs must be either eliminated or have regulatory coverage under a separate NPDES permit. Authorized NSWDs, as defined in this

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285 U.S. Environmental Protection Agency Region IX, Total Maximum Daily Loads for Metals and Selenium San Gabriel River and Impaired Tributaries (March 26, 2007) <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/Established/San%20Gabriel%20River%20Metals%20TMDL/final_sangabriel_metalstmdl_3-27-07.pdf> [as of May 20, 2021] (San Gabriel River Metals TMDL)

286 San Gabriel River Metals TMDL, p. 22.

General Permit, are authorized because these discharges do not commingle with stormwater associated with construction activity. The Regional Water Board may impose additional requirements on NSWDs if deemed necessary per site-specific analysis.

2) Wet-weather Waste Load Allocations

The San Gabriel River Metals TMDL assigns a mass-based waste load allocation per construction area in kilograms per day (kg/d) for lead for discharges into the San Gabriel River Reach 2 watershed (all upstream reaches and tributaries) and Coyote Creek or its tributaries. The waste load allocations are shown in Table 69 and Table 70 below.

Table 69 – San Gabriel River Reach 2 Watershed Waste Load Allocation

Pollutant	Waste Load Allocation (kg/d)
Lead	0.8

Table 70 – Coyote Creek Watershed Waste Load Allocations

Pollutant	Waste Load Allocation (kg/d)
Copper	0.513
Lead	2.07
Zinc	3.0

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The San Gabriel River Metals TMDL Implementation Plan[287] requires incorporation of the waste load allocations in this General Permit as permit limitations expressed as event mean concentrations. The term permit limitation is defined in the TMDL compliance plan as "a water-quality based effluent limitation or a receiving water limitation…permittees may demonstrate compliance with wet-weather waste load allocations in any one of three ways. First, general industrial and construction storm water permittees may be deemed in compliance with permit limitations if they demonstrate that there are no exceedances of the permit limitations at their discharge points or outfalls. Second, general industrial and construction storm water permittees may be deemed in compliance with permit limitations if they demonstrate that there are no exceedances of the permit

287 Los Angeles Regional Water Quality Control Board, Amendment to the Water Quality Control Plan – Los Angeles Region to Incorporate the Implementation Plan for the Total Maximum Daily Loads for Metals and Selenium in the San Gabriel River and Impaired Tributaries (June 6, 2013) <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/docs/R13-004_RB_BPA.pdf> [as of May 20, 2021] (San Gabriel River Metals TMDL Implementation Plan)

limitations in the receiving water at, or downstream of, the permittee's outfalls. Third, if permittees provide a quantitative demonstration that control measures and best management practices (BMPs) will achieve wet-weather waste load allocations consistent with the schedule in Table 7-20.2, then compliance may be demonstrated by implementation of those control measures and BMPs, subject to Executive Officer approval."[288]

The assigned mass-based waste load allocations require site-specific calculations that are incompatible with the monitoring and reporting requirements in this General Permit. Therefore, it is consistent with the requirements and assumptions of the waste load allocations to implement the San Gabriel River Metals and Selenium TMDL Numeric Targets as concentration-based numeric action levels to align the mass-based waste load allocations to the requirements in this General Permit. The TMDL implementation plan provided Responsible Dischargers the three above-stated options for demonstrating waste load allocation compliance and the appropriate option is to implement the TMDL-specific numeric action levels at the point of discharge for the Responsible Discharger's construction site. The assigned concentration-based numeric action levels are shown in Table 71 and Table 72 below. The units are converted from ug/L to mg/L to be consistent with the reporting units in SMARTS.

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Table 71 – San Gabriel River Reach 2 Watershed Waste Load Allocation Translation (concentration-based, total recoverable)

Pollutant	Numeric Targets (ug/L)	Numeric Action Levels (mg/L)
Lead	166	0.166

Table 72 – Coyote Creek Watershed Waste Load Allocations (concentration-based, total recoverable)

Pollutant	Numeric Targets (ug/L)	Numeric Action Levels (mg/L)
Copper	27	0.027
Lead	106	0.106
Zinc	158	0.158

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that discharge into the San Gabriel River and that identify on-site sources of copper, lead, and zinc through the required pollutant source assessment, shall compare all

288 San Gabriel River Metals TMDL Implementation Plan, p. 4-5.

non-visible sampling and analytical results to the applicable numeric action levels for the identified metals.

If an exceedance or failure of a BMP is observed, the Responsible Discharger shall evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the numeric action levels in the future. Responsible Dischargers that perform the required pollutant source assessment and implement BMPs specific to preventing or controlling stormwater exposure to the metals sources are expected to meet the numeric action levels.

The San Gabriel River Metals TMDL's final compliance deadline was September 30, 2017. Since this compliance deadline has passed, the numeric action levels are applicable upon the effective date of this General Permit.

xiv. Santa Monica Bay Toxics TMDL[289]

The U.S. EPA adopted the Santa Monica Bay Toxics TMDL on March 26, 2012, to address the impairment for Santa Monica Bay due to DDTs and polychlorinated biphenyls (PCBs). Santa Monica Bay, as defined in this TMDL, is Point Dume to Point Vicente and the Palos Verdes shelf from Point Vicente to Point Fermin.

- Source Analysis

  DDTs are organochlorine insecticides widely used in the past on agricultural crops and to control disease-carrying insects. The United States banned the use of DDTs in 1972, except for public health emergencies involving insect diseases and control of body lice. Although use of DDTs is limited, it can persist in the environment, adhering strongly to soil particles. PCBs are mixtures of up to 209 individual chlorinated compounds (known as congeners). In 1976, the manufacturing of PCBs was prohibited because of evidence that they build up in the environment and can cause harmful health effects. Similar to DDTs, PCBs adhere to soil and can be transported into watersheds via erosion and stormwater runoff. Studies within the watershed indicated that concentrations of DDTs and PCBs in stormwater may exceed human health criteria. Therefore, construction sites covered

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289 U.S. Environmental Protection Agency Region IX, Santa Monica Bay Total Maximum Daily Loads for DDTs and PCBs (March 26, 2012), <https://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/Established/SantaMonica/FinalSantaMonicaBayDDTPCBsTMDL.pdf> [as of May 20, 2021] (Santa Monica Bay Toxics TMDL)

under this General Permit are considered Responsible Dischargers for the Santa Monica Bay Toxics TMDL.

- Waste Load Allocation Translation

  The Santa Monica Bay Toxics TMDL assigns mass-based waste load allocations of 0.16 g/yr for DDT and 0.82 g/yr for PCBs to be met at the construction site's discharge location(s) for discharges into Santa Monica Bay. The waste load allocations are based on the aggregate area represented by individual permittees covered under this General Permit, which is roughly 0.56 percent of the watershed's total area. Table 73 shows the waste load allocation below.

Table 73 – Santa Monica Bay Toxics Waste Load Allocations

Pollutant	Waste Load Allocation (g/yr)
DDTs	0.16
PCBs	0.82

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Permittees covered under this General Permit are not expected to perform individual sampling. Requiring Responsible Dischargers to directly implement the waste load allocation and sample for the pollutant(s) would be impractical, costly, and not aligned with the requirements of this General Permit. However, as mentioned in the source analysis, most toxic pollutants loadings in this watershed are in particulate form and associated with wet-weather flows. Therefore, the following will address this TMDL:

1) Comply with the site-specific erosion and sediment control, and post-construction requirements in this General Permit.
2) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of the toxic pollutants associated with the impaired water body, through the required pollutant source assessment, are to implement BMPs specific to preventing or controlling stormwater exposure to the toxic pollutants. Furthermore, Responsible Dischargers are to comply with the RUSLE 2 modeling requirements in Attachment H, Section I.G.2.

The Los Angeles Regional Water Quality Control Board has not adopted an Implementation Plan or a compliance schedule for the toxic pollutants addressed by the Santa Monica Bay Toxics TMDL. Therefore, Responsible Dischargers are required to achieve compliance with the waste load allocations upon the effective date of this General Permit.

xv. San Diego Creek and Newport Bay Toxics TMDL [290,291]

The U.S. EPA adopted the San Diego Creek and Newport Bay Toxics TMDL on June 14, 2002, to address the impairments of San Diego Creek and Newport Bay due to cadmium, chlordane, chlorpyrifos, chromium, copper, DDT, diazinon, dieldrin, lead, mercury, polychlorinated biphenyls (PCBs), selenium, toxaphene, and zinc. However, the Santa Ana Regional Water Quality Control Board adopted a separate Revised Organochlorine Compounds (chlordane, DDT, dieldrin, PCBs, and toxaphene) TMDL on July 15, 2011, which revises the loading capacities in the U.S. EPA TMDL based on an updated impairment assessment. For the purpose of this General Permit and factsheet, both TMDLs will be addressed as a single San Diego Creek and Newport Bay Toxics TMDL.

- Source Analysis

  The San Diego Creek and Newport Bay Toxics TMDL provides source analyses specific to the pollutant categories: metals, organochlorine compounds, chromium, and mercury. These pollutants are known to adsorb or adhere to sediment which are transported through the watershed via soil erosion and runoff. Surface runoff from natural background and man-made contributions are estimated to be the largest source of metals within San Diego Creek and its tributaries. The largest source of dissolved metals (except copper) to Upper and Lower Newport Bay are thought to be freshwater-borne loads from San Diego Creek. Likewise, the main source of continual loadings of organochlorine pollutants to the Newport Bay watershed is also attributed to erosion of

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290 United States EPA, Total Maximum Daily Loads for Toxic Pollutants San Diego Creek and Newport Bay, California (June 14, 2002), <https://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/docs/sd_crk_nb_toxics_tmdl/summary0602.pdf> [as of May 20, 2021] (San Diego Creek and Newport Bay Toxics TMDL)

291 Santa Ana Regional Water Quality Control Board, Revised Organochlorine Compounds TMDLs for San Diego Creek, Upper and Lower Newport Bay (July 15, 2015),

<https://www.waterboards.ca.gov/rwqcb8/water_issues/programs/tmdl/docs/oc/2011-0037/FINAL/R8-2011-0037_Attachment2_Final_BPA.PDF> [as of May 20, 2021] (San Diego Creek and Newport Bay Toxics TMDL)

surface soils or in-stream sediments, primarily from San Diego Creek. Construction activities have the potential to exacerbate erosion within the watershed, therefore construction sites covered under this General Permit are considered Responsible Dischargers.

Chlorpyrifos, chromium, diazinon, dieldrin, mercury, and selenium are not translated for this General Permit as construction stormwater discharges are not identified as sources of these pollutants.

- Waste Load Allocation Translation

  The San Diego Creek and Newport Bay Toxics TMDL assigns waste load allocations for various metals (cadmium, copper, lead, and zinc) and organochlorine compounds (chlordane, DDT, PCBs, and toxaphene) to Responsible Dischargers to be met at the site's discharge location(s) for dischargers into Newport Bay or San Diego Creek and its tributaries. The following list details the water bodies and their associated pollutants with assigned waste load allocations:

  1) San Diego Creek: cadmium, copper, lead, zinc, DDT, and toxaphene

     The San Diego Creek and Newport Bay Toxics TMDL assigns concentration-based waste load allocations for cadmium, copper, lead, and zinc to the category "Other NPDES permittees" which includes Responsible Dischargers in addition to seven other NPDES permits. The TMDL does not specifically identify construction stormwater dischargers as a major source of metals to the impaired waterbodies or divide the waste load allocations between permitted dischargers. Furthermore, the TMDL includes an option for the Water Boards to conduct a permit-specific analysis to divide the waste load allocations; however, conducting the analysis on a discharge flow, volume, and timing basis is not aligned with the framework of this General Permit.

     The waste load allocations are assigned to Responsible Dischargers to be met at the construction site's discharge location(s) for discharges into San Diego Creek and its tributaries including the Santa Ana-Delhi Channel, Big Canyon Channel, East Costa Mesa Channel, and other tributaries into San Diego Creek (San Diego Creek Watershed). Therefore, these waste load allocations are translated as concentration-based numeric action levels applied at the point(s) of discharge from the Responsible Discharger's construction site. The waste load allocations are hardness dependent, meaning the receiving water body hardness must be known to calculate the waste load allocations.

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Receiving water body hardness is dependent on receiving water body flow. The U.S. EPA calculated the hardness-dependent criteria for cadmium, copper, lead, and zinc as shown in Table 5-2 of the San Diego Toxics TMDL with the following CTR equation:

$$CMC = WER \times (Acute\ Conversion\ Factor) \times (\exp\{mA[\ln(hardness)]+bA\})$$

Where CMC stands for criterion maximum concentration, WER is the water effect ratio, and mA and bA are constants, specific to each metal. Hardness is defined as the concentration of calcium carbonate (CaCO3) in the water column and has the units of milligram per liter (mg/L). Freshwater aquatic life criteria for certain metals are expressed as a function of hardness because hardness and/or water quality characteristics that are usually correlated with hardness can reduce or increase the toxicity of some metals. The site-specific hardness is used to calculate the metal numeric targets.

Only one hardness value is selected to be representative of the receiving water body instead of requiring Responsible Dischargers to sample for receiving water body hardness in concurrence with taking a discharge sample to calculate the metal criteria. This is consistent with the approach taken in many hardness-dependent TMDLs of assigning a hardness value based on existing data. The U.S. EPA and the Santa Ana Regional Water Quality Control Board staff evaluated daily flow records of the San Diego Creek for 19 years. The TMDL developed multiple receiving water hardness values based on flow and did not assign one hardness value to be representative of the San Diego Creek water body. A hardness of 197mg/L was calculated as the average hardness for large flows and is selected as the typical hardness value associated with a precipitation event flow at San Diego Creek. Table 5-2 of the San Diego Toxics TMDL shows how the California Toxics Rule (CTR) equation was used to calculate the acute concentration criteria at a hardness of 197 mg/L.

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Table 74 – San Diego Creek Watershed Waste Load Allocation Translation

Parameter	CTR Equation	Total Criteria with 197 hardness in mg/L	Total freshwater acute concentration Numeric Action Level mg/L*
Cadmium	(exp(1.128*ln(hardness)-3.6867))	0.0097	0.0097
Copper	(exp(0.9422*ln(hardness)-1.7))	0.027	0.027
Lead	(exp(1.273*ln(hardness)-1.460))	0.194	0.194
Zinc	(exp(0.8473*ln(hardness)+0.884))	0.21	0.21

*Values are rounded to reflect the significant figures of each respective pollutant

An average hardness of San Diego Creek was selected to calculate the criteria for translating each pollutant into a numeric action level in the San Diego Toxics TMDL because it is not feasible or practical to require Responsible Dischargers to collect the ambient hardness of the receiving water body in concurrence with each monitoring sample.

The Revised Organochlorine Compounds TMDL assigns mass-based waste load allocations for total DDT and toxaphene on an annual basis to Responsible Dischargers in the San Diego Creek watershed, shown in Table 76 below. Requiring Responsible Dischargers to calculate the construction site's specific mass loading of a pollutant(s) would be impractical, costly, and not aligned with the requirements of this General Permit. However, as mentioned in the source analysis, most organochlorine compound loadings in this watershed are in the form of fine sediment transported through erosion. The TMDL's implementation plan intends to use source control to reduce the loading of organochlorine compounds into the watershed, which is aligned with the requirements of this General Permit. Therefore, the following will address this TMDL:

a) Comply with the site-specific erosion and sediment controls, and post-construction requirements in this General Permit.

b) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

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2) Upper Newport Bay: cadmium, copper, lead, zinc, chlordane, DDT, and PCBs

Mass-based waste load allocations for dissolved cadmium, copper, lead, and zinc are assigned to be met in the receiving water of Upper Newport Bay. Concentration-based waste load allocations for cadmium, copper, lead, and zinc in Upper Newport Bay are assigned to Other NPDES Dischargers, which includes construction stormwater dischargers. However, the TMDL does not specifically identify construction stormwater dischargers as a major source of metals to the impaired waterbodies or divide the waste load allocations between permitted dischargers. The TMDL includes an option for the Water Boards to conduct a permit-specific analysis to dive the waste load allocations; however, conducting the analysis on a discharge flow, volume, and timing basis is not aligned with the framework of this General Permit. Therefore, these waste load allocations are translated as concentration-based numeric action levels applied to the point(s) of discharge from the Responsible Discharger's construction site. The concentration-based waste load allocations are translated into total concentrations using the CTR conversion factor for saltwater acute criteria. The numeric action levels are shown in Table 75 below.

The Revised Organochlorine Compounds TMDL assigns mass-based waste load allocations for chlordane, DDT, and PCBs on an annual basis to Responsible Dischargers in Upper Newport Bay, shown in Table 76 below. Requiring Responsible Dischargers to calculate the construction site's specific mass loading of a pollutant(s) would be impractical, costly, and not aligned with the requirements of this General Permit. However, as mentioned in the source analysis, most organochlorine compound loadings in this watershed are in the form of fine sediment transported through erosion. The TMDL's implementation plan intends to use source control to reduce the loading of organochlorine compounds into the watershed, which is aligned with the requirements of this General Permit. Therefore, the following will address this TMDL:

a) Comply with the site-specific erosion and sediment controls, and post-construction requirements in this General Permit.

b) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

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3) Lower Newport Bay: copper, lead, zinc, chlordane, DDT, and PCBs

Mass-based waste load allocations for dissolved copper, lead, and zinc are assigned to be met in the receiving water of Lower Newport Bay. Concentration-based waste load allocations for copper, lead, and zinc in Lower Newport Bay are assigned to Other NPDES Dischargers, which includes construction stormwater dischargers. However, the TMDL does not specifically identify construction stormwater dischargers as a major source of metals to the impaired waterbodies or divide the waste load allocations between permitted dischargers. The TMDL includes an option for the Water Boards to conduct a permit-specific analysis to dive the waste load allocations; however, conducting the analysis on a discharge flow, volume, and timing basis is not aligned with the framework of this General Permit. Therefore, these waste load allocations are translated as concentration-based numeric action levels applied to the point(s) of discharge from the Responsible Discharger's construction site. The concentration-based waste load allocations are translated into total concentrations using the CTR conversion factor for saltwater acute criteria. The numeric action levels are shown in Table 75 below.

The Revised Organochlorine Compounds TMDL assigns mass-based waste load allocations for chlordane, DDT, and PCBs on an annual basis to Responsible Dischargers in Lower Newport Bay, shown in Table 76 below. Requiring Responsible Dischargers to calculate the construction site's specific mass loading of a pollutant(s) would be impractical, costly, and not aligned with the requirements of this General Permit. However, as mentioned in the source analysis, most organochlorine compound loadings in this watershed are in the form of fine sediment transported through erosion. The TMDL's implementation plan intends to use source control to reduce the loading of organochlorine compounds into the watershed, which is aligned with the requirements of this General Permit. Therefore, the following will address this TMDL:

a) Comply with the site-specific erosion and sediment controls, and post-construction requirements in this General Permit.

b) For each phase of the construction project, install erosion controls that will result in predicted erosion rates that are as protective as pre-construction (e.g., undisturbed vegetation for the area) conditions. Calculate the predicted erosion rates by using RUSLE2 modeling as described in Attachment H.

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4) Rhine Channel Area of Lower Newport Bay: copper, lead, and zinc

Mass-based waste load allocations for dissolved, copper, lead, and zinc are assigned to be met in the receiving water of the Rhine Channel. Concentration-based waste load allocations for copper, lead, and zinc in Lower Newport Bay are assigned to Other NPDES Dischargers, which includes construction stormwater dischargers. However, the TMDL does not specifically identify construction stormwater dischargers as a major source of metals to the impaired waterbodies or divide the waste load allocations between permitted dischargers. The TMDL includes an option for the Water Boards to conduct a permit-specific analysis to dive the waste load allocations; however, conducting the analysis on a discharge flow, volume, and timing basis is not aligned with the framework of this General Permit. Therefore, these waste load allocations are translated as concentration-based numeric action levels applied to the point(s) of discharge from the Responsible Discharger's construction site. The concentration-based waste load allocations are translated into total concentrations using the CTR conversion factor for saltwater acute criteria. The numeric action levels are shown in Table 75 below.

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Table 75 – Upper Newport Bay, Lower Newport Bay and Bay Segments, and Rhine Channel Metals Waste Load Allocation Translation

Parameter	Dissolved saltwater acute TMDLs and allocations (ug/L)	CTR Conversion Factor for saltwater acute criteria	Total saltwater acute concentration Numeric Action Level (mg/L)
Cadmium*	42	0.994	0.042**
Copper	4.8	0.83	0.00578**
Lead	210	0.951	0.221**
Zinc	90	0.946	0.095**

*Applies to Upper Newport Bay only
**Values are rounded to reflect the significant figures of each respective pollutant

Table 76 – San Diego Creek, Upper Newport Bay and Lower Newport Bay Organochlorine Compounds Waste Load Allocations

Parameter	Total DDT (g/yr)	Chlordane (g/yr)	Total PCBs (g/yr)	Toxaphene (g/yr)
San Diego Creek	99.8			1.5
Upper Newport Bay	40.3	23.4	23.2	
Lower Newport Bay	14.9	8.6	60.7	

- Compliance Actions and Schedule

  1) Metals

     Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that discharge into San Diego Creek, Upper Newport Bay, Lower Newport Bay, or the Rhine Channel and that identify on-site sources of cadmium, copper, lead, and zinc through the required pollutant source assessment, shall compare all non-visible sampling and analytical results to the applicable numeric action levels for the identified metals.

     If an exceedance or failure of a BMP is observed, the Responsible Discharger shall evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the numeric action levels in the future. Responsible Dischargers that perform the required pollutant source assessment and implement BMPs specific to preventing or controlling stormwater exposure to the metals' sources are expected to meet the numeric action levels.

     The Santa Ana Regional Water Quality Control Board has not adopted an Implementation Plan or a compliance schedule for the metals addressed by the San Diego Creek and Newport Bay Toxics TMDL. Therefore, Responsible Dischargers are required to achieve compliance with the translated numeric action levels by the effective date of this General Permit.

  2) Organochlorine Compounds

     Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that identify on-site sources of organochlorine compounds associated with the impaired water body, through the required pollutant source assessment, are to implement BMPs specific to preventing or controlling stormwater exposure to the organochlorine compounds. Furthermore, Responsible Dischargers are to comply with the RUSLE2 modeling requirements in Attachment H, Section I.G.2.

     The Revised Organochlorine Compounds TMDL's final compliance deadline for the TMDLs is December 31, 2020. Therefore, Responsible Dischargers shall comply with the requirements of this General Permit and the RUSLE2 modeling requirements in Attachment H, Section I.G.2, upon the effective date of this General Permit.

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xvi. Chollas Creek Metals TMDL[292]

The San Diego Regional Water Quality Control Board adopted the Chollas Creek Metals TMDL on June 13, 2007, to address the impairment of Chollas Creek due to dissolved copper, lead, and zinc.

- Source Analysis

  The major urban runoff contributors of copper, lead, and zinc into Chollas Creek include freeways, commercial, and industrial land uses.[293] Construction erosion is a potential source of metals in Chollas Creek.[294] Sediment is assumed to not reside in Chollas Creek long enough to allow metal concentrations to build to high enough levels that the sediment becomes a source to the creek.[295] However, construction sites covered under this General Permit are identified as Responsible Dischargers for the Chollas Creek Metals TMDL.

- Waste Load Allocation Translation

  The Chollas Creek Metals TMDL assigns waste load allocations for dissolved copper, lead, and zinc to Responsible Dischargers to be met at the construction discharge location(s).

  The waste load allocations for dissolved copper, lead, and zinc are concentration-based and set equal to 90 percent of the numeric targets, which is the CTR acute criteria, shown in Table 77 below.

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292 San Diego Regional Water Quality Control Board, A Resolution Adopting an Amendment to the Water Quality Control Plan for the San Diego Basin (9) to Incorporate Total Maximum Daily Loads for Dissolved Copper, Lead, and Zinc in Chollas Creek, Tributary to San Diego Bay, and to Revise the Toxic Pollutants Section of Chapter 3 to Reference the California Toxics Rule (June 2007) <https://www.waterboards.ca.gov/sandiego/water_issues/programs/tmdls/docs/cholascreekmetals/update011509/R9-2007-0043_Signed.pdf> [as of May 20, 2021] (Chollas Creek Metals TMDL)

293 Chollas Creek Metals TMDL, p. 3.

294 San Diego Regional Water Quality Control Board, Total Maximum Daily Loads for Dissolved Copper, Lead, and Zinc in Chollas Creek, Tributary to San Diego Bay (May 2007) <https://www.waterboards.ca.gov/sandiego/water_issues/programs/tmdls/docs/cholascreekmetals/update011509/Technical_Report.pdf> [as of May 20, 2021] (Chollas Creek Metals TMDL Technical Report)

295 Chollas Creek Metals TMDL Technical Report, p. 49-50.

Table 77 – Chollas Creek Metals Waste Load Allocations

Pollutant	90 Percent of Dissolved Metal Concentration Numeric Targets (ug/L)
Dissolved Copper	(0.90) X (0.96) X exp(0.9422 X ln[hardness] – 1.700) X WER
Dissolved Lead	(0.90) X [1.46203 – 0.145712 X ln(hardness)] X exp(1.273 X ln[hardness] – 1.460) X WER
Dissolved Zinc	(0.90) X (0.978) X exp(0.8473 X ln[hardness] + 0.884) X WER

The CTR acute criteria for dissolved copper, lead, and zinc are calculated using water effect ratios (WER), which represents the correlation between the concentrations present in the water column and the concentrations that are biologically available and toxic to aquatic life. The San Diego Regional Water Board adopted Resolution R9-2017-0015 which established site-specific WERs for dissolved copper (6.998) and zinc (1.711) in Chollas Creek. In the absence of a site-specific WER, such as for lead, a default value of 1.0 is used.

The CTR acute criteria calculation also requires receiving water body hardness, which results in a floating target that would differ at each sample because the receiving water body hardness is dependent on receiving water body flow. Hardness is defined as the concentration of calcium carbonate (CaCO3) in the water column and has the units of milligram per liter (mg/L). Freshwater aquatic life criteria for certain metals are expressed as a function of hardness because hardness and/or water quality characteristics that are usually correlated with hardness can reduce or increase the toxicities of some metals.

Known site-specific hardness data is used to calculate the waste load allocation instead of requiring Responsible Dischargers to calculate their metal limit by sampling the receiving water body hardness in concurrence with taking a discharge sample. This is consistent with the approach taken in many hardness dependent TMDLs of assigning a hardness value based on existing data. Hardness data for Chollas Creek was obtained by Regional Board TMDL staff from California Integrated Water Quality System (CIWQS). Data analysis was conducted on hardness results from wet-weather sampling events from the Chollas Creek TMDL watershed with sample dates ranging from 1994 to 2017. All results obtained were marked as part of the Chollas Creek TMDL project, however not all stations had specific location information. Statistics run on the data set produced a hardness geometric mean of 94.07 mg/L. Table 78 below shows how the CTR equation was used to calculate the acute concentration criteria at a hardness of 94.07 mg/L.

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Table 78 – Chollas Creek Dissolved Metals Waste Load Allocation Translation

Pollutant	CTR equation	Total Criteria (ug/L) using hardness of 94.07 mg/L	90 Percent of Total Criteria as the Waste Load Allocation (ug/L)	Translated Numeric Effluent Limitations (mg/L)*
Copper	6.998 X (exp(0.9422 X ln[hardness] - 1.7))	92.4823777	83.23413993	0.083
Lead	1 X (exp(1.273 X ln[hardness] - 1.460))	75.5324136	67.97917227	0.068
Zinc	1.711 X (exp(0.8473 X ln[hardness] + 0.884))	194.6576544	175.181889	0.175

*Values are rounded to reflect the significant figures of each respective pollutant

A geometric mean hardness of Chollas Creek was selected to calculate the criteria for translating each pollutant into a numeric effluent limitation in the Chollas Creek Metals TMDL because it is not feasible or practical to require Responsible Dischargers to collect the ambient hardness of the receiving water body in concurrence with each monitoring sample. Therefore, Responsible Dischargers are assigned numeric effluent limitations for dissolved copper, lead, and zinc for discharges to Chollas Creek to be met at the construction site's discharge location(s).

- Compliance Actions and Schedule

  Responsible Dischargers shall comply with the requirements of this General Permit. Responsible Dischargers that discharge into Chollas Creek and that identify on-site sources of copper, lead, and zinc through the required pollutant source assessment, shall compare all non-visible sampling and analytical results to the applicable numeric effluent limitations for the identified metals.

  If an exceedance or failure of a BMP is observed, the Responsible Discharger shall evaluate the BMPs being used and identify and implement a strategy in the site's SWPPP to prevent potential exceedances of the numeric effluent limitations in the future. Responsible Dischargers that perform the required pollutant source assessment and implement BMPs specific to preventing or controlling stormwater exposure to the metals' sources are expected to meet the numeric effluent limitations.

  The Chollas Creek Metals TMDL's final compliance deadline is October 22, 2028. As an interim target, Responsible Dischargers shall apply the translated numeric effluent limitation values as numeric action levels up until the compliance date of October 22, 2028. Future reissuances of this General Permit may incorporate additional or revised compliance

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requirements or interim targets to progress towards the required final compliance when a numeric effluent limitation applies.

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ATTACHMENT A

ACRONYMS AND TERMS

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED
WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES
(GENERAL PERMIT)

Acronym or Term	Definition
ASBS	Areas of Special Biological Significance
ASTM	American Society of Testing and Materials; Standard Test Method for Particle-Size Analysis of Soils
ATS	Active Treatment System
BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
CBPELSG	California Board of Professional Engineers, Land Surveyors and Geologists
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CGP	NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities
CIWQS	California Integrated Water Quality System
COI	Change of Information
CPESC	Certified Professional in Erosion and Sediment Control
CPSWQ	Certified Professional in Storm Water Quality
CSMP	Construction Site Monitoring Program
CTR	California Toxics Rule
CWA	Clean Water Act
CWC	California Water Code
DAR	Duly Authorized Representative
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DWQ	Division of Water Quality
ELAP	Environmental Laboratory Accreditation Program
ELG	Effluent Limitation Guidelines
JTU	Jackson Turbidity Units
LID	Low Impact Development
LOEC	Lowest Observed Effect Concentration
LRP	Legally Responsible Person

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LUP	Linear Underground and Overhead Projects
MATC	Maximum Allowable Threshold Concentration
MDL	Method Detection Limit
MRP	Monitoring and Reporting Program
MS4	Municipal Separate Storm Sewer System
NAL	Numeric Action Level
NEL	Numeric Effluent Limitation
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NOEC	No Observed Effect Concentration
NOI	Notice of Intent
NONA	Notice of Non-Applicability
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NTR	National Toxics Rule
NTU	Nephelometric Turbidity Units
O&M	Operation and Maintenance
OC	Organochlorine
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
POTW	Publicly Owned Treatment Works
PRD	Permit Registration Document
Previous Permit	State Water Board Order 2009-009-DWQ, as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ
QA/QC	Quality Assurance and Quality Control
QAPrP	Quality Assurance Program Plan
QSD	Qualified SWPPP Developer
QSP	Qualified SWPPP Practitioner
Regional Water Board	Regional Water Quality Control Board
RUSLE	Revised Universal Soil Loss Equation
RUSLE2	Revised Universal Soil Loss Equation 2
SMARTS	Stormwater Multiple Application and Report Tracking System
State Water Board	State Water Resources Control Board
SWAMP	Surface Water Ambient Monitoring Program
SWMM	Storm Water Management Model
SWPPP	Storm Water Pollution Prevention Plan
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
USC	United States Code
U.S. EPA	United States Environmental Protection Agency
USGS	United States Geological Survey

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Water Boards	Collectively, the State Water Resources Control Board and the Regional Water Quality Control Boards
WDID	Waste Discharge Identification Number
WLA	Waste Load Allocation
WER	Water Effect Ratio
WET	Whole Effluent Toxicity
WQO	Water Quality Objective
WQS	Water Quality Standard

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ATTACHMENT B

GLOSSARY

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED
WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES
(GENERAL PERMIT)

70 Percent Final Cover
For final construction site stabilization, 70 percent final cover is the permanent vegetative cover that is evenly established over 70 percent of all disturbed and exposed areas of soil (non-paved or non-built). In areas that naturally have low vegetative coverage (e.g., deserts), 70 percent of natural conditions is acceptable.

Active Areas of Construction
Active areas of construction are all areas subject to land surface disturbance activities related to the project including, but not limited to, project staging areas, immediate access areas and storage areas. All previously active areas of construction are considered active areas (unless temporarily defined as inactive areas) until final stabilization is complete.

Active Treatment System
An active treatment system is a treatment technology that employs chemical coagulation, chemical flocculation, or electrocoagulation to reduce turbidity caused by fine suspended sediment, and/or to control pH levels. An active treatment system relies on enclosed computerized systems with pumps, filters, and real-time controls.

Acute Toxicity
Acute toxicity in water is caused by chemical stimuli that rapidly induce a negative effect on aquatic life; in aquatic toxicity tests, acute toxicity is demonstrated by an effect observed within 96 hours or less.

Aerial Deposition
Aerial deposition is the deposition of airborne particulates from construction activities or nearby activities that settle onto surfaces. Such particulates can include, but are not limited to, metals, nutrients, organics, sediment, and trash.

Ancillary Facility
An ancillary facility is a support area required for construction activities of the linear underground and overhead project permitted area. The ancillary facility may be located adjacent to or within the linear underground and overhead project alignment (i.e., transmission/distribution right-of-way) or may be regionally located away from the linear underground and overhead project alignment. Ancillary areas include, but are not limited to, new access roads, helicopter landing zones, laydown yards, staging areas, substations, valve stations, etc.

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Best Available Technology Economically Achievable (BAT)
As defined by U.S. EPA, BAT is a technology-based standard established by the Clean Water Act (CWA) § 304(b)(2) as the most appropriate means available on a national basis for controlling the direct discharge of toxic and nonconventional pollutants to navigable waters. The BAT effluent limitations guidelines, in general, represent the best existing performance of treatment technologies that are economically achievable within an industrial point source category or subcategory.

Best Conventional Pollutant Control Technology (BCT)
As defined by U.S. EPA, BCT is a technology-based standard established by the Clean Water Act (CWA) § 304(b)(4) for the discharge from existing industrial point sources of conventional pollutants including biochemical oxygen demand (BOD), total suspended sediment (TSS), fecal coliform, pH, and oil and grease.[1]

Best Management Practices (BMPs)
BMPs are management practices and structural controls used to prevent or reduce the discharge of pollutants from runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage to waters of the United States. BMPs include scheduling of activities, prohibitions of practices, operation and maintenance procedures, treatment, and vegetated infiltration basins amongst other practices.

Best Professional Judgment
Best professional judgement is a method used by permit writers to develop technology-based NPDES permit conditions on a case-by-case basis using all reasonably available and relevant data to establish technology-based limits or to determine other appropriate means to control its discharge (U.S. EPA NPDES Permit Writer's Manual 2010).

Chain of Custody Form
The Chain of Custody form is used to track sample handling as samples progress from sample collection to the analytical laboratory. The Chain of Custody form is then used to track the resulting analytical data from the laboratory to the client. Chain of Custody forms can be obtained from an analytical laboratory upon request.

Coagulation
Coagulation is the clumping of particles in a discharge to settle out impurities, often induced by chemicals such as lime, alum, and iron salts.

Common Plan of Development or Sale
A common plan of development or sale is a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one common plan. The "common plan" of development or sale is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, sales pitch, advertisement, drawing, permit application, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot

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[1] U.S. EPA. Learn about Effluent Guidelines. Web. <https://www.epa.gov/eg/learn-about-effluent-guidelines#BCT> [as of October 19, 2020]

stakes, surveyor markings, etc.) indicating construction activities may occur on a specific plot. However, broad planning documents, such as land use master plans, conceptual master plans, or broad-based California Environmental Quality Act (CEQA) or National Environmental Policy Act (NEPA) documents that identify potential projects for an agency or facility are not considered common plans of development. For construction projects within a larger common plan of development or sale located at least one-quarter mile apart and the area between the projects is not being disturbed, each individual project may be regulated as a separate construction project if land for interconnecting road, pipeline, or utilities that is part of the same common plan is not concurrently being disturbed.

Construction Site Monitoring Program
Construction site monitoring program is a description of methods and procedures for monitoring discharges at a construction site.

Conveyance System
Conveyance system is a sewer, ditch, pipe, hose, swale, or any engineered feature that is designed to convey water or any combination of such components.

Debris
Debris is litter, rubble, discarded refuse, or remains of destroyed inorganic anthropogenic waste.

Demolition and Pre-Development Site Preparation
Demolition and pre-development site preparation is a construction stage including demolition of existing structures that expose soil, rough grading and/or disking, clearing and grubbing operations, or any soil disturbance prior to mass grading.

Detected Not Quantifiable
Detected not quantifiable is a sample result that is between the method detection limit and the minimum level or reporting limit.

Detention
Detention is the temporary storage of stormwater to improve quality or reduce the volumetric flow rate of discharge or both.

Dewatering
Dewatering is the process of removing excess water in an excavation or impoundment by pumping or other mechanical means.

Discharge Location
Discharge location is a common outlet from a construction site drainage area where stormwater, authorized non-stormwater, or dewatering discharge leaves the site or project boundary, or enters any on-site waters of the United States (e.g., a creek running through a site).

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Discharger
The discharger is a person as defined in Water Code, § 13050(c), which includes companies and governmental bodies, subject to this General Permit. The discharger is responsible for compliance with this Permit, including work done by QSDs, QSPs, and QSP delegates. The following persons may serve as the discharger:

1. A person, company, agency, or other entity that possesses a real property interest (including, but not limited to, fee simple ownership, easement, leasehold, or other rights of way) in the land upon which the construction or land disturbance activities will occur for the regulated site.

2. For linear underground and overhead projects, the utility company, municipality, or other public or private company or agency that owns or operates the linear underground or overhead project.

3. For land controlled by an estate or similar entity, the person who has day-to-day control over the land (including, but not limited to, a bankruptcy trustee, receiver, or conservator).

4. For pollution investigation and remediation projects, any potentially responsible party that has received permission to conduct the project from the holder of a real property interest in the land.

5. For U.S. Army Corps of Engineers projects, the U.S. Army Corps of Engineers may provide written authorization to its bonded contractor to serve as the discharger, provided the U.S. Army Corps of Engineers is also responsible for compliance with the General Permit, as authorized by the Clean Water Act or the Federal Facilities Compliance Act.

6. For projects on public lands, a public agency with a real property interest in the land may provide written authorization via an encroachment permit to another public agency to serve as the discharger, provided that both public agencies remain responsible for compliance with this General Permit.

A contractor is qualified to be a discharger if the contractor satisfies one of the requirements above.

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Dose Rate
In applied chemistry, dose rate is dose of a chemical per time unit (e.g., mg/day), sometimes also called dosage or injection rate.

Drainage Area
Drainage area is the area of land that drains water, sediment, pollutants, and dissolved materials to a common outlet or discharge location.

Duly Authorized Representative (DAR)
A Duly Authorized Representative is a named individual or position that has responsibility for the overall operation of the regulated construction project or activities

including, but not limited to, a superintendent, project manager, or other positions of equivalent or higher responsibility. Additionally, an individual or position that has overall responsibility for environmental matters for the owner or company may be designated as a Duly Authorized Representative. The Legally Responsible Person designates the Duly Authorized Representative through SMARTS, authorizing the Duly Authorized Representative to sign, certify, and electronically submit Permit Registration Documents, Notices of Termination, and any other supporting documents, reports, or information required by this General Permit, the State or Regional Water Boards, or U.S. EPA. A Duly Authorized Representative cannot be a contractor, consultant, or other third party.

Effective Date
An effective date is a date set by the State Water Resources Control Board (State Water Board) during the adoption of an Order, for the date that at least one or more of the Order provisions take effect and the previous Order is rescinded.

Effluent
Effluent is any discharge either to the receiving water or beyond the property boundary controlled by the discharger.

Effluent Limitation
An effluent limitation is any numeric or narrative restriction imposed on quantities, discharge rates, and concentrations of pollutants which are discharged from point sources into waters of the United States, the waters of the contiguous zone, or the ocean.

Erosion
Erosion is the process, by which soil particles are detached and transported by the actions of wind, water, or gravity.

Erosion Control BMPs
Erosion control BMPs is vegetation, such as grasses and wildflowers, and other materials, such as straw, fiber, stabilizing emulsion, protective blankets, rolled erosion control product, etc., placed to stabilize areas of disturbed soils, reduce loss of soil due to the action of water or wind, and prevent water pollution.

Field Measurements
Field measurements are results of testing procedures performed in the field with portable field-testing kits or meters.

Final Stabilization
Final stabilization is established when all soil disturbing activities at each individual parcel within the construction site have been completed, and the establishment of a permanent vegetative cover, or equivalent permanent stabilization measures (such as riprap, gabions, or geotextiles) to prevent erosion in a manner consistent with the requirements in this General Permit.

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First Order Stream
A first order stream is a stream with no tributaries.

Flocculants
Flocculants are substances which promote the clumping of particles.

Forecasted Precipitation Event
Forecasted precipitation event is any weather pattern that is forecasted to have a 50 percent or greater chance of producing 0.5 inches of precipitation in a 24-hour period in the project area. The discharger shall obtain precipitation forecast information from the National Weather Service Forecast Office (e.g., by entering the zip code of the project's location at https://forecast.weather.gov). Precipitation events end when there are two sequential 24-hour periods with less than 0.25 inches of precipitation forecast for each period.

Full Capture System
A full capture system is a treatment control, or series of treatment controls, including but not limited to, a multi-benefit project or a low impact development control that traps all particles that are 5mm or greater, and has a design treatment capacity that is either:

1. Of not less than the peak flow rate, Q, resulting from a one-year, one-hour, storm in the subdrainage area; or

2. Appropriately sized to, and designed to, carry at least the same flows as the corresponding storm drain.

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Full Capture System Equivalency
Full capture system equivalency is the trash load that would be reduced if full capture systems were installed, operated, and maintained for all storm drains that capture runoff from the relevant areas of land (e.g., facilities or sites regulated by NPDES permits for discharges of stormwater associated with industrial activity, including construction activity). The full capture system equivalency is a trash load reduction target that the permittee quantifies by using an approach, and technically acceptable and defensible assumptions and methods for applying the approach, subject to the approval of the permitting authority.

Good Housekeeping BMPs
Good housekeeping BMPs are designed to reduce or eliminate the addition of pollutants to construction site runoff through analysis of pollutant sources, implementation of proper handling/disposal practices, employee education, and other actions.

Grading and Land Development Phase
Grading and land development phase includes reconfiguring the topography and slope, including: alluvium removals; canyon cleanouts; rock undercuts; keyway excavations; landform grading; and stockpiling of select material for capping operations.

Groundwater
Groundwater is water that exists underground in saturated zones beneath the land surface.

Hydraulically Downgradient
Hydraulically downgradient is the direction of stream flow towards a lower elevation.

Hydromodification
Hydromodification is the alteration of the hydrologic characteristics of coastal and non-coastal waters, which in turn could cause degradation of water resources. Hydromodification can cause excessive erosion and/or sedimentation rates, causing excessive turbidity, channel aggradation and/or degradation.

Inactive Project
Inactive project is where all construction activities (including passive treatment technology, active treatment systems, and/or active equipment), are fully stabilized and will be suspended for 30 days or more.

Infeasible
Infeasible means that the discharger has demonstrated that the specific requirement is not technologically possible, or not economically practicable and achievable in light of best industry practices.

K Factor
The K factor is the soil erodibility factor used in the Revised Universal Soil Loss Equation (RUSLE). The K factor represents the combination of detachability of the soil, runoff potential of the soil, and the transportability of the sediment eroded from the soil.

Legally Responsible Person
The Legally Responsible Person is a representative of a permittee and signatory that is legally designated to sign, certify, and electronically submit any documents required by the General Permit, the State or Regional Water Board, or U.S. EPA. An LRP must be one of the following:

1. For a corporation or limited liability company: a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (a) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation or limited liability company; or (b) the manager of the facility if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

2. For a partnership or sole proprietorship: a general partner or the proprietor, respectively;

3. For a municipality, state, federal, or other public agency: a principal executive officer, ranking elected official, city manager, council president, or any other authorized

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public employee with managerial responsibility over the construction or land disturbance project (including, but not limited to, project manager, project superintendent, or resident engineer);

4. For an individual: the individual; or

5. For any type of entity not listed above (e.g., trusts, estates, receivers): an authorized person with managerial authority over the construction or land disturbance project.

Maximum Allowable Threshold Concentration
Maximum allowable threshold concentration is the allowable concentration of residual, or dissolved, coagulant/flocculant in effluent. The MATC shall be coagulant/flocculant-specific, and based on toxicity testing conducted by an independent, third-party laboratory. Typically, the MATC is equal to the geometric mean of the NOEC (No Observed Effect Concentration) and LOEC (Lowest Observed Effect Concentration) Acute and Chronic toxicity results for most sensitive species determined for the specific coagulant. The most sensitive species test shall be used to determine the MATC.

Method Detection Limit
Method detection limit is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero.

Minimum Level or Reporting Limit
Minimum level or reporting limit is the lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard in a method, assuming that all method-specified sample weights, volumes, and cleanup procedures have been employed.

Multi-Benefit Project
Multi-benefit project is a treatment control project designed to achieve the benefits set forth in California Water Code § 10562, subdivision (d). Examples include projects designed to: infiltrate, recharge, or store stormwater for beneficial reuse; develop or enhance habitat and open space through stormwater and non-stormwater management; and/or reduce stormwater and non-stormwater runoff volume.

Natural Channel Evolution
Natural channel evolution is the physical trend in channel adjustments following a disturbance that causes the river to have more energy and degrade or aggrade more sediment. Channels have been observed to pass through 5 to 9 evolution types. Once a channel passes though the suite of evolution stages, the channel will rest in a new state of equilibrium.

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Non-Detect
Non-detect is a sample result represented by "ND" in which the concentration of the subject pollutant analyte is less than the method detection limit, and therefore not detectable by the laboratory method and/or equipment used.

Non-Stormwater Discharges
Non-stormwater discharges are discharges that do not originate from precipitation events. They can include, but are not limited to, discharges of process water, air conditioner condensate, non-contact cooling water, vehicle wash water, sanitary wastes, concrete washout water, paint wash water, irrigation water, dust control over-wetting, or pipe testing water.

Non-Stormwater Pollution Controls
Non-stormwater pollution controls are the general site and materials management measures that directly or indirectly aid in minimizing the non-stormwater originated discharge of sediment and other construction related pollutants from the construction site.

Non-Structural Controls
Non-structural controls are best management practices that do not involve a structured or engineered solution. Non-structural controls include measures including education, site planning, and stormwater management regulations.

Non-Visible Pollutants
Non-visible pollutants associated with a specific site or activity that can have a negative impact on water quality but cannot be seen though observation (e.g., chlorine).

Numeric Action Level
A numeric action level (e.g., a pH range, turbidity value, or concentration) is a level that triggers a required evaluation of the effectiveness of best management practices implemented on the subject construction site, and the required implementation of additional corrective actions necessary to reduce the subject pollutant below the numeric action level. The numeric action level compliance location applies to each sample location and/or corresponding discharge location.

Numeric Action Level Exceedance
Non-TMDL numeric action level exceedance: A numeric action level exceedance occurs when the field reading for the one sample taken during each day of a qualifying precipitation event at each sample and/or discharge location, exceeds an applicable numeric action level. A numeric action level exceedance is not a violation of this General Permit. A discharger failing to report and failing to modify implementation of its best management practices to prevent further numeric action level exceedance(s), is a violation of this General Permit.

TMDL-related numeric action level exceedance: A TMDL-related numeric action level exceedance occurs on the second, and each subsequent, analytical result for samples taken from any and all discharge location(s) within the same drainage area, during the

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same reporting year and taken in accordance with Attachment D or E Section III.D.3, that is above the concentration set forth in an applicable numeric action level. A numeric action level exceedance is not a violation of this General Permit; however, it is a violation when the discharger fails to report and respond to the numeric action level exceedance(s).

Numeric Effluent Limitation
Numeric effluent limitation is a technology-based or water quality-based limit (e.g., pH range, turbidity value, or concentration) established for discharges covered under this General Permit. The numeric effluent limitation compliance location(s) applies to each sample and/or discharge location at the point of discharge from an active treatment system if applicable.

Numeric Effluent Limitation Exceedance
Active treatment system numeric effluent limitation exceedance: An active treatment system numeric effluent limitation exceedance occurs when the analytical result for the samples taken during operation of an active treatment system exceeds an applicable numeric effluent limitation. A numeric effluent limitation exceedance is a violation of this General Permit and subject to mandatory minimum penalties.

TMDL-related numeric effluent limitation exceedance: A TMDL-related numeric effluent limitation exceedance occurs on the second, and each subsequent, analytical result for samples taken from any and all discharge location(s) within the same drainage area, during the same reporting year and taken in accordance with Attachment D or E Section III.D.3, that is above the concentration set forth in an applicable numeric effluent limitation. Each numeric effluent limitation exceedance after the first instance is a violation of this General Permit and subject to mandatory minimum penalties.

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Passive Treatment
Passive treatment is the application of natural or synthetic chemicals and products to reduce turbidity in discharges through coagulation and flocculation. Passive treatment does not rely on computerized, enclosed systems with pumps, filters, and real-time controls. Passive treatment may include pumps where they are necessary to move water around the construction site.[2] Passive treatment products are available in a variety of forms and may be land-applied for soil stabilization (e.g., bonded fiber matrixes, hydromulches) or water-applied for sediment removal (e.g., liquid treatment chemicals, powders, slow-releasing solid blocks/socks).

Permanent Control Measures
Permanent control measures are the erosion prevention materials designed to provide long-term protection to underlying soils. This may include, but is not limited to buildings, paving a uniform (evenly distributed, without large bare areas) perennial vegetative cover, riprap, gabions, or biodegradable rolled erosion control products (RECP).

[2] U.S. EPA. 2017 Construction General Permit. Web. January 11, 2017. <https://www.epa.gov/npdes/epas-2017-construction-general-permit-cgp-and-related-documents> [as of October 19, 2020]

pH
pH is the unit universally used to express the intensity of the acid or alkaline condition of a water sample. The pH of natural waters tends to range between 6 and 9, with neutral being 7. Extremes of pH can have deleterious effects on aquatic systems.

Post-Construction BMPs
Post-construction BMPs are structural and non-structural controls which detain, retain, infiltrate, and/or filter out pollutants discharged to receiving waters after a construction project is completed. Low impact development features are considered a type of post-construction BMP.

Precipitation Event
Precipitation event is any weather pattern that results in precipitation (rain, snow, sleet, or hail).

Programmatic Permitting
Programmatic permitting is an approach for linear underground and overhead project dischargers to obtain General Permit coverage for multiple non-contiguous sites with similar scope and construction activities, that are located within one Regional Water Board boundary and have the same Legally Responsible Person.

Project
Project is the area that includes sites where land is disturbed and also includes the areas of activities that do not disturb land.

Property Boundary
Property boundary or the area enclosed by the property lines. Property boundary includes project area and sites.

Qualified SWPPP Developer (QSD)
Qualified SWPPP developer is a qualified stormwater professional authorized by the discharger to develop and revise SWPPPs.

Qualified SWPPP Practitioner (QSP)
Qualified SWPPP practitioner is a qualified stormwater professional authorized by the discharger to conduct non-stormwater and stormwater visual observations, sampling, and implementation of all elements of the SWPPP.

Qualifying Precipitation Event
Qualifying precipitation event is any weather pattern that is forecast to have a 50 percent or greater Probability of Precipitation (PoP) and a Quantitative Precipitation Forecast (QPF) of 0.5 inches or more within a 24-hour period. The event begins with the 24-hour period when 0.5 inches has been forecast and continues on subsequent 24-hour periods when 0.25 inches of precipitation or more is forecast.

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R Factor
R factor is the erosivity factor used in the Revised Universal Soil Loss Equation (RUSLE). The R factor represents the erosivity of the climate at a particular location. An average annual value of R is determined from historical weather records using erosivity values determined for individual storms. The erosivity of an individual storm is computed as the product of the storm's total energy, which is closely related to storm amount, and the storm's maximum 30-minute intensity.

Regional Water Quality Control Board (Regional Water Board)
A Regional Water Board is a semi-autonomous board comprised of board members appointed by the Governor and confirmed by the state Senate. California has nine Regional Water Boards with jurisdictions based on watersheds. A Regional Water Board may delegate its authority to the executive officer to the board, or other designated staff.

Remaining Sub-Sampled Material
Remaining sub-sampled material is the material (for example: organic material, gravel, etc.) that remains after the organisms to be identified have been removed from the subsample for identification. (Generally, no macroinvertebrates are present in the remaining subsampled material, but the sample needs to be checked and verified using a complete Quality Assurance (QA) plan).

Reporting Period
A reporting period is a specified period of time in which pertinent report information is applicable. For example, a standard reporting period in this Order is July 1 through June 30 of each year.

Responsible Discharger
Responsible dischargers are dischargers who:

1. Discharge stormwater and authorized non-stormwater directly, or through a municipal separate sewer system (MS4) or other conveyance, to impaired water bodies or watersheds identified in a U.S. EPA-approved TMDL with a waste load allocation assigned to construction stormwater sources; and

2. Have identified, through the site-specific pollutant source assessment, that one or more pollutants specific to the TMDL are present on-site with the potential to enter construction stormwater discharges.

Revised Universal Soil Loss Equation (RUSLE)
Revised universal soil loss equation is the empirical model that calculates average annual soil loss as a function of rainfall and runoff erosivity, soil erodibility, topography, erosion controls, and sediment controls.

Revised Universal Soil Loss Equation 2 (RUSLE2)
Revised universal soil loss equation 2 is the updated Windows®-based empirical model that calculates average annual soil loss as a function of rainfall and runoff erosivity, soil

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erodibility, topography, erosion controls, and sediment controls. This includes subsequent equivalent versions of this model.

Routine Maintenance
Routine maintenance are activities intended to maintain the original line and grade, hydraulic capacity, and/or original purpose of a facility. The Order further defines routine maintenance (Section II.B.1) for road and highway projects as the replacement of the structural section, but not when the activity exposes the underlying soil or erodible subgrade. The road surface and base are not part of the subgrade. As such, those portions of a project that remove the paved road surface and base down to the erodible subgrade and/or underlying soil would not be considered routine maintenance.

Runoff Control BMPs
Runoff control BMPs are designed to control the peak volume and flow rate, or prevent scour due to concentrated flows.

Run-on
Run-on are discharges that originate offsite and flow onto the property of a separate project site.

Sampling Location
Sampling location for traditional construction projects: An identified discharge location where samples of stormwater, non-stormwater, or dewatering discharges are obtained to determine compliance with requirements in this General Permit.

Sampling location for linear underground and overhead projects: An identified discharge location, representative of the project's construction activities, where samples of stormwater, non-stormwater, or dewatering discharges are obtained to determine compliance with requirements in this General Permit.

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Secondary Containment
Secondary containment is a device or control measure in addition to the primary containment that is used to stop a discharge of pollutants or hazardous material from leaving a specified area.

Sediment
Sediment is solid particulate matter, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level.

Sediment Control BMPs
Sediment control BMPs are practices and controls that trap soil particles after erosion by rain, flowing water, or wind. They include those practices that intercept and slow or detain the flow of stormwater to allow sediment to settle and be trapped (e.g., silt fence, sediment basin, fiber rolls, etc.).

Sedimentation
Sedimentation is the process of deposition of suspended matter carried by water, wastewater, or other liquids, by gravity. It is usually accomplished by reducing the velocity of the liquid below the point at which it can transport the suspended material.

Sensitive Watershed
Sensitive watershed is a watershed draining into a receiving water body listed on the State Water Board's approved CWA 303(d) list for sedimentation/siltation, turbidity, or a water body designated with beneficial uses of cold, spawn, and migratory.

Settleable Solids
Settleable solids is a solid material that can be settled within a water column during a specified time frame. It is typically tested by placing a water sample into an Imhoff settling cone and then allowing the solids to settle by gravity for a given length of time. Results are reported either as a volume of milliliter per liter (mL/L) or as a concentration (milligrams per liter (mg/L)).

Sheet Flow
Sheet flow is overland flow of water that occurs in areas where there are no defined channels where the water spreads out over a large area at a uniform depth.

Site
A site is the area disturbed where the construction activity is physically located or conducted, including staging, storage, and access areas.

Site Operating Hours
Site operating hours are the time periods when the site is staffed to conduct any function related to the construction activity.

Soil Amendment
A soil amendment is any material that is added to the soil to change its chemical properties, engineering properties, or erosion resistance that could become mobilized by stormwater.

Source
Source is any construction activity, material, or area that causes or contributes to pollutants in stormwater.

Stormwater
Stormwater is rain, snowmelt, or any other liquid or solid precipitation that may result in runoff, and drainage from a site.

Streets and Utilities Phase
Streets and utilities phase is the construction stage including excavation and street paving, lot grading, curbs, gutters and sidewalks, public utilities, public water facilities including fire hydrants, public sanitary sewer systems, storm sewer system, and/or other drainage improvements.

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Structural Controls
Structural controls are any structural facility or fabrication designed and constructed to mitigate the adverse impacts of stormwater and urban runoff pollution.

Surface Runoff
Surface runoff is the portion of stormwater that does not infiltrate into the ground or evaporate, but instead flows overland onto adjacent land or watercourses or is routed to stormwater conveyance systems.

Topsoil
Topsoil is the uppermost part of the soil profile, which is the most favorable material for plant growth. It is typically rich in organic matter.

Total Maximum Daily Load (TMDL)
A TMDL is the sum of the maximum amount of a pollutant that a waterbody can receive per day and still meet state water quality standards. It is the sum of the individual Waste Load Allocations (WLAs) for point sources, the load allocations for nonpoint and natural background sources, and the margin of safety.

Total Suspended Solids (TSS)
The measure of total suspended solids is the measure of the suspended solids in a water sample which includes inorganic substances, such as soil particles and organic substances, such as algae, aquatic plant/animal waste, particles related to industrial/sewage waste, etc. The TSS test measures the concentration of suspended solids in water by measuring the dry weight of a solid material contained in a known volume of a sub-sample of a collected water sample. Results are reported in mg/L.

Toxicity
Toxicity is the adverse response(s) of organisms to chemicals or physical agents ranging from mortality to physiological responses such as impaired reproduction or growth anomalies.

Trash
Trash is all improperly discarded solid material from any production, manufacturing, or processing operation including, but not limited to, products, product packaging, or containers constructed of plastic, steel, aluminum, glass, paper, or other synthetic or natural materials.

Tributary
Tributary is a smaller river or stream that flows into a larger river or stream.

Turbidity
Turbidity is the optical condition and cloudiness of water caused by suspended or dissolved particles or colloids. Turbidity is quantified by the degree to which light traveling through a water column is scattered by the suspended organic and inorganic particles it contains. The turbidity test is reported in Nephelometric Turbidity Units (NTU) or Jackson Turbidity Units (JTU) with a calibrated turbidity meter.

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Vertical Construction Phase
Vertical construction phase is the build out of structures from foundations to roofing, including rough landscaping.

Waste Load Allocation (WLA)
Waste load allocation is the portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution.

Water Effect Ratio (WER)
Water effect ratio is a factor that can be used per U.S. EPA water quality criteria (WQC) regulations, to customize national aquatic life criteria to reflect site-specific water column conditions. The WER is used to derive site-specific criteria that maintain the level of protection of aquatic life intended by the "Guidelines for deriving numerical national WQC" (U.S. EPA 1985).

Waters of the United States
Waters of the United States is defined by the federal Environmental Protection Agency in 40 Code of Federal Regulations § 122.2.

Water Quality Objectives (WQO)
Water quality objectives are defined in the California Water Code as limits or levels of water quality constituents or characteristics, which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area.

Water Quality Standards
Water quality standards consists of beneficial uses, water quality objectives to protect those uses, an antidegradation policy, and policies for implementation. Water quality standards are established in Regional Water Quality Control Plans (Basin Plans) and statewide Water Quality Control Plans. U.S. EPA has also adopted water quality criteria (the same as objectives) for California in the National Toxics Rule and California Toxics Rule.

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ATTACHMENT C

CONTACTS

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCAITED
WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES
(GENERAL PERMIT)

State Water Resources Control Board
www.waterboards.ca.gov
P.O. Box 1977
Sacramento, CA 95812-1977
stormwater@waterboards.ca.gov

Division of Financial Assistance: (916) 341-5700
Division of Water Quality: (916) 341-5455
Office of Enforcement: (916) 341-5272
Office of Public Affairs: (916) 341-5254
Office of Legislative Affairs: (916) 341-5251
Office of the Ombudsman: (916) 341-5254



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CALIFORNIA Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

ATTACHMENT C

Regional Water Quality Control Board Stormwater Program Contacts

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CENTRAL VALLEY REGION (5S)
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SANTA ANA REGION (8)
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CALIFORNIA Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

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South Lake Tahoe, CA 96150
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COLORADO RIVER REGION (7)
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Palm Desert, CA 92260
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SAN DIEGO REGION (9)
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2375 Northside Drive, Suite 100
San Diego, CA 92108-2700
(619) 516-1990

STORMWATER STAFF DIRECTORY
https://www.waterboards.ca.gov/water_issues/programs/stormwater/contact.html

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ATTACHMENT D

TRADITIONAL CONSTRUCTION RISK LEVEL REQUIREMENTS

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORMWATER DISCHARGES
ASSOCIATED WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES
(GENERAL PERMIT)

I. GENERAL REQUIREMENTS

Risk Level 1, 2, and 3 dischargers shall implement the following minimum best management practices (BMPs) to reduce or prevent pollutants in construction stormwater discharges, monitoring requirements, and reporting requirements. If a requirement in this attachment does not specify a specific Risk Level, then the requirement applies to Risk Level 1, 2, and 3 dischargers.

II. MINIMUM BEST MANAGEMENT PRACTICES

II.A. Good Site Management "Housekeeping"

II.A.1. Dischargers shall implement good site management (i.e., "housekeeping") measures for construction materials that could potentially be a threat to water quality if discharged or exposed to stormwater. At a minimum, dischargers shall implement the following good housekeeping measures:

a. Identify and protect the products used and/or expected to be used and the end products that are produced and/or expected to be produced from exposure to stormwater. Products do not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (e.g., poles, equipment pads, cabinets, conductors, insulators, bricks, roofing, and siding);

b. Apply BMPs to erodible stockpiled construction materials (e.g., soil, spoils, fly-ash, stucco, hydrated lime) to prevent erosion and pollutant transport;

c. Store chemicals in watertight containers with secondary containment to prevent any spillage or leakage or store in a completely enclosed storage area;

d. Minimize exposure of construction materials to precipitation. Construction materials do not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (e.g., poles, equipment pads, cabinets, conductors, insulators, bricks);

e. Implement BMPs to control the off-site tracking of sediment and loose construction and landscape materials; and

f. Implement BMPs to control the discharge of plastic materials and limit the use of plastic materials when more sustainable, environmentally friendly alternatives exist. Dischargers shall consider the use of plastic materials resistant to solar degradation where plastic materials are deemed necessary.

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II.A.2. Dischargers shall implement good housekeeping measures for waste management, which, at a minimum, shall consist of the following:

a. Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, masonry wash waters, and other wash waters. Wash waters shall be captured and treated prior to discharge, or disposed of at a permitted facility that can accept that waste, to mitigate impacts to water quality;

b. Provide containment (e.g., secondary containment) of sanitation facilities (e.g., portable toilets) to prevent discharges of pollutants to the stormwater drainage system or receiving water;

c. Clean or replace sanitation facilities and inspect them regularly for leaks and spills;

d. Keep debris or trash in waste containers if it is subject to transport from the site by wind or runoff;

e. Cover waste disposal containers at the end of every business day and during a precipitation event;

f. Prevent discharges from waste disposal containers to the stormwater drainage system or receiving water (e.g., containers with solid bottoms and regular maintenance);

g. Contain and securely protect stockpiled waste material from wind and precipitation unless actively being used; and

h. Secure and contain concrete washout areas and other washout areas that may contain additional pollutants to minimize discharge into the underlying soil and onto surrounding areas. Washout areas shall be covered prior to and during a precipitation event.

II.A.3. Dischargers shall implement good housekeeping for vehicle/equipment storage and maintenance, which shall consist of the following:

a. Contain fuel, grease, and oil to prevent them from leaking into ground, storm drains, or surface waters;

b. Place all equipment or vehicles, which are to be fueled, maintained, and/or stored in a designated area with BMPs installed; and

c. Clean leaks immediately and dispose of leaked materials properly in accordance with the law.

II.A.4. Dischargers shall implement good housekeeping for landscape materials, which shall consist of the following:

a. Contain and protect stockpiled materials such as mulches and topsoil, or other erodible landscape materials, from wind and precipitation unless being actively used;

b. Contain packaged landscape materials (e.g., fertilizers) when they are not being actively used;

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c. Discontinue the application of any erodible landscape material at least 2 days before a forecasted precipitation event as defined in Attachment B or during periods of precipitation; and

d. Apply erodible landscape material at quantities and rates in accordance with manufacturer recommendations or based on written specifications by knowledgeable and experienced field personnel;

II.A.5. Dischargers shall implement good housekeeping measures on the construction site to control the aerial deposition of site materials and from site operations. Such particulates can include, but are not limited to, metals, nutrients, organics, sediment, other particulates, and trash.

II.A.6. Dischargers shall document all housekeeping BMPs in the SWPPP that correspond to the nature and phase of the construction activities. Construction phases at traditional land development projects include demolition and pre-development site preparation phase, grading and land development phase, streets and utilities phase, vertical construction phase, and final landscaping and site stabilization phase.

II.B. Non-Stormwater Management

II.B.1. Dischargers shall implement the following measures to control all non-stormwater discharges during construction:

a. Wash vehicles in such a manner as to prevent non-stormwater discharges to surface waters or municipal separate sewer system drainage systems;

b. Clean streets in such a manner as to prevent unauthorized non-stormwater discharges from reaching surface water or municipal separate sewer system drainage systems; and

c. Eliminate any non-stormwater discharges not authorized in Section IV.A of this General Permit's Order.

II.C. Preserve Existing Topsoil

II.C.1. Dischargers shall preserve existing topsoil, unless infeasible, through the following practices:

a. Stockpiling existing topsoil, or transferring topsoil to other locations, to deploy and reestablish vegetation prior to termination of coverage; and

b. Stabilizing disturbed topsoil during construction.

Preserving existing topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed.[1]

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1 Examples may include the removal of topsoil containing invasive seedbanks, lack of space to stockpile topsoil, and sites that are designed to be highly impervious after construction with little to no vegetation intended to remain.

II.D. Erosion Control

II.D.1. Dischargers shall implement the following practices to eliminate or minimize site erosion. Erosion control BMPs (except for sprayed products) shall be available on-site or at a nearby location (e.g., common lay-down yard), year-round with trained persons able to deploy the product under the direction of the Qualified SWPPP Practitioner:

a. Implement effective wind erosion control;

b. Preserve existing vegetation;

c. Minimize the amount of soil exposed during construction activity;

d. Minimize the disturbance of steep slopes;

e. Schedule earthwork to minimize the amount of disturbed area when feasible;

f. Immediately initiate stabilization for disturbed areas whenever earth disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days;[2]

g. Minimize soil compaction in areas other than where the intended function of a specific area dictates that it be compacted;

h. Reestablish vegetation or non-vegetative erosion controls as soon as practicable;

i. If feasible, divert up gradient run-on water from contacting areas of exposed soils disturbed by construction activities or convey run-on through the site in a manner that prevents erosion from areas of construction and does not compromise the effectiveness of erosion, sediment, and perimeter controls;

j. Run-on water flowing onto a site from off-site areas may be separated from a site's stormwater discharge to eliminate commingled contribution. Run-on diversion shall occur prior to entering an area affected by construction activity. Run-on flow diversion shall be conveyed through or around the construction activity in plastic pipe or an engineered conveyance channel in a manner that will not cause erosion due to flow diversion. Run-on combined with a site's stormwater discharge is considered a stormwater discharge.

k. Limit the use of plastic materials when more sustainable, environmentally friendly alternatives exist. Where plastic materials are deemed necessary, the

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2 In arid, semiarid, and drought-stricken areas where initiating vegetative stabilization measures immediately is infeasible, alternative stabilization measures shall be employed as specified by the Regional Water Board. Stabilization shall be completed within a period of time determined by the Regional Water Board. In limited circumstances stabilization may not be required if the intended function of a specific area of the site necessitates that it remains disturbed.

discharger shall consider the use of plastic materials resistant to solar degradation;

l. Control stormwater and non-stormwater discharges to minimize downstream channel and bank erosion; and

m. Control peak flowrates and total volume of stormwater and authorized non-stormwater discharges to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points.

II.D.2. Dischargers that stabilize soil using bonded-fiber matrices, hydromulches, spray tackifiers, or other land-applied products shall:

a. Apply the product according to the manufacturer's instructions and guidance; and

b. Apply the product according to the manufacturer's guidance to allow for ample cure time and to prevent treatment chemicals from being transported by runoff.

II.E. Sediment Controls

II.E.1. Dischargers shall implement the following site sediment controls:

a. Establish and maintain effective perimeter controls;

b. Stabilize all construction entrances and exits to sufficiently control erosion and sediment discharges from the site; and

c. Design, install, and maintain effective sediment controls to minimize the discharge of pollutants utilizing site-specific BMPs.

At a minimum, design sediment basins and impoundments according to the method provided in the California Stormwater Quality Association Construction BMP Handbook[3] and utilize outlet structures that withdraw water from the surface. Dischargers utilizing sediment basins shall complete installation prior to other land disturbance activities.

II.F. Additional Risk Level 2 and 3 Requirements:

II.F.1. Risk Level 2 and 3 dischargers shall implement the following additional erosion and sediment control BMPs for areas under active[4] construction:

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3 California Stormwater Quality Association (CASQA), Construction BMP Handbook (January 2015), <https://www.casqa.org/sites/default/files/casqa-handbook-construction/master_hanbook_file_2015_sec.pdf> [as of May 20, 2021] (CASQA Construction BMP Handbook)

4 Active areas of construction are areas undergoing land surface disturbance and associated site areas. This includes construction activity during the preliminary phase, mass grading phase, streets and utilities phase, and the vertical construction phase.

a. Design and construct cut and fill slopes in a manner to ensure slope stability and to minimize erosion including, but not limited to, these practices:

   i. Reduce continuous slope length using terracing and diversions;

   ii. Reduce slope steepness; and

   iii. Roughen slope surfaces with large cobble or track walking.

b. Install linear sediment controls along the toe of the slope, face of the slope, and at the grade breaks of exposed slopes according to sheet flow lengths as shown in Table 1 until the slope has reached Notice of Termination conditions for erosion protection. When infeasible to comply with Table 1 due to site-specific geology or topography, the QSD shall include in the SWPPP a justification for the use of an alternative method to protect slopes from erosion and sediment loss.

Table 1 - Critical Slope and Sheet Flow Length Combinations for Linear Sediment Reduction Barrier

Slope Ratio (Vertical to Horizontal)	Sheet flow length not to exceed
≤ 1:20	Per QSD's specification.
> 1:20 to ≤ 1:4	35 feet
> 1:4 to ≤ 1:3	20 feet
> 1:3 to ≤ 1:2	15 feet
> 1:2	10 feet

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II.F.2. Limit construction activity traffic to and from the project to entrances and exits that employ effective controls to prevent off-site tracking of sediment.

II.F.3. Maintain and protect all storm drain inlets, perimeter controls, and BMPs at entrances and exits (e.g., tire wash off locations).

II.F.4. Remove any excess sediment or other construction activity-related materials that are deposited on the impervious roads by vacuuming or sweeping prior to any precipitation event.

II.F.5. Implement additional site-specific sediment controls upon written request by the Regional Water Boards when the implementation of the other requirements in this Section are determined to inadequately protect the site's receiving water(s).

II.G. Surface Water Buffer[5]

II.G.1. Dischargers shall provide and maintain natural buffers and/or equivalent erosion and sediment controls when a water of the U.S. is located within 50 feet of the site's earth disturbances, unless infeasible.

II.G.2. Dischargers shall comply with one of the following alternatives for any discharges to waters of the U.S. located within 50 feet of a site's earth disturbances:

a. Provide and maintain a 50-foot undisturbed natural buffer from the edge of the disturbed area to the top of bank;

b. Provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by erosion and sediment controls that achieve, in combination, the sediment load reduction equivalent to a 50-foot undisturbed natural buffer. The equivalent sediment load may be calculated using RUSLE2 or another method approved by the Regional Water Board; or

c. Implement erosion and sediment controls to achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer when infeasible to provide and maintain an undisturbed natural buffer of any size. The equivalent sediment load may be calculated using RUSLE2 or another method approved by the Regional Water Board.

II.H. Pesticide Application

Dischargers shall only apply pesticides that have been authorized for use through California Department of Pesticide Regulation. The application of pesticides shall follow manufacturer's guidance.

II.I. Demolition of Existing Structure

Dischargers shall prevent exposing demolition materials to precipitation. Demolition materials should be covered with an impermeable barrier such as, but not limited to, plastic sheeting prior to precipitation to prevent known contaminants from being mobilized. Dischargers unable to cover demolished material that were not previously investigated or found to be absent of applicable pollutants in reportable quantities shall sample for any non-visible pollutants that may be in stormwater

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5 The surface water buffer requirements apply to work above the top-of-bank or high-water level of waters of the United States. Work within a channel or streambed (water body-dependent construction), Clean Water Act § 404 projects with a § 401 certification, and projects where no natural surface buffer exists (e.g., concrete channelization) are exempt from the requirements. All types of in-channel work may be regulated under § 401 (Clean Water Act - Regional Boards), § 404 (Clean Water Act - Army Corps of Engineers), or §1602 (California Fish and Game Code).

discharges such as, but not limited to, asbestos, leaded paint, or Poly Chlorinated Biphenyls (PCBs)[6].

II.J. Maintenance and Repair

II.J.1. Dischargers shall begin maintaining, repairing, and/or implementing design changes (reviewing alternatives that have not been used yet) to BMPs within 72 hours of identification of failures or other shortcomings and complete the changes as soon as possible, prior to the next forecasted precipitation event.

II.J.2. Dischargers shall have a Qualified SWPPP Practitioner (QSP) verify all BMP maintenance and repairs were appropriately implemented during the next visual inspection following completion. The QSP may delegate BMP maintenance and repair verification to an appropriately trained delegate.

III. MONITORING REQUIREMENTS

III.A. General Requirements

The monitoring requirements of this Section are issued pursuant to Water Code § 13383 and specifies monitoring requirements for dischargers subject to this Order.

All dischargers shall implement the Construction Site Monitoring Program in compliance with this Section at the time of the commencement of construction activity and shall continue implementation until the project is complete and the project site is stabilized as defined in Section III.H in the Order.

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III.B. Monitoring Exceptions

III.B.1. Dischargers shall conduct visual inspections and collect samples to meet the requirements of this Attachment. Dischargers are not required to physically conduct visual inspections or collect samples under the following conditions:

a. During dangerous weather conditions such as electrical storms, flooding, and high winds above 40 miles per hour;

b. Outside of scheduled site operating hours; or

c. When the site is not accessible to personnel.

III.B.2. For inactive projects, dischargers may reduce the visual inspection frequency and suspend sampling per Section III.G of the Order. Dischargers shall provide an explanation with supporting information for all missed visual inspections or sampling required by this Attachment, to be included in the Annual Report.

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6 PCBs were used between January 1, 1950 and January 1, 1980 and should be considered to be potentially present in structures built during that timeframe. “Structure”, in this instance, shall have been constructed with floor space (such as a building).

III.C. Visual Inspection Requirements

III.C.1. Dischargers shall perform visual inspections, based on their Risk Level, in accordance with Table 2 below. The purpose of visual inspections is, to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. Except as specified in Section III.C.3 below, inspectors shall be the Qualified SWPPP Developer, Qualified SWPPP Practitioner, or be trained by the Qualified SWPPP Practitioner.

Table 2 – Visual Inspection Schedule[7]

Risk Level	Weekly	Pre-Qualifying Precipitation Event	During Qualifying Precipitation Event	Post-Qualifying Precipitation Event
1	X	X	X	X
2	X	X	X	X
3	X	X	X	X

III.C.2. Dischargers shall conduct weekly visual inspections to ensure that BMPs are properly installed and maintained. A pre-, during, or post-qualifying precipitation event inspection also satisfies the weekly visual inspection requirement.

III.C.3. Dischargers shall have a QSP conduct a pre-Qualifying Precipitation Event inspection within 72 hours prior to any weather pattern that is forecasted to have a 50 percent or greater chance of 0.5 inches or more in a 24-hour period. Precipitation forecast information shall be obtained from the National Weather Service Forecast Office (e.g., by entering the zip code of the project's location at https://www.weather.gov/) and shall be included as part of the inspection checklist weather information. If extended forecast precipitation data (greater than three days) is available from the National Weather Service, the pre-precipitation event inspection may be done up to 120 hours in advance. The pre-Qualifying Precipitation Event inspection shall include an inspection of the following:

a. All stormwater drainage areas to identify leaks, spills, or uncontrolled pollutant sources and when necessary, implement appropriate corrective actions to control pollutant sources.

b. All BMPs to identify whether they have been properly implemented in accordance with the SWPPP, and when necessary, implement appropriate corrective actions to control pollutant sources.

c. All stormwater storage and containment areas to detect leaks and check for available capacity to prevent overflow.

III.C.4. Dischargers shall conduct visual inspections at least once every 24-hour period during Qualifying Precipitation Events. Qualifying Precipitation Events are

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7 This table is limited to routine weekly inspections and Qualifying Precipitation Event related inspections. Other visual inspections may be required under this Permit and are described in the applicable sections.

extended for each subsequent 24-hour period forecast to have at least 0.25 inches of precipitation.

III.C.5. Dischargers shall conduct post-Qualifying Precipitation Event visual inspections within 96 hours after each Qualifying Precipitation Event if 0.5 inches or more precipitation is measured during the duration of the Qualifying Precipitation Event using the onsite rain gauge. The inspection is to:

a. Identify if BMPs were adequately designed, implemented, and effective;

b. Identify BMPs that require repair or replacement due to damage; and

c. Identify additional BMPs that need to be implemented and revise the SWPPP accordingly.

III.C.6. Dischargers shall conduct visual inspections during scheduled site operating hours.

III.C.7. For each required inspection, dischargers shall develop and complete an inspection checklist that, at a minimum includes:

a. Inspection type (weekly, pre-precipitation, daily precipitation, or post-precipitation event);

b. Inspection date and time the inspection was conducted;

c. Weather information, including the presence or absence of precipitation, an estimate of the beginning of the Qualifying Precipitation Event, duration of the event, date of the end of the Qualifying Precipitation Event, and the amount of precipitation in inches;

d. Site information, including stage of construction, activities completed since last inspection, and approximate area of the site exposed;

e. A description of any BMPs evaluated and any deficiencies noted, including those that may have resulted in the release of non-visible pollutants;

f. A list of BMPs inspected, including erosion controls, sediment controls, chemical and waste controls, and non-stormwater controls;

g. Report of the presence of any floating and suspended materials, odors, discolorations, visible sheens, and any sources of pollutants in discharges and contained stormwater;

h. Any corrective actions required, including any necessary changes to the SWPPP and the associated implementation dates;

i. Photographs of areas of concern and the QSP's description of the problem, if any; and

j. Inspector's name, title, and certification, if any.

III.D. Water Quality Monitoring Requirements

Dischargers shall collect samples of discharges, based on their Risk Level in accordance with Table 3 and the requirements below, to monitor water quality and

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assess compliance with the requirements of this General Permit. Samplers shall be the QSD, QSP, or be trained by the QSP.

Table 3 – Sample Collection Schedule

Risk Level	Stormwater Discharge Sample Collection (as applicable)	Receiving Water Sample Collection (as applicable)	Non-Visible Sample Collection (as applicable)
1	Not Applicable	Not Applicable	X
2	X	Not Applicable	X
3	X	X (Post-exceedance)	X

III.D.1. Risk Level 2 and 3 Stormwater Discharge Monitoring Requirements

III.D.1.a. Risk Level 2 and 3 dischargers shall collect stormwater grab samples, from all discharge locations incorporating runoff from project construction sites[8], during discharge and within site operating hours. The grab samples shall be representative of the discharge flow and characteristics.

III.D.1.b. Risk Level 2 and 3 dischargers shall obtain one sample from each discharge location per 24-hour period of each Qualifying Precipitation Event, during active discharge.

III.D.1.c. Risk Level 2 and 3 dischargers shall collect samples of stored or contained stormwater during discharge from the impoundment, in accordance with Attachment J.

III.D.1.d. Risk Level 2 and 3 dischargers shall analyze all samples for:

i. pH and turbidity (refer to Order, Section IV.C.3.c and d); and

ii. Any additional parameter required by the Regional Water Board.

III.D.1.e. Risk Level 2 and 3 dischargers may sample run-on from surrounding areas if there is reason to believe run-on may contribute to exceedance of numeric action levels and/or numeric effluent limitations.

III.D.2. Risk Level 3 Receiving Water Monitoring Requirements

III.D.2.a. Risk Level 3 dischargers who discharge directly into receiving waters are also required to monitor that receiving water if sampling results from the discharge monitoring location meets either of the following conditions:

i. pH value falls outside of the range of 6.0 and 9.0 pH units; or

ii. Turbidity exceeds 500 NTU.

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8 The Glossary definition of 'site' applies here, i.e., *The area where the construction activity is physically located or conducted, including staging, storage, and access areas.*

III.D.2.b. Receiving water monitoring does not apply if run-on from a forest fire or any other natural disaster caused the stormwater results to fall outside the pH range or exceed the turbidity value.

III.D.2.c. Risk Level 3 dischargers required to conduct receiving water monitoring shall collect samples as follows:

i. Collect, at minimum, one upstream receiving water sample from an accessible and safe location that is:

1. Representative of the receiving water;
2. As close as possible to the discharge location; and
3. Upstream from the discharge location.

ii. Collect, at minimum, one downstream receiving water sample from an accessible and safe location that is:

1. Representative of the receiving water;
2. As close as possible to the discharge location; and
3. Downstream from the discharge location.

III.D.2.d. Risk Level 3 dischargers shall analyze the samples for the parameter that triggered this monitoring (either pH or turbidity, or both).

III.D.2.e. Risk Level 3 dischargers shall collect the samples once every 24-hour period of the Qualifying Precipitation Event.

III.D.2.f. Risk Level 3 dischargers shall specify the specific locations where samples were collected, date and time of sample collection, as well as constituents analyzed.

III.D.2.g. The Regional Water Board delegate may require, in writing, that the Risk Level 3 discharger continue to sample the receiving water for the parameter that required this monitoring (pH and/or turbidity) after the Qualifying Precipitation Event ends.

III.D.3. Non-Visible Pollutant Monitoring Requirements

III.D.3.a. Dischargers shall implement sampling and analysis requirements to monitor non-visible pollutants when there is:

i. Evidence of pollutant releases that are not visually detectable in stormwater discharges; and

ii. Releases of substances which could cause or contribute to an exceedance of water quality objectives in the receiving waters.

III.D.3.b. Dischargers are required to conduct sampling and analysis for non-visible pollutants identified in the SWPPP or otherwise known to be on site, only when the pollutants may be discharged due to failure to implement BMPs, a container spill or leak, or a BMP breach, failure, or malfunction.

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III.D.3.c. Dischargers shall collect at least one sample, within 8 hours, from each discharge location hydraulically down-gradient from the observed triggering event or condition.

III.D.3.d. Dischargers shall continue to collect at least one sample per applicable discharge location for each 24-hour period that there is discharge, until the necessary corrective actions are completed to control further discharge of the pollutant.

III.D.3.e. Dischargers are not required to sample if one of the conditions described in Section III.D.3.b above (e.g., breach or spill) occurs and, prior to discharge, the material containing the pollutant is fully remediated or removed; and BMPs to control the pollutant are implemented, maintained, or replaced as necessary.

III.D.3.f. Dischargers shall analyze samples in the field or submit them to a laboratory as specified in Section III.F of this Attachment for analysis of all non-visible pollutants suspected to be present in the discharge, including applicable TMDL-specific pollutants listed in Table H-2 in Attachment H.

III.E. Sample Collection and Handling Instructions

III.E.1. Dischargers shall:

a. Identify applicable parameters that require laboratory analysis for each stormwater discharge location (pH and turbidity are typically analyzed with field meters).

b. Request the laboratory provide the appropriate number of sample containers, types of containers, sample container labels, blank Chain of Custody forms, and sample preservation instructions.

c. Use the appropriate sample shipping method to the laboratory. The laboratory should receive samples within 48 hours of the physical sampling (unless otherwise required by the laboratory to meet all method hold times). The options are to either deliver the samples to the laboratory, arrange to have the laboratory pick them up, or ship them overnight to the laboratory.

d. Use only the sample containers provided/specified by the laboratory to collect and store samples. Use of any other type of containers could cause sample contamination.

e. Prevent sample contamination by not touching or putting anything into the sample containers before collecting stormwater samples.

f. Not overfill sample containers. Overfilling can change the analytical results.

g. Secure each sample container cap without stripping the cap threads.

h. Label each sample container. The label shall identify the date and time of sample collection, the person taking the sample, and the sample collection location or discharge point. The label should also identify any sample containers that have been preserved.

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i. Carefully pack the sample container into an ice chest or refrigerator to prevent breakage and maintain temperature during shipment; frozen ice packs or ice is placed into the shipping container to keep the sample close to 4° C (39° F) until arriving at the laboratory (do not freeze samples).

j. Complete a Chain of Custody form with each set of samples. The Chain of Custody form shall include the discharger's name, address, and phone number, identification of each sample container and sample collection point, person collecting the samples, the date and time each sample container was filled, the analysis that is required for each sample container, and both the signatures of the persons relinquishing and receiving the sample containers.

III.E.2. The Discharger shall designate and train personnel for the collection, maintenance, and shipment of samples in accordance with the above sample protocols and laboratory-specific practices.

III.E.3. Dischargers shall perform all sampling and preservation protocols in accordance with the 40 Code of Federal Regulations Part 136 and the current edition of "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association).[9]

III.E.4. Dischargers may refer to the Surface Water Ambient Monitoring Program's (SWAMP) Quality Assurance Program Plan (QAPrP) for more information on sampling collection and analysis.[10]

III.F. Analytical Methods Requirements

III.F.1. Dischargers shall refer to Table 4 for applicable test methods, detection limits, and reporting units.

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9 Unless other test procedures have been specified in this General Permit or by the Water Boards.

10 Additional information regarding the SWAMP QAPrP can be found at: <https://www.waterboards.ca.gov/water_issues/programs/swamp/quality_assurance.html#qaprp>. [as of October 20, 2020]

Table 4 - Test Methods, Detection Limits and Reporting Units

Parameter	Test Method	Discharger Type	Method Detection Limit	Reporting Units
pH	Field test with calibrated portable instrument using U.S. EPA approved procedures	Risk Level 2 and 3	0.2	pH units
Turbidity	U.S. EPA 0180.1 and/or field test with calibrated portable instrument	Risk Level 2 and 3	1	NTU
Non-Visible Pollutant Parameter(s)	U.S. EPA-approved test method for the specific pollutant parameter	All Risk Levels	Dependent on the test method	Dependent on the test method

III.F.2. All monitoring instruments and equipment shall be calibrated and maintained in accordance with manufacturers' specifications to ensure accurate measurements. Additionally, records of calibration shall be retained for at least three years and made available upon request.

III.F.3. Risk Level 2 and 3 dischargers shall perform pH analysis on-site with a calibrated pH meter using a U.S. EPA acceptable test method.

III.F.4. Risk Level 2 and 3 dischargers shall perform turbidity analysis using a calibrated turbidity meter (turbidimeter), either on-site or at a State Water Board Environmental Laboratory Accreditation Program (ELAP)-accredited laboratory. Acceptable test methods include Standard Method 2130 B or U.S. EPA Method 180.1.

III.F.5. All analyses of laboratory-analyzed parameters shall be sent to and conducted at a laboratory recognized by the State Water Board Environmental Laboratory Accreditation Program (ELAP), with the exception of field analysis conducted by the discharger for turbidity and pH.

III.F.6. All dischargers shall assign a value of zero (0) for all non-visible pollutant analytical results less than the minimum level (reporting limit), as reported by the laboratory, used in calculations required by this permit (e.g., numeric action level and numeric effluent limitation exceedance determinations), so long as a sufficiently sensitive test method was used as evidenced by the reported method detection limit and minimum level.

III.G. Exceedance Response Requirements[11]

III.G.1. Dischargers are subject to the applicable numeric action levels and/or numeric effluent limitations based on their Risk Level as shown in Table 5 below.

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11 Terms including, but not limited to, numeric action level, numeric effluent limitation, and exceedances are defined in Attachment B of this General Permit.

Table 5 - Numeric Action Levels and Numeric Effluent Limitations

Parameter	Discharger Type	Numeric Action Level	Numeric Effluent Limitation
pH	Risk Level 2 and 3	Lower = 6.5 Upper = 8.5	Not Applicable
Turbidity	Risk Level 2 and 3	250 NTU	Not Applicable
TMDL-related Pollutant	Responsible Dischargers with a project of any Risk Level	Refer to Table H-2 in Attachment H	Refer to Table H-2 in Attachment H

III.G.2. For pH and turbidity, the discharger shall use the field meter readings obtained from each discharge location per day of discharge to determine if there has been an exceedance of the numeric action levels.

III.G.3. Whenever analytical results indicate that the discharge is below the lower pH value, above the upper pH value, exceeds the turbidity value, or exceeds an applicable TMDL-related numeric action level or numeric effluent limitation, dischargers shall determine the source(s) of the pollutant and immediately implement corrective actions to:

a. Meet Best Available Technology Economically Achievable and Best Conventional Pollutant Control Technology requirements in 40 Code of Federal Regulations §§ 450.21 through 450.23[12]; and

b. Reduce or prevent pollutants in stormwater and authorized non-stormwater discharges from causing further exceedances.

III.G.4. Dischargers shall iterate corrective actions until the discharge is in compliance with the applicable numeric action level(s).

III.G.5. The source evaluation shall be kept with the SWPPP and specifically address what corrective actions were taken or will be taken and provide a schedule for their completion.

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IV. REPORTING REQUIREMENTS

IV.A. Visual Inspections

Dischargers shall keep all completed inspection checklists and related documentation with the SWPPP on-site or electronically.

12 United States Environmental Protection Agency, Construction and Development Effluent Limitation Guidelines §§ 450.21 through 450.23, <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-N/part-450/subpart-B?toc=1> [as of June 28, 2022].

IV.B. Water Quality Monitoring

IV.B.1. Risk Level 2 and 3 Stormwater Discharge Monitoring Reporting

IV.B.1.a. Risk Level 2 and 3 dischargers shall electronically submit through SMARTS all field sampling results within 30 days of the completion of the precipitation event or within 10 days if the field sampling results demonstrate the exceedance of the pH, and/or turbidity numeric action levels.

IV.B.1.b. Risk Level 2 and 3 dischargers that exceeded the pH and/or turbidity numeric action levels shall prepare a Numeric Action Level Exceedance Report when requested, in writing, from a Regional Water Board delegate and shall submit and certify each Numeric Action Level Exceedance Report through SMARTS within 30 days of receiving the written request, in accordance with Section IV of this General Permit's Order.

IV.B.1.c. The Numeric Action Level Exceedance Report shall include:

i. The analytical method(s), method reporting unit(s), and method detection limit(s) for each parameter;

ii. The date, place, time of sampling, visual inspections, and/or measurements, including precipitation; and

iii. An assessment of the existing BMPs associated with the sample that exceeded the numeric action level, a description of each corrective action taken including photographs, and date of implementation.

IV.B.1.d. Risk Level 2 and 3 dischargers that prepared a Numeric Action Level Exceedance Report shall retain a copy of the report for a minimum of three years after the date the exceedance report is certified and submitted.

IV.B.2. Risk Level 3 Receiving Water Monitoring Reporting

IV.B.2.a. Risk Level 3 dischargers shall electronically submit all receiving water sample results through SMARTS within 10 days of a precipitation event.

IV.B.3. Non-Visible Pollutant Monitoring Reporting

IV.B.3.a. All dischargers that conducted non-visible pollutant monitoring shall electronically submit through SMARTS all field and/or analytical sampling results within 30 days after obtaining the analytical result or within 10 days after if the analytical results demonstrate the exceedance of an applicable TMDL-related numeric action level or numeric effluent limitation or Basin Plan parameter.

IV.B.3.b. All dischargers that exceeded an applicable TMDL-related numeric action level shall prepare a Numeric Action Level Exceedance Report when requested, in writing, from a Regional Water Board delegate and shall submit and certify each Numeric Action Level Exceedance Report through SMARTS within 30 days of receiving the written request, in accordance with Section IV of this General Permit's Order.

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IV.B.3.c. The Numeric Action Level Exceedance Report shall include:

i. The analytical method(s), method reporting unit(s), and method detection limit(s) for each parameter;

ii. The date, place, time of sampling, visual inspections, and/or measurements, including precipitation; and

iii. An assessment of the existing BMPs associated with the sample that exceeded the numeric action level, a description of each corrective action taken including photographs, and date of implementation.

IV.B.3.d. All dischargers that prepared a Numeric Action Level Exceedance Report shall retain a copy of the report for a minimum of three years after the date the exceedance report is certified and submitted.

IV.B.3.e. All dischargers that exceed an applicable TMDL-related numeric effluent limitation shall comply with the water quality-based corrective action requirements in Section VI.Q of the Order.

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ATTACHMENT D.1

RISK DETERMINATION WORKSHEET

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED
WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES
(GENERAL PERMIT)

The Risk Determination Worksheet in this Attachment serves as guidance for construction stormwater dischargers and may be used to manually calculate the site-specific risk of a construction project. Dischargers are required to submit risk information using the Stormwater Multiple Application and Report Tracking System (SMARTS) as part of filing a Notice of Intent for coverage under the Construction Stormwater General Permit.

Dischargers may use SMARTS to auto-populate values for the soil erodibility factor (K factor), length-slope factor (LS factor), and the receiving water risk (the risk sediment poses to receiving waters) based on the provided latitude and longitude coordinates for the project. SMARTS relies on the same data as the GIS map method, which dischargers can use to confirm the auto-populated values. Dischargers may alternatively use the individual method, a site-specific analysis, to determine the K factor, LS factor, and receiving water risk where GIS data may not accurately reflect the site's characteristics.

Dischargers may use a combination of the GIS map method or individual method to calculate the K factor, LS factor, sediment risk, and receiving water risk in steps 1 and 2, depending on which method is judged to be the most accurate for the site.

SMARTS will automatically determine the combined Risk Level based on the entered information.

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Instructions:

Step 1 – Determine sediment risk via one of the following options:

- GIS Map Method - EPA Rainfall Erosivity Calculator & GIS Map
- Individual Method - EPA Rainfall Erosivity Calculator & Individual Data

Step 2 – Determine receiving water risk via one of the following options:

- GIS Map Method - GIS Map of Sediment-Sensitive Watersheds
- Individual Method - Provided Sediment Impaired Water Bodies

Step 3 – Determine combined Risk Level

Step 1 – Sediment Risk Worksheet

The Construction Stormwater General Permit requires dischargers to calculate sediment risk by multiplying the rainfall erosivity (R), soil erodibility (K), and length-slope (LS) factors. Determine the values for each of the factors and use the table below to assess the site-specific sediment risk for the construction project.

a. Rainfall Erosivity (R) Factor

Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-minute intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S.

A guide for the U.S. EPA Rainfall Erosivity Factor Calculator (https://www.waterboards.ca.gov/water_issues/programs/stormwater/smarts/construction/docs/rfactor_guide.pdf) is available to dischargers to assist with calculating the site-specific R factor.

R Factor Value = _____

b. Soil Erodibility (K) Factor

The soil erodibility (K) factor represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff.

A soil erodibility nomograph is provided on page 4 to assist the discharger with determining the site-specific K factor.

K Factor Value = _____

c. Length-Slope (LS) Factor

The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases.

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A length-slope table is provided on page 5 to assist the discharger with estimating the weighted LS factor for the site prior to construction.

LS Factor Value = _____

d. Watershed Erosion Estimate

Estimate watershed erosion by multiplying the R, K, and LS factors, then use the table below to determine the site-specific sediment risk for the project.

Watershed Erosion Estimate (tons/acre) = R x K x LS = _____

Watershed Erosion Estimate (tons/acre)	Site-Specific Sediment Risk
Less than 15 tons/acre	Low
Greater than or equal to 15 tons/acre and less than 75 tons/acre	Medium
Greater than or equal to 75 tons/acre	High

Site-specific Sediment Risk (High, Medium, or Low) = _____

e. Sediment Risk GIS Map Method

In addition to the U.S. EPA Rainfall Erosivity Factor Calculator, State Water Board staff has prepared map tools to assist dischargers with estimating site-specific K and LS factors. Dischargers may use the map tools instead of manually determining the K and LS factors using the nomograph on page 4 and tables on page 5. Additionally, SMARTS is equipped with an auto-populate feature that can generate K and LS factors given the project latitude and longitude coordinates.

K Factor Map

(https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/guidance/k_factor_map.pdf)

LS Factor Map

(https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/guidance/ls_factor_map.pdf)

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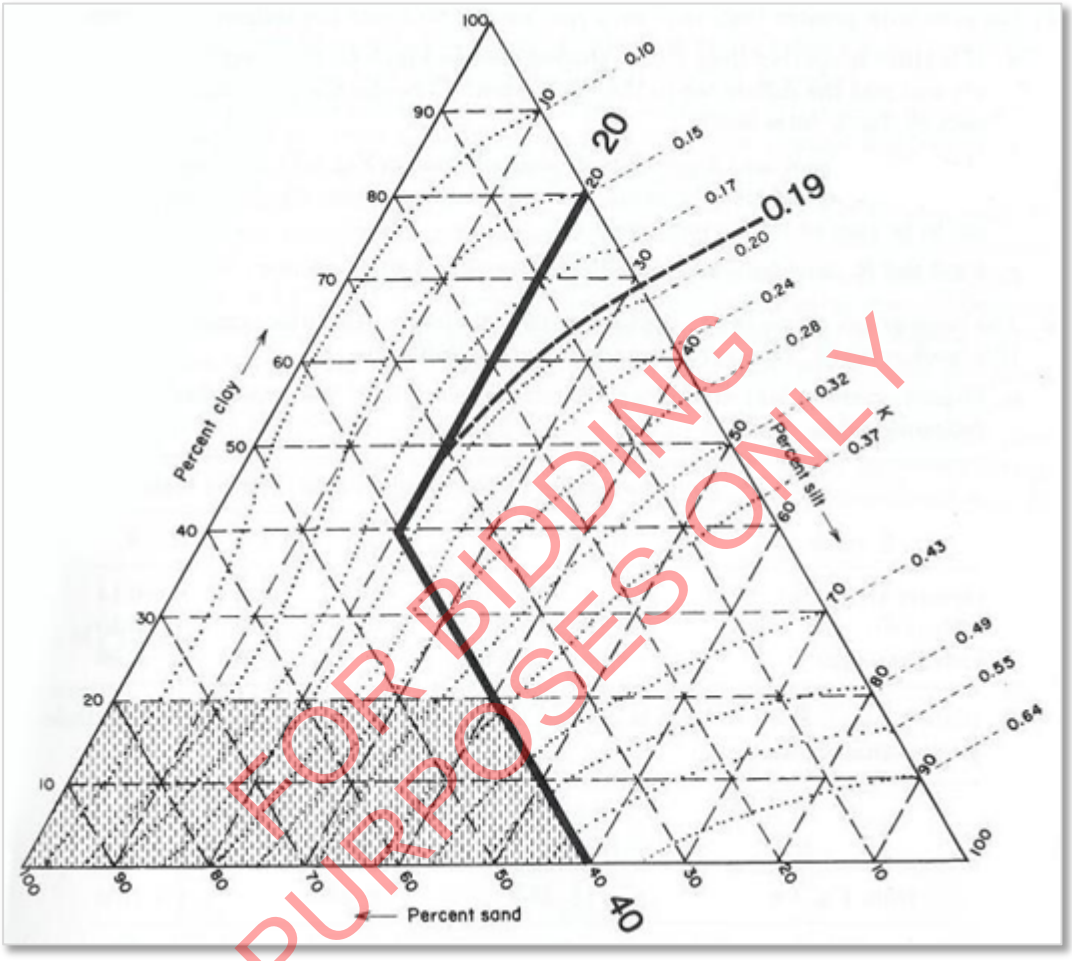
Soil Erodibility (K) Factor Nomograph

The K factor can be determined by using the nomograph method, which requires that a particle size analysis (ASTM D-422)[1,2] be conducted to determine the percentages of sand, very fine sand, silt, and clay. Use the figure below to determine the appropriate K factor value.



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The figure above is the Erickson triangular nomograph used by the USDA to determine the K factor for a soil based on its texture (percent silt plus very fine sand, percent sand, percent organic matter, soil structure, and permeability).

1 ASTM D-422 is the standard test method used for the quantitative determination of the distribution of particle sizes in soils.

2 Environmental Protection Agency, American Society for Testing and Materials (ASTM) Standards, <https://www.epa.gov/sites/default/files/2020-01/documents/sedc_2004-2005_append.pdf> [as of June 22, 2022]

Nomograph from Erickson 1977, as referenced in Goldman et. al., 1986.
Length-Slope (LS) Factor Table for Construction Sites

To determine a construction site's specific LS factor locate the intercept of the site's Sheet Flow Length (ft) and Average Watershed Slope (percent). Table from Renard et. al., 1997.

Sheet Flow Length (ft)	Average Watershed Slope (percent)									
	0.2	0.5	1.0	2.0	3.0	4.0	5.0	6.0	8.0	10.0
< 3	0.05	0.07	0.09	0.13	0.17	0.20	0.23	0.26	0.32	0.35
6	0.05	0.07	0.09	0.13	0.17	0.20	0.23	0.26	0.32	0.37
9	0.05	0.07	0.09	0.13	0.17	0.20	0.23	0.26	0.32	0.38
12	0.05	0.07	0.09	0.13	0.17	0.20	0.23	0.26	0.32	0.39
15	0.05	0.07	0.09	0.13	0.17	0.20	0.23	0.26	0.32	0.40
25	0.05	0.07	0.10	0.16	0.21	0.26	0.31	0.36	0.45	0.57
50	0.05	0.08	0.13	0.21	0.30	0.38	0.46	0.54	0.70	0.91
75	0.05	0.08	0.14	0.25	0.36	0.47	0.58	0.69	0.91	1.20
100	0.05	0.09	0.15	0.28	0.41	0.55	0.68	0.82	1.10	1.46
150	0.05	0.09	0.17	0.33	0.50	0.68	0.86	1.05	1.43	1.88
200	0.06	0.10	0.18	0.37	0.57	0.79	1.02	1.25	1.72	2.34
250	0.06	0.10	0.19	0.40	0.64	0.89	1.16	1.43	1.99	2.72
300	0.06	0.10	0.20	0.43	0.69	0.98	1.28	1.60	2.24	3.09
400	0.06	0.11	0.22	0.48	0.80	1.14	1.51	1.90	2.70	3.75
600	0.06	0.12	0.24	0.56	0.96	1.42	1.91	2.43	3.52	4.95
800	0.06	0.12	0.26	0.63	1.10	1.65	2.25	2.89	4.24	6.03
1000	0.06	0.13	0.27	0.69	1.23	1.86	2.55	3.30	4.91	7.02

Sheet Flow Length (ft)	Average Watershed Slope (percent)								
	12.0	14.0	16.0	20.0	25.0	30.0	40.0	50.0	60.0
< 3	0.36	0.38	0.39	0.41	0.45	0.48	0.53	0.58	0.63
6	0.41	0.45	0.49	0.56	0.64	0.72	0.85	0.97	1.07
9	0.45	0.51	0.56	0.67	0.80	0.91	1.13	1.31	1.47
12	0.47	0.55	0.62	0.76	0.93	1.08	1.37	1.62	1.84
15	0.49	0.58	0.67	0.84	1.04	1.24	1.59	1.91	2.19
25	0.71	0.85	0.98	1.24	1.56	1.86	2.41	2.91	3.36
50	1.15	1.40	1.64	2.10	2.67	3.22	4.24	5.16	5.97
75	1.54	1.87	2.21	2.86	3.67	4.44	5.89	7.20	8.37
100	1.88	2.31	2.73	3.57	4.59	5.58	7.44	9.13	10.63
150	2.51	3.09	3.68	4.85	6.30	7.70	10.35	12.75	14.89
200	3.07	3.81	4.56	6.04	7.88	9.67	13.07	16.16	18.92
250	3.60	4.48	5.37	7.16	9.38	11.55	15.67	19.42	22.78
300	4.09	5.11	6.15	8.23	10.81	13.35	18.17	22.57	26.51
400	5.01	6.30	7.60	10.24	13.53	16.77	22.95	28.60	33.67
600	6.67	8.45	10.26	13.94	18.57	23.14	31.89	39.95	47.18
800	8.17	10.40	12.69	17.35	23.24	29.07	40.29	50.63	59.93
1000	9.57	12.23	14.96	20.57	27.66	34.71	48.29	60.84	72.15

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Step 2 – Receiving Water Risk Worksheet

Receiving water risk is based on whether a project drains to a water body or watershed that is sediment-sensitive. If the answer to either question below is "yes", the project is considered a **high** receiving water risk. If the answer to both questions below is "no", the project is considered a **low** receiving water risk.

1. Does the disturbed area discharge (either directly or indirectly) to a 303(d)-listed water body impaired by sediment? For help with identifying impaired water bodies, please refer to the 2020 – 2022 California Integrated Report (Clean Water Act Section 303(d) - 305(b) Report) (https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2020_2022_integrated_report.html).

OR

2. Does the disturbed area discharge (either directly or indirectly) to a water body with designated beneficial uses of COLD, SPAWN, and MIGRATORY? For help with identifying designated beneficial uses, please refer to the appropriate Regional Water Quality Control Board Basin Plan below.

Region 1 – North Coast Basin Plan
(https://www.waterboards.ca.gov/northcoast/water_issues/programs/basin_plan/)

Region 2 – San Francisco Bay Basin Plan
(https://www.waterboards.ca.gov/sanfranciscobay/basin_planning.html#2010basinplan)

Region 3 – Central Coast Basin Plan
(https://www.waterboards.ca.gov/centralcoast/publications_forms/publications/basin_plan/index.html)

Region 4 – Los Angeles Basin Plan
(https://www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan/)

Region 5 – Central Valley Basin Plan[3]
(https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/index.html)

Region 6 – Lahontan Basin Plan
(https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/index.html)

Region 7 – Colorado River Basin Plan
(https://www.waterboards.ca.gov/coloradoriver/water_issues/programs/basin_planning/)

Region 8 – Santa Ana Basin Plan
(https://www.waterboards.ca.gov/santaana/water_issues/programs/basin_plan/index.html)

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3 The Central Valley Basin Plan lists the COLD beneficial use designation as part of the SPAWN and MIGRATORY beneficial uses. Waterbodies will be considered high-risk receiving waters if listed as SPAWN (COLD) and MIGRATORY (COLD).

Region 9 – San Diego Basin Plan
(https://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.html)

Sediment-Sensitive Watershed GIS Map Method

State Water Board staff has prepared a High-Risk Receiving Watershed Map tool (https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/guidance/receivingwaterrisk.pdf) to assist dischargers with determining site-specific receiving water risk. Additionally, SMARTS is equipped with an auto-populate feature that can determine the receiving water risk based on the project latitude and longitude coordinates. Projects located in the watersheds highlighted in red are considered high-risk. Please note that the map option may not reflect the correct receiving watershed, lacking site-specific drainage information.

The discharger is responsible for identifying the appropriate receiving water. If the project does not discharge to the watershed as depicted on the High-Risk Receiving Watershed Map, please contact the appropriate Regional Water Quality Control Board.

Site-Specific Receiving Water Risk (High or Low) = _____

Step 3 – Combined Risk Level Matrix

The below matrix is used to determine the combined Risk Level of the project, factoring in both sediment risk and receiving water risk.

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Receiving Water Risk	Sediment Risk: Low	Sediment Risk: Medium	Sediment Risk: High
Low	Level 1	Level 2	
High	Level 2		Level 3

Combined Risk Level (1, 2, or 3) = _____

ATTACHMENT D.2

PERMIT REGISTRATION DOCUMENT REQUIREMENTS

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED
WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES
(GENERAL PERMIT)

I. PERMIT REGISTRATION DOCUMENT REQUIREMENTS

All Linear Underground and Overhead Projects shall comply with the Permit Registration Document requirements in Attachments E, E.1, and E.2 of this General Permit. All traditional construction projects shall comply with Permit Registration Document requirements in this General Permit and this Attachment.

I.A. General Permit Registration Document Submittal Requirements

Dischargers of stormwater associated with construction activity that result in the disturbance of one acre or more of land area shall apply for and obtain coverage under NPDES General Construction for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit). Any construction activity that is a part of a larger common plan of development or sale must also be covered under this General Permit, regardless of size. For example, if 0.5 acre of a 20-acre subdivision is disturbed by the construction activities of discharger A and the remaining 19.5 acres is to be developed by discharger B, discharger A must obtain this General Permit for the 0.5-acre site.

Other discharges from construction activities that are covered under this General Permit can be found in Section II of the Order of this General Permit.

It is the Legally Responsible Person's responsibility to obtain coverage under this General Permit by electronically certifying and submitting complete Permit Registration Documents.

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I.B. Fees

I.B.1. A discharger must submit the appropriate fee with its completed Notice of Intent application package. Fees are established through regulations adopted by the State Water Board every year.[1] Fees are subject to change by regulation.

I.B.2. Where the fee is calculated based upon the total area of land disturbed (opposed to the total acreage of land owned), total acreage includes all areas anticipated to be disturbed throughout the duration of the project (e.g., 10 acres are scheduled

1 California Code of Regulations (CCR), Title 23, Division 3, Chapter 9. Waste Discharge Reports and Requirements, Article 1. Fees.

to be disturbed the first year and 10 acres in each subsequent year for 5 years; the fees would be based upon 50 acres of total disturbance).

I.B.3. Dischargers that apply for and satisfy the Small Construction Rainfall Erosivity Wavier requirements shall pay the applicable fee.

I.C. Permit Registration Document Submittal Prior to Commencement of Construction

Dischargers proposing to conduct construction activities subject to this General Permit shall certify and submit Permit Registration Documents prior to the commencement of construction activity. Construction activity cannot commence until the WDID number is issued.

In all cases, except public emergencies (e.g., wildfire, flood), Permit Registration Documents must be completed and WDID number issued before construction can commence (refer to Section III.A.3 of the Order of this General Permit).

I.D. Submittal of Complete Permit Registration Documents

All dischargers required to comply with this General Permit shall electronically certify and submit the required Permit Registration Documents, through the Stormwater Multiple Application and Report Tracking System (SMARTS). The discharger shall assure that all information in its Permit Registration Documents complies with the Homeland Security Act and other federal law addressing security in the United States.

The discharger shall submit completed Permit Registration Documents to obtain coverage under this General Permit. If any of the required items are incomplete or missing, the submittal will be rejected.

The State Water Board will process the application package in the order received and assign a WDID number upon receipt of a complete submittal. Permit coverage begins once a WDID number is assigned.

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II. STANDARD PERMIT REGISTRATION DOCUMENTS

II.A. Notice of Intent

The Notice of Intent is a site-specific application to obtain coverage for discharges of stormwater and authorized non-stormwater from construction and land disturbance activities to waters of the United States. The application includes the entry of site information, contact information, and site-specific requirements.

II.B. Risk Level Determination

All dischargers are required to conduct a Risk Level Determination, where the site's overall risk is separated into sediment risk and receiving water risk. The discharger must utilize either the Water Board's standard risk determination (provided in

SMARTS), a site-specific risk determination, or a combination of the two as described in Attachment D.1 of this General Permit.

II.B.1. A standard risk determination, using the Geographic Information Systems (GIS) map method, includes utilizing the following:

i. U.S. EPA Rainfall Erosivity (R) Factor Calculator website;

ii.. Sediment Risk Map tool; and

iii. High-Risk Receiving Watershed Map tool.

II.B.2. A site-specific risk determination, using the individual method, includes utilizing the following:

i. U.S. EPA Rainfall Erosivity (R) Factor Calculator website;

ii. Manually calculated soil erodibility (K) and length-slope (LS) factors; and

iii. 303(d) list of water bodies impaired for sediment.

II.B.3. The applicable beneficial uses for the receiving water are listed in the Regional Water Quality Control Board Basin Plan applicable to the site.

II.B.4. Sites that discharge to an unlisted receiving water that is tributary to a sediment-sensitive waterbody, within the Hydrologic Unit Code 10 (HUC 10) watershed scale, are considered high receiving water risk sites.

II.B.5. The discharger may use a combination of the standard and site-specific risk determination methods to calculate the soil erodibility (K), length-slope (LS) sediment risk, and receiving water risk factors.

II.B.6. The discharger shall calculate the site's sediment risk and receiving water risk during all phases of construction activity (e.g., demolition and pre-development site preparation, grading and land development, streets and utilities, vertical construction, final landscaping, and site stabilization). The construction start date begins with initial disturbance to land, including disturbances under previous landowners, and ends with final stabilization of the site.

II.B.7. SMARTS will assign the higher Risk Level to the entire site for any site spanning two or more planning watersheds.

II.B.8. Sites, parcels, or individual lots that are part of a larger plan of development shall include the larger plan of development in Risk Level determination. The discharger shall include this determination in the Permit Registration Documents submittal.

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II.B.9. Dischargers may request that the Regional Water Board revise the site-specific Risk Level determination values in SMARTS by providing the following information to the Regional Water Board:

i. A site-specific soils test (ASTM D-422)[2,3] certified by an accredited Materials Testing Laboratory and reviewed by a QSD to determine the K factor used in the revised Risk Level determination. The soil testing must include the soil classification method used (e.g., Unified Soil Classification System);

ii. Review of a site-specific survey or plan by a QSD to determine the LS factor used in the revised Risk Level determination; and

iii. A revised Risk Level determination manually calculated in accordance with Attachment D.1 of this General Permit.

II.C. Site-Specific Stormwater Pollution Prevention Plan, Drawings, and Map

The Stormwater Pollution Prevention Plan (SWPPP) (including site-specific drawings and map) is a site-specific document developed for implementation of this General Permit. The SWPPP shall be developed by a Qualified SWPPP Developer and certified and submitted by each discharger with the other Permit Registration Documents.

II.D. Additional Requirements

II.D.1. All dischargers, other than Linear Underground and Overhead Project dischargers or dischargers subject to the post-construction requirements of an existing NPDES Phase I or II MS4 permit, shall complete the post-construction calculations and upload post-construction plans and other supporting documentation as an attachment in SMARTS.

II.D.2. All dischargers, other than Linear Underground and Overhead Project dischargers, within a Phase I or II municipal separate storm sewer system permitted area, shall upload the following items in SMARTS:

II.D.2.a. An attachment or web-source containing the applicable NPDES Phase I or Phase II municipal separate storm sewer system permittee's post-construction requirements; and

II.D.2.b. The post-construction plans and calculations submitted to or approved by the applicable NPDES Phase I or Phase II municipal separate storm sewer system permittee.

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2 ASTM D-422 is the standard test method used for the quantitative determination of the distribution of particle sizes in soils.

3 Environmental Protection Agency, American Society for Testing and Materials (ASTM) Standards, <https://www.epa.gov/sites/default/files/2020-01/documents/sedc_2004-2005_append.pdf> [as of June 22, 2022]

II.D.3. Dischargers who are proposing to implement an Active Treatment System shall also certify and submit in SMARTS:

II.D.3.a. Complete Active Treatment System Plan in accordance with Attachment F at least 14 days prior to the planned operation of the Active Treatment System and a copy shall be available on-site during Active Treatment System operation;

II.D.3.b. System design and supporting documentation; and

II.D.3.c. Proof that the system and/or Active Treatment System Plan was designed by a qualified Active Treatment System professional in accordance with Attachment F of this General Permit.

II.D.4. Dischargers who are proposing to implement passive treatment shall certify and submit in SMARTS:

II.D.4.a. Complete Passive Treatment Plan in accordance with Attachment G of this General Permit at least 14 days prior to the planned operation of the passive treatment system and a copy shall be available on-site during operation;

II.D.4.b. System design and supporting documentation; and

II.D.4.c. Proof that the Passive Treatment Plan and/or system was designed by an appropriate licensed professional (see Attachment G of this General Permit).

II.D.5. Dischargers who are proposing an alternate Risk Justification shall include:

II.D.5.a. Soil type identification through an accredited Materials Testing Laboratory analysis and reviewed by a QSD; and

II.D.5.b. Review of a site-specific slope survey or plan by a QSD to determine the LS factor used in the revised Risk Level determination.

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II.E. Certification of Submitted Documents

The Legally Responsible Person shall certify and submit all Permit Registration Documents required by this General Permit through SMARTS. The discharger's Legally Responsible Person shall have a signed original Electronic Authorization Form on file with the State Water Board for each organization in SMARTS.

II.F. Exceptions to Standard Permit Registration Document Requirements

Construction sites with a valid Small Construction Rainfall Erosivity Wavier are not required to submit a SWPPP (including site-specific drawings and map).

II.G. Assistance

Dischargers and discharger representatives may email the State Water Board, Stormwater Help Desk, at stormwater@waterboards.ca.gov, to answer questions.

ATTACHMENT E

LINEAR UNDERGROUND AND OVERHEAD PROJECT REQUIREMENTS

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORMWATER DISCHARGES
ASSOCIATED WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES
(GENERAL PERMIT)

I. LINEAR UNDERGROUND AND OVERHEAD PROJECT BASELINE REQUIREMENTS

Linear underground and overhead projects are identified as one of three types of risk (Type 1, 2, and 3) based on the project area or segment's threat to water quality. Risk Types for linear projects are determined through SMARTS and clarified in Attachment E.1 of this General Permit when obtaining permit coverage. Risk Type 1, 2, and 3 dischargers shall implement the following minimum best management practices to reduce or prevent pollutants in construction stormwater discharges, and comply with monitoring and reporting requirements. If a requirement in this Attachment does not specify a specific Risk Type, then the requirement applies to Risk Type 1, 2, and 3 dischargers.

II. MINIMUM BEST MANAGEMENT PRACTICES

II.A. Good Site Management "Housekeeping"

II.A.1. Dischargers shall implement good site management measures (i.e., "housekeeping") for construction materials on a linear project site that could potentially be a threat to water quality if discharged or exposed to stormwater. At a minimum, dischargers shall implement the following good housekeeping measures:

a. Identify and protect the products used and/or expected to be used, and the end products that are produced and/or expected to be produced from exposure to stormwater. This requirement does not apply to materials and equipment that are designed to be outdoors and exposed to environmental conditions (e.g., poles, equipment pads, cabinets, conductors, insulators, bricks);

b. Apply best management practices (BMPs) to erodible stockpiled construction materials (e.g., soil, spoils, fly-ash, stucco, hydrated lime) to prevent erosion and pollutant transport;

c. Store chemicals in watertight containers with secondary containment to prevent any spillage or leakage or store in a complete enclosed storage area;

d. Minimize exposure of construction materials to precipitation. This requirement does not include materials and equipment that are designed to

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be outdoors and exposed to environmental conditions (e.g., poles, equipment pads, cabinets, conductors, insulators, bricks);

e. Implement BMPs to control the off-site tracking of sediment and loose construction and landscape materials; and

f. Implement BMPs to control the discharge of plastic materials and limit the use of plastic materials when more sustainable, environmentally friendly alternatives exist. Dischargers shall consider the use of plastic materials resistant to solar degradation where plastic materials are deemed necessary.

II.A.2. Dischargers shall implement good housekeeping measures for waste management, which, at a minimum to the extent feasible, shall consist of the following:

a. Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, masonry wash waters, and other wash waters. Wash waters shall be captured and treated prior to discharge or disposed of at a permitted facility that can accept that waste, to mitigate impacts to water quality;

b. Provide containment (e.g., secondary containment) of sanitation facilities (e.g., portable toilets) to prevent discharges of pollutants to the stormwater drainage system or receiving water;

c. Clean or replace sanitation facilities and inspecting them regularly for leaks and spills;

d. Keep debris or trash in waste containers if it is subject to transport from the site by wind or runoff;

e. Cover waste disposal containers at the end of every business day and during a precipitation event;

f. Prevent discharges from waste disposal containers to the stormwater drainage system or receiving water (e.g., containers with solid bottoms and regular maintenance);

g. Contain and securely protect stockpiled waste material from wind and precipitation unless actively being used; and

h. Secure and contain concrete washout areas and other washout areas that may contain additional pollutants to minimize discharge into the underlying soil and onto the surrounding areas. Washout areas shall be covered prior to and during a precipitation event.

II.A.3. Dischargers shall implement good housekeeping for vehicle/equipment storage and maintenance, which shall consist of the following:

a. Contain fuel, grease, and oil to prevent them from leaking into the ground, storm drains, or surface waters;

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b. Place all equipment or vehicles, which are to be fueled, maintained, and stored in a designated area with BMPs installed; and

c. Clean leaks immediately and dispose of leaked materials properly in accordance with the law.

II.A.4. Dischargers shall implement good housekeeping for landscape materials, which, at a minimum, shall consist of the following:

a. Contain and protect stockpiled materials such as mulches and topsoil, or other erodible landscape materials, from wind and precipitations unless being actively used;

b. Contain packaged landscape materials (e.g., fertilizers) when they are not being actively used;

c. Discontinue the application of any erodible landscape material at least 2 days before a forecasted precipitation event as defined in Attachment B or during periods of precipitation; and

d. Apply erodible landscape material at quantities and rates according to manufacturer recommendations or based on written specifications by knowledgeable and experienced field personnel.

II.A.5. Dischargers shall implement good housekeeping measures on the linear construction site, and of site operations, to control aerial deposition of site materials. Such particulates can include, but are not limited to, metals, nutrients, organics, sediment, other particulates, and trash.

II.A.6. Dischargers shall document all housekeeping BMPs in the Stormwater Pollution Prevention Plan (SWPPP) that correspond to the nature and phase of the construction activities.

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II.B. Non-Stormwater Management

II.B.1. Dischargers shall implement the following measures to control all non-stormwater discharges during construction, to the extent feasible:

a. Wash vehicles in such a manner as to prevent non-stormwater discharges to surface waters or municipal separate storm sewer system drainage systems;

b. Clean streets in such a manner as to prevent unauthorized non-stormwater discharges from reaching surface water or municipal separate storm sewer system drainage systems; and

c. Eliminate any non-stormwater discharges that are not specified in Section IV.A of this General Permit's Order, Authorized Non-Stormwater Discharges.

II.C. Preserve Existing Topsoil

II.C.1. Dischargers shall preserve existing topsoil, unless infeasible, through the following practices:

a. Stockpiling existing topsoil, or transferring topsoil to other locations, to deploy and reestablish vegetation prior to termination of coverage; and

b. Stabilizing disturbed topsoil during construction.

II.C.2. Preserving existing topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed.[1]

II.D. Erosion Control

II.D.1. Dischargers shall implement the following practices to eliminate or minimize site erosion. Erosion control BMPs (with the exception of sprayed products) shall be available on-site, or at a nearby location (e.g., common lay-down yard), year-round with trained persons able to deploy the product under the direction of the Qualified SWPPP Practitioner:

a. Implement effective wind erosion controls;

b. Preserve existing vegetation;

c. Minimize the amount of soil exposed during construction activity;

d. Minimize the disturbance of steep slopes;

e. Schedule earthwork to minimize the amount of disturbed area when feasible;

f. Immediately initiate stabilization for disturbed areas whenever earth disturbing has permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days;[2]

g. Minimize soil compaction in areas other than where the intended function of a specific area dictates that it be compacted;

h. Reestablish vegetation or non-vegetative erosion controls as soon as practicable;

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1 Examples may include the removal of topsoil containing invasive seedbanks, lack of space to stockpile topsoil, and sites that are designed to be highly impervious after construction with little to no vegetation intended to remain.

2 In arid, semiarid, and drought-stricken areas where initiating vegetative stabilization measures immediately is infeasible, alternative stabilization measures shall be employed as specified by the Regional Water Board. Stabilization shall be completed within a period of time determined by the Regional Water Board. In limited circumstances stabilization may not be required if the intended function of a specific area of the site necessitates that it remains disturbed.

i. If feasible, divert up gradient run-on water from contacting areas of exposed soils disturbed by construction activities or convey run-on through the site in a manner that prevents erosion from areas of construction and does not compromise the effectiveness of erosion, sediment, and perimeter controls;

j. Run-on water flowing onto a site from off-site areas may be separated from a site's stormwater discharge to eliminate commingled contribution. Run-on diversion shall occur prior to entering an area affected by construction activity. Run-on flow diversion shall be conveyed through or around the construction activity in plastic pipe or an engineered conveyance channel in a manner that will not cause erosion due to flow diversion. Run-on combined with a site's stormwater discharge is considered a stormwater discharge;

k. Limit the use of plastic materials when more sustainable, environmentally-friendly alternatives exist. Where plastic materials are deemed necessary, the discharger shall consider the use of plastic materials resistant to solar degradation;

l. Control stormwater and non-stormwater discharges to minimize downstream channel and bank erosion; and

m. Control peak flowrates and total volume of stormwater and authorized non-stormwater discharges to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points.

II.D.2. Dischargers that stabilize soil using bonded-fiber matrices, hydromulches, spray tackifiers, or other land-applied products shall:

a. Apply the product according to the manufacturer's instructions and guidance; and

b. Apply the product according to the manufacturer's guidance to allow for ample cure time and to prevent treatment chemicals from being transported by runoff.

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II.E. Sediment Controls

II.E.1. Dischargers shall implement the following site sediment controls:

a. Establish and maintain effective perimeter controls;

b. Stabilize all construction entrances and exits to sufficiently control erosion and sediment discharges from the site;

c. Design, install, and maintain effective sediment controls to minimize the discharge of pollutants utilizing site-specific BMPs; and

d. Design sediment basins and impoundments according to the California Stormwater Quality Association's (CASQA) current Construction BMP

Guidance Handbook[3] and utilize outlet structures that withdraw water from the surface, unless infeasible. Linear project dischargers utilizing sediment basins shall complete installation prior to other land disturbance activities unless infeasible.

II.F. Additional Linear Underground and Overhead Project Type 2 and 3 Requirements

II.F.1. At Risk Type 2 and 3 sites, dischargers shall implement the following additional erosion and sediment control BMPs for areas under active construction:[4]

a. Design and construct cut and fill slopes in a manner to ensure slope stability and to minimize erosion including, but not limited to, these practices:

i. Reduce continuous slope-length using terracing and diversions;

ii. Reduce slope steepness; and

iii. Roughen slope surfaces with large cobble or track walking.

b. Install linear sediment controls along the toe of the slope, face of the slope, and at the grade breaks of exposed slopes according to sheet flow lengths as shown in Table 1 until slope has reached Notice of Termination conditions for erosion protection. When infeasible to comply with Table 1 due to site-specific geology or topography, the Qualified SWPPP Developer shall include in the SWPPP a justification for the use of an alternative method to protect slopes from erosion and sediment loss.

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Table 1 - Critical Slope and Sheet Flow Length Combinations for Linear Sediment Reduction Barrier

Slope Ratio (Vertical to Horizontal)	Sheet flow length not to exceed
≤ 1:20	Per Qualified SWPPP Developer's specification.
> 1:20 to ≤ 1:4	35 feet
> 1:4 to ≤ 1:3	20 feet
> 1:3 to ≤ 1:2	15 feet
> 1:2	10 feet

3 California Stormwater Quality Association (CASQA), Construction BMP Handbook (January 2015), <https://www.casqa.org/sites/default/files/casqa-handbook-construction/master_hanbook_file_2015_sec.pdf> [as of May 20, 2021] (CASQA Construction BMP Handbook)

4 Active areas of construction are areas undergoing land surface disturbance and associated site areas included in the SWPPP. This includes construction activity during the preliminary phase, mass grading phase, streets and utilities phase, and the vertical construction phase.

II.F.2. Risk Type 2 and 3 dischargers shall limit construction activity traffic to and from the project to entrances and exits that employ effective controls to prevent off-site tracking of sediment.

II.F.3. Risk Type 2 and 3 dischargers shall maintain and protect all storm drain inlets, perimeter controls, and BMPs at entrances and exits (e.g., tire wash off locations).

II.F.4. Risk Type 2 and 3 dischargers shall remove any excess sediment or other construction activity-related materials that are deposited on the impervious roads by vacuuming or sweeping prior to any precipitation event.

II.F.5. Risk Type 2 and 3 dischargers shall implement additional site-specific sediment controls upon written request by the Regional Water Boards when the implementation of the other requirements in this Section are determined to inadequately protect the site's receiving water(s).

II.G. Surface Water Buffer[5]

II.G.1. Linear project dischargers shall provide and maintain natural buffers and/or equivalent erosion and sediment controls when a water of the United States is located within 50 feet of the site's earth disturbances, unless infeasible.

II.G.2. Linear project dischargers shall comply with one of the following alternatives for any discharges to waters of the United States located within 50 feet of a site's earth disturbances:

a. Provide and maintain a 50-foot undisturbed natural buffer, from the edge of the disturbed area to the top of bank;

b. Provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by erosion and sediment controls that achieve, in combination, the sediment load reduction equivalent to a 50-foot undisturbed natural buffer. The equivalent sediment load may be calculated using the Revised Universal Soil Loss Equation, Volume 2 (RUSLE2) model or another method approved by the Regional Water Board; or

c. Implement erosion and sediment controls to achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer when it is infeasible to provide and maintain an undisturbed natural buffer of any size. The equivalent sediment load may be calculated using RUSLE2 or another method approved by the Regional Water Board.

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5 The surface water buffer requirements apply to work above the top-of-bank or high-water level of waters of the United States. Work within a channel or streambed (water body-dependent construction), Clean Water Act § 404 projects with § 401 certification, and projects where no natural surface buffer exists (e.g., concrete channelization) are exempt from the requirements. All types of in-channel work may be regulated under Section 401 (Clean Water Act - Regional Boards), Section 404 (Clean Water Act - Army Corps of Engineers), or Section 1602 (California Fish and Game Code).

II.H. Pesticide Application

Linear project dischargers shall only apply pesticides that have been authorized for use through California Department of Pesticide Regulation. The application of pesticides shall follow manufacturer's guidance.

II.I. Demolition of Existing Structure

Linear project dischargers shall prevent demolition materials from being exposed to precipitation. Demolition materials should be covered with an impermeable barrier such as, but not limited to, plastic sheeting prior to precipitation to prevent known contaminants from being mobilized. Dischargers unable to cover demolished material that were not previously investigated or found to be absent of applicable pollutants in reportable quantities shall sample for any non-visible pollutants that may be in stormwater discharges that may be present such as, but not limited to, asbestos, leaded paint, or poly chlorinated biphenyls (PCBs)[6].

II.J. Maintenance and Repair

II.J.1. Linear project dischargers shall begin maintaining, repairing, and/or implementing design changes (reviewing alternatives that have not been used yet) to BMPs within 72 hours of identification of failures or other short comings, and complete the changes as soon as possible, prior to the next forecasted precipitation event.

II.J.2. Linear project dischargers shall have a Qualified SWPPP Practitioner (QSP) verify all BMP maintenance and repairs were appropriately implemented during the next visual inspection following completion. The QSP may delegate BMP maintenance and repair verification to an appropriately trained delegate.

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III. MONITORING REQUIREMENTS

III.A. General Requirements

Linear project dischargers shall implement the Construction Site Monitoring Program in compliance with this Section at the time of the commencement of construction activity and shall continue implementation until the project is complete and the project site is stabilized as defined in Section III.H in the Order.

The monitoring requirements of this Section are issued pursuant to Water Code § 13383 and specify monitoring requirements for linear project dischargers subject to this Order.

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6 PCBs were used between January 1, 1950 and January 1, 1980 and should be considered to be potentially present in structures built during that timeframe. "Structure", in this instance, shall have been constructed with floor space (such as a building).

III.B. Monitoring Exceptions

III.B.1. Linear project dischargers shall conduct visual inspections and collect samples to meet the requirements of this Attachment. Dischargers are not required to physically conduct visual inspections or collect samples under the following conditions:

a. During dangerous weather conditions such as electrical storms, flooding, and high winds above 40 miles per hour;

b. Outside of scheduled site operating hours; or

c. When the linear project site is not accessible to personnel.

III.B.2. For linear project sites that are inactive, the discharger may reduce the visual inspection frequency and suspend sampling per Section III.G of the Order.

III.B.3. Linear project dischargers shall provide an explanation with supporting information for all missed visual inspections or sampling required by this Attachment, to be included in the Annual Report.

III.C. Visual Inspection Requirements

III.C.1. Linear project dischargers shall perform visual inspections, based on their Risk Type, in accordance with Table 2 below. The purpose of the visual inspections is to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. Except as specified in Section III.C.3 below, inspectors shall be the Qualified SWPPP Developer, Qualified SWPPP Practitioner, or be trained by the Qualified SWPPP Practitioner.

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Table 2 – Visual Inspection Schedule[7]

Linear Underground and Overhead Project Type	Weekly	Pre-Qualifying Precipitation Event	During Qualifying Precipitation Event	Post-Qualifying Precipitation Event
1	X	X	X	Not Applicable
2	X	X	X	X
3	X	X	X	X

III.C.2. Linear project dischargers shall conduct weekly visual inspections to ensure that BMPs are properly installed and maintained. A pre-, during, or post-qualifying precipitation event inspection satisfies the weekly visual inspection requirement.

7 This table is limited to routine weekly inspections and Qualifying Precipitation Event related inspections. Other visual inspections may be required under this Permit and are described in the applicable sections.

III.C.3. Linear project dischargers shall have a QSP conduct a pre-Qualifying Precipitation Event inspection within 72 hours prior to any weather pattern that is forecasted to have a 50 percent chance of 0.5 inches or more in a 24-hour period. Precipitation forecast information shall be obtained from the National Weather Service Forecast Office (e.g., by entering the zip code of the project location at https://www.weather.gov/) and shall be included as part of the inspection checklist weather information. If extended forecast precipitation data (greater than three days) is available from the National Weather Service, the pre-precipitation event inspection may be done up to 120 hours in advance. The pre-Qualifying Precipitation Event inspection shall include an inspection of the following:

a. All stormwater drainage areas to identify leaks, spills, or uncontrolled pollutant sources and when necessary, implement appropriate corrective actions to control pollutant sources;

b. All BMPs to identify whether they have been properly implemented in accordance with the SWPPP and when necessary, implement appropriate corrective actions to control pollutant sources; and

c. All stormwater storage and containment areas to detect leaks and check for available capacity to prevent overflow.

III.C.4. Dischargers shall conduct daily visual inspections at least once every 24-hour period during Qualifying Precipitation Events. Qualifying Precipitation Events are extended for each subsequent 24-hour period forecast to have at least 0.25 inches of precipitation.

III.C.5. Risk Type 2 and 3 dischargers* shall conduct post-Qualifying Precipitation Event visual inspections within 96 hours after each Qualifying Precipitation Event if 0.5 inches or more precipitation is measured during the duration of the Qualifying Precipitation Event using the onsite rain gauge. The 96-hour time frame may include the two consecutive 24-hour periods with less than 0.25 inches forecast, which mark the end of the precipitation event. The inspection is to:

a. Identify if BMPs were adequately designed, implemented, and effective;

b. Identify BMPs that require repair or replacement due to damage; and

c. Identify any additional BMPs that need to be implemented and revise the SWPPP accordingly.

III.C.6. Linear project dischargers shall conduct all visual inspections during scheduled site operating hours.

III.C.7. For each required inspection, Linear project dischargers shall develop and complete an inspection checklist that, at a minimum includes:

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* The July 22, 2022 draft Order was clear that this monitoring requirement applied to only Risk Type 2 and 3 dischargers. Change Sheet #2, which was circulated September 7, 2022, inadvertently did not reflect this limitation. The final Order has been corrected to reflect that this requirement applies only to Risk Type 2 and 3.

a. Inspection type (weekly, pre-precipitation, daily precipitation, or post-precipitation event);

b. Inspection date and time the inspection was conducted;

c. Weather information, including the presence or absence of precipitation, an estimate of the beginning of the Qualifying Precipitation Event, duration of the event, date of the Qualifying Precipitation Event, and the amount of precipitation in inches;

d. Site information, including stage of construction, activities completed since last inspection, and approximate area of the site exposed;

e. A description of any BMPs evaluated and any deficiencies noted, including those that may have resulted in the release of non-visible pollutants;

f. A list of the inspections of all BMPs inspected, including erosion controls, sediment controls, chemical and waste controls, and non-stormwater controls;

g. Report of the presence of any floating and suspended materials, odors, discolorations, visible sheens, and any sources of pollutants in discharges and contained stormwater;

h. Any corrective actions required, including any necessary changes to the SWPPP and the associated implementation dates;

i. Photographs of areas of concern and the QSP's description of the problem, if any; and

j. Inspector's name, title, and certification, if any.

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III.D. Water Quality Monitoring Requirements

Linear project dischargers shall collect samples of discharges, based on their Risk Type, in accordance with Table 3 and the requirements below, to monitor water quality and assess compliance with the requirements of this General Permit. Samplers shall be the Qualified SWPPP Developer, Qualified SWPPP Practitioner, or be trained by the Qualified SWPPP Practitioner.

Table 3 – Sample Collection Schedule

Linear Underground and Overhead Project Risk Type	Stormwater Discharge Sample Collection (when applicable)	Receiving Water Sample Collection (when applicable)	Non-Visible Sample Collection (when applicable)
1	**Not Applicable**	**Not Applicable**	**X**
2	**X**	**Not Applicable**	**X**
3	**X**	**X (Post-exceedance)**	**X**

III.D.1. Risk Type 2 and 3 Stormwater Discharge Monitoring Requirements

III.D.1.a. Risk Type 2 and 3 dischargers shall collect stormwater samples from sampling locations at one or more discharge locations representative of the project's construction activities, during discharge and within site operating hours. The samples shall be representative of the discharge flow and characteristics.

III.D.1.b. Risk Type 2 and 3 dischargers shall obtain one sample from each representative sample location per 24-hour period of each qualifying precipitation event, during active discharge.

III.D.1.c. Risk Type 2 and 3 dischargers shall collect samples of stored or contained stormwater during discharge from the impoundment, in accordance with Attachment J.

III.D.1.d. Risk Type 2 and 3 dischargers shall analyze all their effluent samples for:

i. pH and turbidity (refer to Order, Section IV.C.3.c and d); and

ii. Additional parameter required by the Regional Water Board Executive Officer.

III.D.1.e. Risk Type 2 and 3 dischargers may sample run-on from surrounding areas if there is reason to believe run-on may contribute to exceedance of numeric action levels and/or numeric effluent limits.

III.D.2. Risk Type 3 Receiving Water Monitoring Requirements

III.D.2.a. Risk Type 3 dischargers who discharge directly into receiving waters are required to monitor that receiving water if sampling results from the discharge monitoring location meets either of the following conditions:

i. pH value falls outside of the range of 6.0 and 9.0 pH units; or

ii. Turbidity exceeds 500 NTU.

III.D.2.b. Receiving water monitoring does not apply if run-on from a forest fire or any other natural disaster caused the stormwater results to fall outside the pH range or exceed the turbidity value.

III.D.2.c. Risk Type 3 dischargers required to conduct receiving water monitoring shall collect samples as follows:

i. Collect, at minimum, one upstream receiving water sample from an accessible and safe location that is:

1. Representative of the receiving water;

2. As close as possible to the discharge location; and

3. Upstream from the discharge location.

ii. Collect, at minimum, one downstream receiving water sample from an accessible and safe location that is:

1. Representative of the receiving water;

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2. As close as possible to the discharge location; and
3. Downstream from the discharge location.

III.D.2.d. Risk Type 3 dischargers shall analyze the samples for the parameter that triggered this monitoring (either pH or turbidity, or both).

III.D.2.e. Risk Type 3 dischargers shall collect the samples once every 24-hour period of the qualifying precipitation event.

III.D.2.f. Risk Type 3 dischargers shall specify the specific locations where samples were collected, date and time of sample collection, as well as constituents analyzed.

III.D.2.g. The Regional Water Board Executive Officer delegate may require, in writing, that the discharger continue to sample the receiving water for the parameter that required this monitoring (pH and/or turbidity) after the qualifying precipitation event ends.

III.D.3. Non-Visible Pollutant Monitoring Requirements

III.D.3.a. Linear project dischargers shall implement sampling and analysis requirements to monitor non-visible pollutants associated with:

i. Evidence of pollutant releases that are not visually detectable in stormwater discharges; and

ii. Releases of substances that may cause or contribute to an exceedance of water quality objectives in the receiving waters.

III.D.3.b. Linear project dischargers are required to conduct sampling and analysis for non-visible pollutants identified in the SWPPP or otherwise known to be on site, only when the pollutants may be discharged due to failure to implement BMPs, a container spill or leak, or a BMP breach, failure, or malfunction.

III.D.3.c. Linear project dischargers shall collect at least one sample, within 8 hours, from each discharge location hydraulically downgradient from the observed triggering event or condition.

III.D.3.d. Linear project dischargers shall continue to collect at least one sample per applicable discharge location for each 24-hour period that there is discharge, until the necessary corrective actions are completed to control further discharge of the pollutant.

III.D.3.e. Linear project dischargers are not required to sample if one of the conditions described in Section III.D.3.b above (e.g., breach or spill) occurs and, prior to discharge, the material containing the pollutant is fully remediated or removed; and BMPs to control the pollutant are implemented, maintained, or replaced as necessary.

III.D.3.f. Linear project dischargers shall analyze samples in the field or submit them to a laboratory as specified in Section III.F of this Attachment for all non-visible pollutant anticipated to be present in the discharge, including applicable TMDL-specific pollutants listed in Table H-2 in Attachment H.

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III.E. Sample Collection and Handling Instructions

III.E.1. Linear project dischargers shall:

a. Identify applicable parameters that require laboratory analysis to be tested for each stormwater discharge location (pH and turbidity are typically analyzed with field meters).

b. Request the laboratory provide the appropriate number of sample containers, types of containers, sample container labels, blank Chain of Custody forms, and sample preservation instructions.

c. Use the appropriate sample shipping method to the laboratory. The laboratory should receive samples within 48 hours of the physical sampling (unless otherwise required by the laboratory to meet all method hold times). The options are to either deliver the samples to the laboratory, arrange to have the laboratory pick them up, or ship them overnight to the laboratory.

d. Use only the sample containers provided/specified by the laboratory to collect and store samples. Use of any other type of containers could cause sample contamination.

e. Prevent sample contamination by not touching or putting anything into the sample containers before collecting stormwater samples.

f. Not overfill sample containers. Overfilling can change the analytical results.

g. Secure each sample container cap is tightly secured without stripping the cap threads.

h. Label each sample container. The label shall identify the date and time of sample collection, the person taking the sample, and the sample collection location or discharge point. The label should also identify any sample containers that have been preserved.

i. Carefully pack sample container into an ice chest or refrigerator to prevent breakage and maintain temperature during shipment; frozen ice packs or ice is placed into the shipping container to keep sample close to 4° C (39° F) until arriving at the laboratory (do not freeze samples).

j. Complete a Chain of Custody form with each set of samples. The Chain of Custody form shall include the discharger's name, address, and phone number, identification of each sample container and sample collection point, person collecting the samples, the date and time each sample container was filled, the analysis that is required for each sample container, and both the signatures of the persons relinquishing and receiving the sample containers.

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III.E.2. Personnel for Linear project dischargers shall be designated and trained for the collection, maintenance, and shipment of samples in accordance with the above sample protocols and laboratory-specific practices.

III.E.3. Linear project dischargers shall perform all sampling and preservation protocols in accordance with the 40 Code of Federal Regulations Part 136 and the current edition of "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association).[8]

III.E.4. Linear project dischargers may refer to Surface Water Ambient Monitoring Program's (SWAMP) Quality Assurance Program Plan (QAPrP) for more information on sampling collection and analysis.[9]

III.F. Analytical Methods Requirements

III.F.1. Linear project dischargers shall refer to Table 4 for applicable test methods, detection limits, and reporting units.

Table 4 - Test Methods, Method Detection Limits, and Reporting Units

Parameter	Test Method	Discharger Risk Type	Method Detection Limit	Reporting Units
pH	Field test with calibrated portable instrument using U.S. EPA approved procedures	Type 2 and 3	0.2	pH units
Turbidity	U.S. EPA 0180.1 and/or field test with calibrated portable instrument	Type 2 and 3	1	NTU
Non-Visible Pollutant Parameter(s)	U.S. EPA-approved test method for the specific pollutant parameter	All Types	Dependent on the test method	Dependent on the test method

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III.F.2. All monitoring instruments and equipment shall be calibrated and maintained in accordance with manufacturers' specifications to ensure accurate measurements. Additionally, records of calibration shall be retained for at least 3 years and made available upon request.

III.F.3. Risk Type 2 and 3 dischargers shall perform pH analysis on-site with a calibrated pH meter using a U.S. EPA acceptable test method.

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8 Unless other test procedures have been specified in this General Permit or by the Water Boards.

9 Additional information regarding SWAMP's QAPrP can be found at: <https://www.waterboards.ca.gov/water_issues/programs/swamp/quality_assurance.html#qaprp>. [as of October 20, 2020]

III.F.4. Risk Type 2 and 3 dischargers shall perform turbidity analysis using a calibrated turbidity meter (turbidimeter), either on-site or at a State Water Board Environmental Laboratory Accreditation Program (ELAP)-accredited laboratory. Acceptable test methods include Standard Method 2130 B or U.S. EPA Method 180.1.

III.F.5. All analyses of laboratory-analyzed parameters shall be sent to and conducted at a laboratory recognized by the State Water Board Environmental Laboratory Accreditation Program (ELAP), with the exception of field analysis conducted by the discharger for turbidity and pH.

III.F.6. Linear project dischargers shall assign a value of (0) for all non-visible pollutant analytical results less than the minimum level (reporting limit), as reported by the laboratory, used in calculations required by this Order (e.g., numeric action level and numeric effluent limitation exceedance determinations), so long as a sufficiently sensitive test method was used as evidenced by the reported method detection limit and minimum level.

III.G. Exceedance Response Requirements[10]

III.G.1. Linear project dischargers are subject to the applicable numeric action levels and/or numeric effluent limitations based on the Risk Type as shown in Table 5 below.

Table 5 - Numeric Action Levels and Numeric Effluent Limitations

Parameter	Risk Type	Numeric Action Level	Numeric Effluent Limitation
pH	Type 2 and 3	Lower = 6.5 Upper = 8.5	Not Applicable
Turbidity	Type 2 and 3	250 NTU	Not Applicable
TMDL-related Pollutant	Responsible Dischargers with a project of any Risk Type	Refer to Table H-2 in Attachment H	Refer to Table H-2 in Attachment H

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III.G.2. For pH and turbidity, the discharger shall use the field meter readings obtained from each discharge location per day of discharge to determine if there has been an exceedance of the numeric action levels.

III.G.3. When analytical results indicate that the discharge is below or above the numeric action levels for pH, exceeds the turbidity numeric action level, or exceeds an applicable TMDL-related numeric action level or numeric effluent

10 Terms including, but not limited to, numeric action level and exceedances are defined in Attachment B of this General Permit.

limitation, the discharger shall determine the source(s) of the pollutant and implement corrective actions to:

a. Meet Best Available Technology Economically Achievable and Best Conventional Pollutant Control Technology requirements in 40 Code of Federal Regulations §§ 450.21 through 450.23[11]; and

b. Reduce or prevent pollutants in stormwater and authorized non-stormwater discharges from causing further exceedances.

III.G.4. Linear project dischargers shall iterate corrective actions until the discharge is in compliance with the applicable numeric action level(s).

III.G.5. The source evaluation shall be kept with the SWPPP and specifically address what corrective actions were taken or will be taken and provide a schedule for their completion.

IV. LINEAR PROJECT REPORTING REQUIREMENTS

IV.A. Visual Inspections

Linear project dischargers shall keep all completed inspection checklists and related documentation with the SWPPP on-site or electronically.

IV.B. Water Quality Monitoring

IV.B.1. Risk Type 2 and 3 Stormwater Discharge Monitoring Reporting[12]

IV.B.1.a. Risk Type 2 and 3 dischargers shall electronically submit through SMARTS all field sampling results within 30 days of the completion of the precipitation event or within 10 days if the field sampling results demonstrate the exceedance of the pH and/or turbidity numeric action levels.

IV.B.1.b. Risk Type 2 and 3 dischargers that exceeded the pH and/or turbidity numeric action levels shall prepare a Numeric Action Level Exceedance Report when requested, in writing, from a Regional Water Board delegate and shall submit and certify each Numeric Action Level Exceedance Report through SMARTS within 30 days of receiving the written request, in accordance with Section IV of this General Permit's Order.

IV.B.1.c. The Numeric Action Level Exceedance Report shall include:

i. The analytical method(s), method reporting unit(s), and method detection limit(s) of each parameter;

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11 United States Environmental Protection Agency, Construction and Development Effluent Limitation Guidelines §§ 450.21 through 450.23, <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-N/part-450/subpart-B?toc=1> [as of June 28, 2022].

12 Terms including, but not limited to, numeric action level and exceedances are defined in Attachment B of this General Permit.

ii. The date, place, time of sampling, visual inspections, and/or measurements, including precipitation; and

iii. An assessment of the existing BMPs associated with the sample that exceeded the numeric action level, a description of each corrective action taken including photographs, and date of implementation.

IV.B.1.d. Risk Type 2 and 3 dischargers that prepared a Numeric Action Level Exceedance Report shall retain a copy of the report for a minimum of three years after the date the exceedance report is certified and submitted.

IV.B.2. Risk Type 3 Receiving Water Monitoring Reporting

IV.B.2.a. Risk Type 3 dischargers conducting receiving water monitoring shall electronically submit through SMARTS all receiving water samples within 10 days after completion of the precipitation event.

IV.B.3. Non-Visible Pollutant Monitoring Reporting[13]

IV.B.3.a. All Linear project dischargers that conducted non-visible pollutant monitoring shall electronically submit through SMARTS all field and/or analytical sampling results within 30 days after obtaining the analytical result or within 10 days if the analytical results demonstrate the exceedance of an applicable TMDL-related numeric action level or numeric effluent limitation or Basin Plan parameter.

IV.B.3.b. All Linear project dischargers that exceeded an applicable TMDL-related numeric action level shall prepare a Numeric Action Level Exceedance Report when requested, in writing, from a Regional Water Board delegate and shall submit and certify each Numeric Action Level Exceedance Report through SMARTS within 30 days of receiving the written request, in accordance with Section IV of this General Permit's Order.

IV.B.3.c. The Numeric Action Level Exceedance Report shall include:

i. The analytical method(s), method reporting unit(s), and method detection limit(s) for each parameter;

ii. The date, place, time of sampling, visual inspections, and/or measurements, including precipitation; and

iii. An assessment of the existing BMPs associated with the sample that exceeded the numeric action level, a description of each proposed corrective action taken, including photographs, and date of implementation.

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13 Terms including, but not limited to, numeric action level, numeric effluent limitations, and exceedances are defined in Attachment B of this General Permit.

IV.B.3.d. All Linear project dischargers that prepared a Numeric Action Level Exceedance Report shall retain a copy of the report for a minimum of three years after the date the exceedance report is certified and submitted.

IV.B.3.e. All Linear project dischargers that exceed an applicable TMDL-related numeric effluent limitation shall comply with the water quality-based corrective action requirements in Section VI.Q of the Order.

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ATTACHMENT E.1

LINEAR UNDERGROUND AND OVERHEAD PROJECT AREA OR SEGMENT AREA TYPE DETERMINATION

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED
WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES
(GENERAL PERMIT)

Part 1

1. Will ≥70 percent of the construction activity occur on paved surfaces or will <30 percent of the soil disturbance occur on unpaved surfaces?
   a. If Yes, proceed to question 2
   b. If No, proceed to question 3
2. Will areas disturbed be returned to pre-construction condition or equivalent condition at the end of each day?
   a. If Yes, this is a Project Type 1 Linear Underground and Overhead Project
   b. If No, proceed to Part 2 on page 2
3. Will the construction activity occur on unpaved improved roads, including shoulders or land immediately adjacent to the roads?
   a. If Yes, proceed to question 5
   b. If No, proceed to question 4
4. Will >30 percent of the construction activity occur within non-paved shoulders or land immediately adjacent to paved surfaces?
   a. If Yes, proceed to question 5
   b. If No, proceed to Part 2 on page 2
5. Will areas disturbed be returned to pre-construction conditions or equivalent conditions at the end of the day?
   a. If Yes, proceed to question 6
   b. If No, proceed to Part 2 on page 2
6. Will areas of established vegetation disturbed by the construction activity be stabilized and revegetated by the end of the project?
   a. If Yes, proceed to question 7
   b. If No, proceed to Part 2 on page 2

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7. When required, will adequate temporary stabilization BMPs be installed and maintained until vegetation is established to meet minimum vegetative cover requirements in this Order for stabilization?
   a. If Yes, this is a Project Type 1 Linear Underground and Overhead Project
   b. If No, proceed to Part 2 on page 2

Part 2

1. Calculate the Sediment Risk per Attachment D.1 or the Stormwater Multiple Application and Report Tracking System (SMARTS).

   Project Sediment Risk =

   LOW: <15 tons per acre; or

   MEDIUM: ≥15 and <75 tons per acre; or

   HIGH: ≥75 tons per acre

2. Is the project area or project segment area located within a Sediment Sensitive Watershed (refer to Attachment D.1 or SMARTS)?
   a. If Yes, proceed to question 3*
   b. If No, Receiving Water Risk is LOW
3. Is the project area or segment located within the flood plain or a flood prone area (riparian zone) of a Sensitive Receiving Water Body?
   a. If Yes, Receiving Water Risk is HIGH
   b. If No, Receiving Water Risk is MEDIUM

Use the combined risk matrix below to determine the site-specific type for the linear underground and overhead project.

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* The July 22, 2022 draft Order stated "If Yes, proceed to question 10." This error has been corrected in the final Order to "If Yes, proceed to question 3."

		Sediment Risk		
		LOW	MEDIUM	HIGH
Receiving Water Risk	LOW	Type 1	Type 1	Type 2
	MEDIUM	Type 1	Type 2	Type 3
	HIGH	Type 2	Type 3	Type 3

Definition of Terms

Equivalent Condition – Equivalent condition means disturbed soils such as soils from trench excavation required to be hauled away, backfilled into the trench, and/or covered (e.g., metal plates, pavement, plastic covers over spoil piles) at the end of each construction day.

Sediment Sensitive Receiving Water Body – A sediment sensitive receiving water body is defined as a water body segment that is:

- Listed as impaired on California's 2020-2022 Clean Water Act 303(d) List of Impaired Waters for sedimentation, siltation and/or turbidity; (https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2020_2022_integrated_report.html)

  OR

- Designated with beneficial uses of COLD, SPAWN, and MIGRATORY.

Sediment Sensitive Watershed – A sediment sensitive watershed is defined as a watershed draining into a receiving water body (or receiving water body reach):

- Listed as impaired on California's 2020-2022 Clean Water Act 303(d) List of Impaired Waters for sedimentation, siltation, and/or turbidity; (https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2020_2022_integrated_report.html)>

  OR

- Designated with beneficial uses of COLD, SPAWN, and MIGRATORY.

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ATTACHMENT E.2

PERMIT REGISTRATION DOCUMENT REQUIREMENTS FOR LINEAR UNDERGROUND AND OVERHEAD PROJECTS

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED
WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES
(GENERAL PERMIT)

I. PERMIT REGISTRATION DOCUMENT REQUIREMENTS

All linear underground and overhead projects shall comply with the Permit Registration Document requirements in this Attachment and Attachments E and E.1 of this General Permit.

I.A. General Permit Registration Document Requirements

I.A.1. A discharger with construction activities associated with linear projects shall designate a Legally Responsible Person to electronically certify and submit Permit Registration Documents to apply for regulatory coverage under this General Permit through the Stormwater Multiple Application and Report Tracking System (SMARTS) in accordance with Attachment E and E.1 of this General Permit.

I.A.2. Linear Projects Associated with Private or Public Construction Projects

I.A.2.a. A discharger with a linear project with total disturbed land area from construction activities greater than one acre (see Section II.G below) shall obtain coverage under this General Permit.[1]

I.A.2.b. A discharger with linear project construction activities associated with new development and re-development construction projects shall obtain coverage under this General Permit for a linear project where the total disturbed land area of the linear project is greater than 1 acre.

I.A.3. Linear projects not associated with private or municipal pre-development, new development or re-development projects must obtain coverage under this General Permit for its linear project construction activities where the total disturbed land area is greater than one acre.

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1 Obtaining coverage means certifying and submitting complete Permit Registration Documents in SMARTS for the Linear Underground and Overhead Project. Dischargers or LRPs shall have a signed original Electronic Authorization Form on file with the State Water Board for each organization in SMARTS.

I.B. Linear Project Land Disturbance Area Calculations

I.B.1. The total land area disturbed for linear projects is the sum of the:

a. Surface areas of trenches, laterals, and ancillary facilities; plus

b. Area of the base of stockpiles on unpaved surfaces; plus

c. Surface area of the borrow area; plus

d. Areas of paved surfaces to be constructed for the project; plus

e. Areas of new roads constructed or areas of major reconstruction to existing roads (e.g., improvements to two-track surfaces or road widening) for the sole purpose of accessing construction activities or as part of the final project; plus

f. Equipment and material storage, staging, and preparation areas (laydown areas) not on paved surfaces; plus

g. Construction activities areas outside the surface area of trenches, laterals, and ancillary facilities that will be graded and/or disturbed by the use of construction equipment, vehicles, and machinery during construction activities.

I.B.2. Stockpiling Areas

I.B.2.a. Stockpiling areas, borrow areas, and the removal of soils from a linear project shall be included when calculating the area of disturbed soil for a site when:

i. The area of the base of stockpiled soil on-site or immediately adjacent to a linear project and the stockpile is not on a paved surface.

ii. The surface borrow areas that are on-site or immediately adjacent to a linear project.

iii. The area of the base of stockpiled soil that is hauled off-site to a location owned or operated by the discharger that is not a paved surface, except when the off-site location is already subject to a separate NPDES permit covering potential discharges to a waters of the United States.

iv. The surface area of the borrow pit for soil that is brought to the project from an off-site location owned or operated by the discharger except when the off-site location is already subject to a separate stormwater permit or greater than one fourth mile from the linear project.

I.B.2.b. Trench spoils on a paved surface that are either returned to the trench or excavation or hauled away from the project daily for disposal or reuse, will not be included in the disturbed area calculation.

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I.C. Fees

I.C.1. A discharger must submit the appropriate fee with its completed Notice of Intent application package. Fees are established through regulations adopted by the State Water Board every year.[2] Fees are subject to change by regulation.

I.C.2. Where the fee is calculated based upon the total acreage of land disturbed (opposed to the total acreage of land owned), total acreage includes all areas anticipated to be disturbed throughout the duration of the project (e.g., 10 acres is scheduled to be disturbed the first year and 10 acres for four subsequent; the fees would be based upon 50 acres of total disturbance).

I.C.3. Dischargers that apply for and satisfy the Small Construction Rainfall Erosivity Wavier requirements shall pay the applicable fee.

I.D. Permit Registration Documents Submittal Prior to Commencement of Construction

I.D.1. Linear project dischargers proposing to conduct construction activities subject to this General Permit shall certify and submit Permit Registration Documents prior to the commencement of construction activity. Construction activity cannot commence until a Waste Discharge Identification (WDID) number is issued.

I.D.2. A linear project discharger with coverage under a Programmatic Notice of Intent shall certify and submit a Linear Construction Activity Notification for each non-contiguous linear project site prior to the start of construction.

I.D.3. In all cases, except public emergencies (e.g., wildfire, flood), Permit Registration Documents must be completed and WDID number issued before construction can commence (refer to Section III.A.3 of the Order of this General Permit).

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I.E. Submittal of Complete Permit Registration Documents

All dischargers required to comply with this General Permit shall electronically certify and submit the required Permit Registration Documents, through the Stormwater Multiple Application and Report Tracking System (SMARTS). The discharger shall assure that all information in its Permit Registration Documents complies with the Homeland Security Act and other federal law addressing security in the United States.

The discharger shall submit completed Permit Registration Documents to obtain coverage under this General Permit. If any of the required items are incomplete or missing, the Permit Registration Documents submittal will be rejected.

The State Water Board will process the application package in the order received and assign a WDID number upon receipt of a complete Permit Registration Documents submittal. Permit coverage begins once a WDID number is assigned.

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2 California Code of Regulations (CCR), Title 23, Division 3, Chapter 9. Waste Discharge Reports and Requirements, Article 1. Fees.

II. STANDARD PERMIT REGISTRATION DOCUMENTS FOR ALL LINEAR PROJECT DISCHARGERS

II.A. Notice of Intent

II.A.1. A Notice of Intent is a project-specific application to obtain regulatory coverage for discharges of stormwater and authorized non-stormwater from construction activities to waters of the United States. The application includes the entry of site information, contact information, and Permit Registration Document-specific information requirements.

II.A.2. Per Order, Section III.B.4, a Programmatic Notice of Intent covers all sites, of similar scope, within a Regional Water Board boundary or statewide under a single common SWPPP. A regional programmatic Notice of Intent shall include the common SWPPP and contact information. A statewide programmatic Notice of Intent shall include the common SWPPP, contact information, the estimated total disturbed site acreage for the duration of the project, and an identification of the element of Executive Order N-73-20 directing the project. Disturbed acreage for linear project activities regulated under a separate Notice of Intent is excluded from the statewide programmatic permitting disturbed area.

For regional and statewide programmatic permit coverage, each specific site is required to submit a Linear Construction Activity Notification which shall describe site-specific information including:

a. Site name and/or reference number;

b. Site location;

c. Site-specific SWPPP map detailing pollutant sources and implemented BMPs;

d. Total disturbed site acreage;

e. Estimated start and end date;

f. Risk type determination and supporting documentation; and

g. Site contact information (name, phone number, address).

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II.B. Risk Type Determination

All linear project dischargers are required to conduct a Risk Type Determination, where the site's overall risk is separated into sediment risk and receiving water risk. The discharger must utilize either the Water Board's standard risk determination (provided in SMARTS), a site-specific risk determination, or a combination of the two as described in Attachment E.1 of this General Permit.

II.B.1. The standard risk determination (Geographic Information Systems (GIS) Map Method) includes utilizing the following:

a. U.S. EPA Rainfall Erosivity (R) Factor Calculator website;

b. Sediment Risk Map tool; and

c. High-Risk Receiving Watershed Map tool.

II.B.2. The site-specific risk determination (Individual Method) includes utilizing the following:

a. U.S. EPA Rainfall Erosivity (R) Factor Calculator website;

b. Manually calculated soil erodibility (K) and length-slope (LS) factors;

c. 303(d) list of water bodies impaired for sediment; and

d. List of beneficial uses for the receiving water, found in Regional Water Quality Control Board Basin Plans.

II.B.3. Sites that discharge to an unlisted receiving water that is tributary to a sediment-sensitive waterbody, within the Hydrologic Unit Code 10 (HUC 10) watershed scale, are considered high receiving water risk sites.

II.B.4. The discharger may use a combination of the standard and site-specific risk determination methods to calculate the soil erodibility (K), length-slope (LS), sediment risk, and receiving water risk.

II.B.5. The discharger shall calculate the site's sediment risk and receiving water risk during all phases of construction activity (e.g., demolition and pre-development site preparation, grading and land development, streets and utilities, vertical construction, final landscaping, and site stabilization).

II.B.6. SMARTS will assign the higher Risk Type to the entire site for any site spanning two or more planning watersheds.

II.B.7. Sites, parcels, or individual lots that are part of a larger plan of development shall include the larger plan of development in Risk Type determination. The discharger shall include this determination in the Permit Registration Documents submittal.

II.B.8. Dischargers may request that the Regional Water Board revise the site-specific Risk Type determination values in SMARTS by providing the following information to the Regional Water Board:

a. A site-specific soils test (ASTM D-422)[3,4] certified by a California licensed professional engineer or geologist to determine the K factor used in the revised Risk Level determination. The soil testing must include the soil classification method used (e.g., Unified Soil Classification System);

b. A site-specific survey of the elevation change to determine the LS factor used in the revised Risk Type determination certified by a professional licensed by

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3 ASTM D-422 is the standard test method used for the quantitative determination of the distribution of particle sizes in soils.

4 Environmental Protection Agency, American Society for Testing and Materials (ASTM) Standards, <https://www.epa.gov/sites/default/files/2020-01/documents/sedc_2004-2005_append.pdf> [as of July 2022]

the California Board of Professional Engineers, Land Surveyors and Geologists for this work; and

c. A revised Risk Type determination manually calculated in accordance with Attachment E.1 of this General Permit.

II.C. Site Specific Stormwater Pollution Prevention Plan, Drawings, and Map

The SWPPP (including site-specific drawings and map) is a linear project-specific document developed for implementation of this General Permit. The SWPPP shall be developed by a Qualified SWPPP Developer and certified and submitted by each discharger with the other Permit Registration Documents.

II.D. Additional Permit Registration Document Requirements Related to Specific Projects

II.D.1. Dischargers who are proposing to implement active treatment systems shall also certify and submit in SMARTS:

a. A complete Active Treatment System Plan in accordance with Attachment F at least 14 days prior to the planned operation of the active treatment system, and a copy shall be available on-site during active treatment system operation;

b. The system design and supporting documentation; and

c. Proof that the system and/or Active Treatment System Plan was designed by a qualified active treatment system professional in accordance with Attachment F.

II.D.2. Dischargers who are proposing to implement passive treatment shall certify and submit in SMARTS:

a. A complete Passive Treatment Plan in accordance with Attachment G at least 14 days prior to the planned operation of the passive treatment system, and a copy shall be available on-site during operation;

b. The system design and any supporting documentation; and

c. Proof that the Passive Treatment Plan and/or system was designed by an appropriate licensed professional (see Attachment G).

II.D.3. Dischargers who are proposing an alternate Risk Justification shall include:

a. Soil type identification through laboratory analysis, certified by a CBPELSG[5] license holder; and

b. Site slope determination topographic survey certified by a CBPELSG license holder.

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5 California Board of Professional Engineers, Land Surveyors, and Geologists

II.D.4. Dischargers with linear projects applying for programmatic permitting shall use SMARTS to apply, manage, submit, and certify Permit Registration Documents.

II.E. Certification of Submitted Documents

The Legally Responsible Person (LRP) shall certify and submit all Permit Registration Documents required by this General Permit through SMARTS. The discharger's LRP shall have a signed original Electronic Authorization Form on file with the State Water Board for each organization in SMARTS.

II.F. Exceptions to Standard Permit Registration Document Requirements

Dischargers with a valid Small Construction Rainfall Erosivity Waiver for a linear project are not required to submit a SWPPP (including site-specific drawings and map).

II.G. Projects and Activities Not Subject to Coverage Under This General Permit

II.G.1. Coverage under this General Permit is not required where stormwater discharges from the same linear project construction activities are covered by another NPDES permit. Other discharges from construction activities that are covered under this General Permit can be found in the General Permit Order Section II if not specified below.

II.G.2. Linear project construction activity does not include routine maintenance projects to maintain the original line and grade, hydraulic capacity, or original purpose of the facility. Routine maintenance projects are projects associated with operations and maintenance activities that are conducted on existing lines and facilities and within existing right-of-way, easements, franchise agreements or other legally binding agreements of the discharger. Routine maintenance projects include, but are not limited to projects that are conducted to:

a. Maintain the original purpose of the facility, or hydraulic capacity.

b. Update existing lines[6] and facilities to comply with applicable codes, standards, and regulations regardless of if such projects result in increased capacity.

c. Repairing leaks.

II.G.3. Routine maintenance does not include:

a. Construction of new lines[7] or facilities resulting from compliance with applicable codes, standards, and regulations.

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6 Update existing lines includes replacing existing lines with new materials or pipes.

7 New lines are those that are not associated with existing facilities and are not part of a project to update or replace existing lines.

b. Areas of maintenance projects that are outside of an existing right-of-way, franchise, easements, or agreements, or those temporary facilities (e.g., laydown or staging yards) located outside the existing right of way that directly support conductance of maintenance activity. When a linear project acquires new areas, those areas are subject to this General Permit based on the area of construction activity, material storage, vehicle staging, etc., outside the original right of way.

c. Temporary facilities (e.g., laydown or staging yards) that are shared between maintenance (i.e., inside the existing right of way) and areas on a maintenance project (i.e., outside the existing right of way) are subject to this General Permit when the new area (staging/maintenance yard and linear project) has one or more acres of construction activity.

II.G.4. Linear project construction activity does not include field activities associated with the planning and design of a project (e.g., activities associated with route selection).

II.G.5. Tie-ins conducted immediately adjacent to “energized” or “pressurized” facilities by the discharger are not considered small construction activities where all other linear project construction activities associated with the tie-in are covered by a Notice of Intent and SWPPP of a third party or municipal agency.

II.G.6. Miscellaneous connections to the linear projects that are conducted after all other soil disturbing activities are completed, and the total construction activity remains less than one acre.

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II.H. Assistance

Dischargers and discharger representatives may email the State Water Board, Stormwater Help Desk, at stormwater@waterboards.ca.gov, for assistance with Permit Registration Documents.

ATTACHMENT F

ACTIVE TREATMENT SYSTEM REQUIREMENTS

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORMWATER DISCHARGES
ASSOCIATED WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES
(GENERAL PERMIT)

A. GENERAL ACTIVE TREATMENT SYSTEM REQUIREMENTS

A.1. The discharger choosing to implement an active treatment system on its site shall comply with all the requirements in this Attachment.

A.2. Active treatments systems are treatment technologies that employ chemical coagulation, chemical flocculation, or electrocoagulation to reduce turbidity caused by fine suspended sediment, and/or to control pH levels. An active treatment system relies on enclosed computerized systems with pumps, filters, and real-time controls.

A.3. The discharger shall assign a lead person (or project manager) who has either a minimum of five years construction stormwater experience or who is a licensed contractor specifically holding a California Class A Contractors license[1] to oversee the operation of the active treatment system.

A.4. An active treatment system may be bypassed if the discharger has met the following conditions:

a. The discharger demonstrates all discharges from the watershed area that the active treatment system was designed to treat are in compliance with the numeric action levels, numeric effluent limitations, and receiving water limitations established by this General Permit through the applicable monitoring requirements in Attachments D or E; and

b. If dewatering is occurring as part of the bypass, the discharger shall comply with the dewatering requirements in Attachment J.

A.5. The discharger shall comply with applicable local pre-treatment requirements per the local sanitation agency if the active treatment system effluent is locally authorized to be discharge into a sanitary sewer system. The discharger shall include proof of authorization and specific criteria required by the local sanitation agency in its Active Treatment System Plan.

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1 Business and Professions Code Division 3, Chapter 9, Article 4, Class A Contractor: A general engineering contractor is a contractor whose principal contracting business is in connection with fixed works requiring specialized engineering knowledge and skill. Web. <http://www.cslb.ca.gov/About_Us/Library/Licensing_Classifications/A_-_General_Engineering_Contractor.aspx>. [as of May 20, 2021].

B. DESIGN CRITERIA AND SPECIFICATIONS

B.1. Design Criteria

B.1.a. The active treatment system shall be designed to capture and treat (within a 72-hour period) a volume equivalent to the runoff from a 10-year, 24-hour storm event using a watershed coefficient of 1.0.

B.1.b. The watershed runoff coefficient used to size the active treatment system shall be 1.0.

B.1.c. All discharges from the active treatment system must comply with numeric effluent limitations as specified in Section D.4 below.

B.1.d. Runoff in excess of the design storm used to size the active treatment system shall not be routed through the active treatment system and must meet the bypass requirements in Section A.4, above.

B.1.e. The discharger shall design the active treatment system to preclude the discharge of treatment chemicals or settled floc[2] from the system.

B.1.f. The discharger shall design outlets to dissipate energy from concentrated flows.

B.1.g. The discharger shall design the bypass conveyance to dissipate energy from concentrated flows.

B.2. Treatment Chemicals for Coagulation and Flocculation

B.2.a. The discharger shall select, for use within the active treatment system, treatment chemical(s) capable of complying with the technology-based numeric effluent limitations by using one of the following methods:

i. The discharger shall conduct, at minimum, six site-specific jar tests (per treatment chemical with one test serving as a control) for each site to determine the proper treatment chemical and dosage levels for their active treatment system. The discharger shall conduct the jar tests using water samples that represent typical site conditions and in accordance with the current version of ASTM D2035.[3]

ii. Single field jar tests may also be conducted during a project if conditions warrant; an example includes, if construction activities disturb changing types of soils, which consequently cause change in stormwater and runoff characteristics.

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2 Floc is defined as a clump of solids formed by a chemical action.

3 ASTM D2035 is the standard test practice used for coagulation-flocculation jar testing of water, which assists in the evaluation of a treatment to reduce dissolved, suspended, colloidal, and nonsettleable matter in water via chemical coagulation-flocculation.

B.3. Filtration

B.3.a. The active treatment system shall include a filtration step between the coagulant treatment train and the effluent discharge. This is commonly provided by sand, bag, or cartridge filters.

B.3.b. The discharger shall remove, dispose of, or recirculate (to the beginning of the treatment process) all backwash water.

B.4. Instrumentation

B.4.a. The active treatment system shall be equipped with instrumentation that automatically measures and records effluent water quality data and flow rate.

B.4.b. The minimum data recorded shall be consistent with the monitoring and reporting requirements below, and shall include:

i. Influent turbidity;

ii. Effluent turbidity;

iii. Influent pH;

iv. Effluent pH;

v. Residual chemical;

vi. Effluent flow rate;

vii. Effluent flow volume;

viii. Total volume; and

ix. Freeboard on storage.

B.4.c. Systems shall be equipped with a data recording system, such as data loggers or webserver-based systems, which records each measurement on a frequency no longer than once every 15 minutes.

B.4.d. Cumulative flow volume shall be recorded daily. The data recording system shall have the capacity to record a minimum of seven days continuous data.

B.4.e. Instrumentation systems shall be interfaced with system control to provide auto shutoff or recirculation in the event that effluent measurements exceed turbidity or pH numeric action levels or numeric effluent limitations.

B.4.f. The system shall also assure that upon system upset, power failure, or other catastrophic event, the active treatment system will default to a recirculation mode or safe shut down.

B.4.g. Instrumentation (flow meters, probes, valves, streaming current detectors, controlling computers, etc.) shall be installed and maintained per manufacturer's recommendations, which shall be included in the discharger's Quality Assurance/Quality Control plan.

B.4.h. The Quality Assurance/Quality Control plan shall specify calibration procedures and frequencies, instrument method detection limit or sensitivity verification, laboratory duplicate procedures, and other pertinent procedures.

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B.4.i. The instrumentation system shall include a method for controlling coagulant or flocculant dose, to prevent potential overdosing. Available technologies include flow/turbidity proportional metering, periodic jar testing and metering pump adjustment, and ionic charge measurement controlling the metering pump.

C. ACTIVE TREATMENT SYSTEM MAINTENANCE REQUIREMENTS

C.1. Operation and Maintenance

C.1.a. The discharger shall operate and maintain the active treatment system in accordance with the site-specific Operation and Maintenance Manual.

C.1.b. The Operation and Maintenance Manual shall only be used in conjunction with appropriate site-specific design specifications that describe the system configuration and operating parameters.

C.2. Residuals Management

C.2.a. Sediment shall be removed from the storage or treatment cells as necessary to ensure that the cells maintain their required water storage, sediment storage, and settling zone capacity.

C.2.b. Handling and disposal of all solids generated during active treatment system operations shall be done in accordance with all local, state, and federal laws and regulations.

D. ACTIVE TREATMENT SYSTEM MONITORING REQUIREMENTS

D.1. Visual Observations

D.1.a. The discharger shall visually observe the active treatment system for proper performance during each day of operation, including but not limited to:

i. All instrumentation; and

ii. Filter loading to confirm that the final filter stage is functioning properly.

D.1.b. The discharger shall visually observe the active treatment system through either of the following two options:

i. A designated responsible person who is on-site at all times during treatment operations to visually observe all portions of the active treatment system.

OR

ii. An operator continuously monitoring the active treatment system off-site. The active treatment system must be able to conduct a safe shut down autonomously when the operator connection is lost and/or the system is discharging above levels specified by this Attachment. The active treatment system shall have redundant monitoring of dosing amounts, influent, and effluent pollutant monitoring. The system shall be able to perform self-diagnostics for safe system shut down when one or more sensors is not performing as desired. All data relevant to system operation shall be collected, monitored, and recorded.

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D.2. Water Quality Monitoring

D.2.a. The discharger shall continuously monitor and record flow at not greater than 15-minute intervals for total volume treated and discharged.

D.2.b. The discharger shall continuously monitor and record influent and effluent pH at 15-minute intervals if not more frequently.

D.2.c. The discharger shall continuously monitor and record influent and effluent turbidity (expressed in NTU) at 15-minute intervals if not more frequently.

D.2.d. The discharger shall monitor and record the type and amount of chemical(s) used for pH adjustment, if any.

D.2.e. The discharger shall monitor and record the dose rate of chemical used in the active treatment system (expressed in mg/L) 15-minutes after startup and every eight hours of operation.

D.2.f. The discharger shall monitor the effluent for residual all chemical(s) and/or additive levels, performing monthly laboratory duplicates for residual coagulant analysis.

D.3. Residual Chemical and Toxicity Monitoring

D.3.a. The discharger shall utilize a residual chemical test method that has a method detection limit of 10 percent or less than the maximum allowable threshold concentration[4] for the specific coagulant in use and for the most sensitive species to the chemical used.

D.3.b. The discharger shall utilize a residual chemical test method that produces a result within one hour of sampling.

D.3.c. The discharger shall have a State Water Board Environmental Laboratory Accreditation Program (ELAP) accredited laboratory validate the selected residual chemical test is appropriate for the coagulant or flocculant used. Specifically, the laboratory will review the test protocol, test parameters, and the detection limit of the coagulant or flocculant. The discharger shall electronically certify and submit this documentation as part of the Active Treatment System Plan through SMARTS.

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4 The Maximum Allowable Threshold Concentration (MATC) is the allowable concentration of residual, or dissolved, coagulant/flocculant in effluent. The MATC shall be coagulant/flocculant-specific, and based on toxicity testing conducted by an independent, third-party laboratory. A typical MATC would be:

The MATC is equal to the geometric mean of the No Observed Effect Concentration and Lowest Observed Effect Concentration Acute and Chronic toxicity results for most sensitive species determined for the specific coagulant. The most sensitive species test shall be used to determine the MATC.

D.3.d. The discharger shall operate the active treatment system in batch treatment mode if the discharger cannot utilize a residual chemical test method that meets the requirements above, Section D.3.a through D.3.c.

D.3.e. The discharger shall not cause adverse physical impacts on receiving waters through the use of active treatment system batch storage and treatment, including but not limited to, inadequate storage volume, sudden released of the batches, and improperly designed discharge points.

D.3.f. The discharger operating in batch treatment mode shall perform toxicity testing in accordance with the following:

i. The discharger shall initiate acute toxicity testing on effluent samples representing effluent from each batch prior to discharge.[5] All bioassays shall be sent to a laboratory accredited by the State Water Board Environmental Laboratory Accreditation Program.[6]

ii. Acute toxicity tests shall be conducted with the following species and protocols. The methods to be used in the acute toxicity testing shall be those outlined for a 96-hour acute test in "Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms, U.S. EPA-821-R-02-012" for Fathead minnow, *Pimephales promelas or* Rainbow trout, *Oncorhynchus mykiss* may be used as a substitute for Fathead minnow.

iii. All toxicity tests shall meet quality assurance criteria and test acceptability criteria in the most recent versions of the U.S. EPA test method for whole effluent toxicity testing.[7]

iv. All toxicity tests and analysis shall be consistent with statewide requirements for acute and chronic toxicity, including implementation requirements. See Toxicity Provisions.

D.4. Active Treatment System Numeric Effluent Limitation Requirements

D.4.a. Effluent at the point of discharge from the active treatment system shall comply with the technology-based numeric effluent limitations established for active treatment system.

D.4.b. Numeric effluent limitations for discharges from an active treatment system are listed below and in Table 1:

i. pH of all active treatment system discharges shall be within the range of 6.0 to 9.0.

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5 This requirement only requires that the test be initiated prior to discharge.

6 Addition information can be found on the ELAP webpage. <https://www.waterboards.ca.gov/drinking_water/certlic/labs/>

7 U.S. EPA. Whole Effluent Toxicity (WET). Web. <https://www.epa.gov/npdes/whole-effluent-toxicity-wet>. [as of May 20, 2021].

ii. Turbidity of all active treatment system discharges shall be less than 10 NTU for daily flow-weighted average of all samples and 20 NTU for any single sample.

iii. Residual Chemical shall be < 10 percent of Maximum Allowable Threshold Concentration[8] for the most sensitive species to the chemical used.

Table 1 – Numeric Effluent Limitations, Test Methods, Method Detection Limits, and Reporting Units for Active Treatment System Discharges

Parameter	Test Method	Method Detection Limit	Reporting Units	Numeric Effluent Limitation
pH	Field test with calibrated portable instrument	0.2	pH Units	Lower = 6.0 Upper = 9.0
Turbidity	EPA 0180.1 and/or field test with a calibrated portable instrument	1	NTU[9]	10 NTU for Daily Flow-Weighted Average & 20 NTU for Any Single Sample
Residual Chemicals	U.S. EPA-approved test method for the specific pollutant parameter	Less than 10 percent of MATC for most sensitive species to the chemical used	Dependent on the test method	Less than 10 percent of MATC for most sensitive species to the chemical used

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D.4.c. If an analytical effluent sampling result is outside the range of pH numeric effluent limitations (i.e., is below the lower numeric effluent limitation for pH or exceeds the upper numeric effluent limitation for pH), exceeds the turbidity numeric effluent limitation, or exceeds the residual chemical numeric effluent limitation, the discharger shall cease discharge from the active treatment system and comply with the reporting requirements in Section E.3 of this Attachment.

8 The Maximum Allowable Threshold Concentration (MATC) is the allowable concentration of residual, or dissolved, coagulant/flocculant in effluent. The MATC shall be coagulant/flocculant-specific, and based on toxicity testing conducted by an independent, third-party laboratory. The MATC is equal to the geometric mean of the NOEC (No Observed Effect Concentration) and LOEC (Lowest Observed Effect Concentration) Acute and Chronic toxicity results for most sensitive species determined for the specific coagulant. The most sensitive species test shall be used to determine the MATC.

9 Nephelometric Turbidity Unit

D.4.d. Discharges from active treatment system shall comply with applicable numeric effluent limitations (above) unless the precipitation event causing the discharge is determined, after the fact, to be equal to or larger than the compliance precipitation event (expressed in inches of rainfall). The compliance precipitation event for active treatment system discharges is the 10-year, 24-hour storm, as determined using the National Weather Service's Hydrometeorological Design Studies Center Precipitation Frequency Data Server[10] or equivalent.

D.4.e. The discharger may resume operation of the active treatment system if corrective actions were implemented to prevent future exceedances of the numeric effluent limitations.

E. ACTIVE TREATMENT SYSTEM REPORTING REQUIREMENTS

E.1. Active Treatment System Plan

E.1.a. The discharger shall prepare an Active Treatment System Plan that combines the site-specific data and treatment system information required to safely and efficiently operate an active treatment system.

E.1.b. The Active Treatment System Plan shall be electronically certified and submitted through SMARTS as an attachment to the SWPPP, at least 14 days prior to the planned operation of the active treatment system, and a copy shall be available on-site during active treatment system operation.

E.1.c. At a minimum, the Active Treatment System Plan shall include:

i. Contact information of all personnel responsible for monitoring and maintaining the active treatment system;

ii. A map depicting the watershed area treated by the active treatment system, shown in acres;

iii. Specifications of any storage ponds, tanks, or other stormwater containment associated with the active treatment system;

iv. The treatment capacity of the active treatment system, defined as the number of hours needed to treat the captured volume from a given design storm (e.g., 5-year, 24-hour) using a watershed runoff coefficient of 1.0;

v. An Active Treatment System Operation and Maintenance Manual for all equipment that at minimum:

1. Covers the procedures required to install, operate, and maintain the active treatment system;[11]

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10 NOAA's National Weather Service. Web. https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html [as of May 20, 2022].

11 The operation and maintenance manual is typically in a modular format addressing generalized operating and maintenance procedures for each system-specific component.

2. Includes information for specific pumps, generators, control systems, and other equipment used to operate the active treatment system; and
3. Includes a failure plan that gives procedural details on when (failure indicators) and how to shut the system down (procedure), and who at the Regional Water Board to contact.

vi. A monitoring and sampling plan, including quality assurance and quality control documentation that at minimum specifies:

1. Calibration methods and frequencies for all system and field measurement instruments;
2. The methods for determining method detection limits for each residual coagulant measurement method;
3. Acceptable minimum method detection limits for each method, specific to individual coagulants; and
4. Specific procedures for monthly laboratory duplicates for residual coagulant analysis.

vii. An Active Treatment System Health and Safety Plan; and

viii. An Active Treatment System Spill Prevention and Response Plan.

E.2. Visual Observations

E.2.a. The discharger shall keep all completed inspections checklists and related documentation with the SWPPP on-site or electronically.

E.3. Water Quality Monitoring

E.3.a. At a minimum, every 30 days the Legally Responsible Person representing the discharger shall electronically certify and submit active treatment system field data through SMARTS.

E.3.b. The discharger shall report any indications of toxicity or other violations of water quality objectives to the appropriate regulatory agency as required by this General Permit.

E.3.c. The system operator shall immediately report any measurements exceeding water quality standards to the discharger, who shall notify the Regional Water Board.

E.3.d. Dischargers in violation of any of the active treatment system numeric effluent limitations shall electronically certify and submit through SMARTS the analytical results within 24-hours of obtaining the results.

E.3.e. The discharger shall electronically certify and submit a Numeric Effluent Limitation Violation Report in SMARTS with 14 days after the numeric effluent limitation exceedance has been identified for any monitoring data exceeding an applicable numeric effluent limitation in this General Permit.

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E.3.f. The discharger shall include in the Numeric Effluent Limitation Violation Report:

i. The analytical method(s), method reporting unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit shall be reported as “less than the method detection limit”);

ii. The date, place, time of sampling, visual observation (inspections), and/or measurements, including precipitation; and

iii. An assessment of what caused the active treatment system to exceed the numeric effluent limitation, and the proposed corrective actions taken to prevent future exceedances.

E.3.g. The active treatment system dischargers shall report the on-site rain gauge reading and nearby governmental rain gauge readings for verification if an applicable numeric effluent limitation has been exceeded during a precipitation event equal to or larger than the compliance precipitation event.

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ATTACHMENT G

REQUIREMENTS FOR THE USE OF PASSIVE TREATMENT TECHNOLOGIES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH
CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES
(GENERAL PERMIT)

A. GENERAL PASSIVE TREATMENT TECHNOLOGIES REQUIREMENTS

A.1. The discharger choosing to implement passive treatment technologies (passive treatment) on their site shall comply with all requirements in this Attachment and this General Permit.

A.2. Passive treatment is the application of natural or synthetic chemicals and products to reduce turbidity in discharges through coagulation and flocculation. Passive treatment does not rely on computerized, enclosed systems with pumps, filters, and real-time controls. Passive treatment may include pumps where they are necessary to move water around the site.[1] This Attachment is for the use of water applied passive treatment products that remove suspended solids such as sediment from stormwater (e.g., liquid treatment chemicals, powders, slow-releasing solid blocks/socks) without using an active treatment system.

A.3. The discharger shall not use chemical treatment as a standalone Best Management Practice (BMP) for site erosion and sediment controls and shall maximize the use of non-chemical BMPs for site erosion and sediment controls.

A.4. The discharger shall employ a trained person knowledgeable in the principles and practices of passive treatment to oversee the product application or installation.

A.5. The discharger shall store products at the site in leak-proof containers with secondary containment kept under a storm-resistant shelter. The discharger shall follow the manufacturer's instructions for handling and storage.

A.6. The discharger shall use passive treatment in a manner that precludes the accidental discharge of passive treatment products during storage, application, and after being applied.

A.7. The discharger shall maintain a copy of the site-specific Passive Treatment Plan in the Stormwater Pollution Prevention Plan (SWPPP). This document shall be kept updated in the Stormwater Multiple Application and Report Tracking System

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1 U.S. EPA. Federal Register V 77. No 1. Effluent Limitations Guidelines and Standards for the Construction and Development Point Source Category. Web. January 3, 2012. <https://www.govinfo.gov/content/pkg/FR-2012-01-03/pdf/2011-33661.pdf>. [as of May 20, 2021].

(SMARTS) and on-site in compliance with the record retention requirements in the Standard Provisions of this General Permit (Section VI).

B. PASSIVE TREATMENT DESIGN AND TOXICOLOGY REQUIREMENTS

B.1. The use of cationic chemicals for passive treatment is not authorized by this General Permit. Cationic chemicals are only authorized for use in active treatment systems complying with the criteria in Attachment F of this General Permit. Anionic chemicals are authorized for use in passive treatment systems, typically consisting of polyacrylamides[2]. Passive treatment consisting of polyacrylamides must:

a. Be free of nonylphenol and nonylphenol ethoxylates, often used as surfactants in emulsion-based products. Emulsion-based products may contain surfactants and petroleum distillates that can be toxic to aquatic life;[3]

b. Be food grade (National Sanitary Foundation/American National Standards Institute) products, or contain less than 0.05 percent residual monomer by volume;[4]

c. Have a charge density between 10 and 55 percent by weight;

d. Have a molecular weight between 6 and 25 milligrams per mole; and

e. Be mixed and applied in accordance with Occupational Safety and Health Administration Safety Data Sheet requirements and the manufacturer's recommendations.

B.2. A California licensed Professional Engineer shall design the discharge location(s) from the area treated with passive treatment products (treatment zone) to dissipate energy from concentrated flows.

B.3. Stormwater treated with passive treatment products in a treatment zone prior to being discharged from the construction site shall pass through a sediment control

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2 Michigan Department of Environmental Quality, Water Resources Division, Technical Guidance for the Use of Polyacrylamide Products for Soil Erosion and Sedimentation Control (SESC). Web. November 2014. <https://www.michigan.gov/documents/deq/wb-stormwater-TechnicalGuidancePAMs_197048_7.pdf>. [as of May 20, 2021].

3 Michigan Department of Environmental Quality, Water Resources Division, Technical Guidance for the Use of Polyacrylamide Products for Soil Erosion and Sedimentation Control (SESC). Web. November 2014. <https://www.michigan.gov/documents/deq/wb-stormwater-TechnicalGuidancePAMs_197048_7.pdf>. [as of May 20, 2021].

4 The U.S. EPA. Support Document for the Third Six-Year Review of Drinking Water Regulations for Acrylamide and Epichlorohydrin. Web. December 2016. <https://www.epa.gov/sites/production/files/2016-12/documents/810r16019.pdf>. [as of May 20, 2021].

BMP (including, but not limited to, a sediment basin or trap) or filter (including, but not limited to, sand filter or geotextile bag) to settle or remove flocculants prior to discharge from the site.

B.4. The discharger shall include in the Passive Treatment Plan, current acute and chronic toxicological test data provided by the manufacturer, a laboratory employed by the manufacturer, or a third-party organization.

B.4.a. The methods for the acute toxicity testing shall be those outlined for a 96-hour acute test in "Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms, U.S. EPA-821-R-02-012" for *Pimephales promelas* (fathead minnow). Acute toxicity for *Oncorhynchus mykiss* (rainbow trout) may be used as a substitute for testing fathead minnows.

B.4.b. The methods for the chronic toxicity testing shall be those outlined for an 8-day chronic test in "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, U.S. EPA-821-R-02-013" for *Ceriodaphnia dubia* (Daphnia).

B.4.c. All toxicity tests shall meet quality assurance criteria and test acceptability criteria in the most recent versions of the U.S. EPA test method for Whole Effluent Toxicity (WET) testing[5] as well any toxicity provisions adopted by the State Water Board.

B.4.d. The toxicological information in the Passive Treatment Plan shall indicate the safety of the passive treatment product(s) based on expected release rates, toxicity reports, the anticipated concentration (calculated from product release rate) and intended use at the site.

C. PASSIVE TREATMENT APPLICATION REQUIREMENTS

C.1. The discharger shall ensure passive treatment product(s) are used as follows:

C.1.a. The distance or barrier between the treatment zone and the receiving water(s) shall comply with surface water buffer requirements, in Attachment D, Section II.G for traditional construction projects or Attachment E, Section II.G for linear underground and overhead projects, to prevent a discharge of treated effluent to the receiving water. Applying passive treatment products directly into a receiving water is prohibited.

C.1.b. Passive treatment application rates, dosing, and methods used in treatment zones shall be determined based on the manufacturer's guidance to provide adequate sediment control without having an excess amount in runoff.

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5 U.S. EPA. Whole Effluent Toxicity (WET). Web. <https://www.epa.gov/npdes/whole-effluent-toxicity-wet>. [as of May 20, 2021].

C.1.c. Passive treatment re-application rates, dosing, and methods used in treatment zones shall occur based on the manufacturer's recommended frequency and on-site conditions such as soil type, precipitation, and slope to avoid the discharge of excess product in runoff.

C.2. The Passive Treatment Chemicals Performance Testing,[6] Dosing, Mixing, and Settling for use in Sediment Control BMPs

C.2.a. The discharger shall ensure stormwater is treated and sediment from the site is tested by a person trained in the use of the passive treatment product prior to being applied at the site. The testing should demonstrate that the selected formulation is an effective product for removing suspended sediment.

C.2.b. The discharger shall employ a trained person to calculate the appropriate standard passive treatment product quantity per unit flow rate value using the following factors:

i. The specific chemical(s) or product(s) formulation being used;

ii. The amount of chemical/product applied;

iii. The flow rate of water through the system;

iv. The soil type and site topography; and

v. The physical structure of the system.

C.2.c. This calculated value shall be included in the Passive Treatment Plan and be recalculated and resubmitted via SMARTS as site conditions change.

C.2.d. The discharger shall employ a trained person to ensure that the mixing and reaction time recommended by the manufacturer is followed during passive treatment application.

C.2.e. The discharger shall ensure that the settling area for the passive treatment product-sediment laden stormwater is sized to hold the sediment and allows the reasonable cleanout frequency specified in the Passive Treatment Plan. A sedimentation basin BMP shall be implemented upon any evidence that previously settled sediment is being re-suspended.

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D. PASSIVE TREATMENT MONITORING REQUIREMENTS

D.1. The discharger using passive treatment shall comply with the monitoring requirements of the General Permit's Order and all other applicable Attachments.

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6 Toronto and Region Conservation. Canada Anionic Polyacrylamide Application Guide for Urban Construction in Ontario. Web. June 2013. <https://sustainabletechnologies.ca/app/uploads/2013/02/Polymer-Guide-Final_NewFormat.pdf>. [as of May 20, 2021].

D.2. Passive Treatment Plan

A Qualified SWPPP Developer shall prepare the Passive Treatment Plan describing the appropriate application rates, dosing, mixing, settling, and filtration (if applicable). The Passive Treatment Plan shall include:[7]

a. A list of other erosion and sediment control BMPs implemented in the drainage area and treatment zones. Passive treatment shall not be used as a standalone BMP;

b. Manufacturer product details (e.g., function, physical form, product name, expiration date and any other identifiers), specifications, and current acute and chronic toxicological and ecological information;

c. The design details and drawings for maintenance and removal procedures for the products applied on-site;

d. Contact information (name, position, email, phone number) of the trained person who is implementing passive treatment for the discharger; Qualified SWPPP Practitioner; and other site personnel who are trained to assist the discharger with the passive treatment implementation;

e. Inspection and maintenance requirements for treatment zones;

f. Monitoring, sampling and reporting plan, including quality assurance/quality control (QA/QC);

g. Health and safety procedures;

h. Spill prevention and response procedures;

i. Calculated and re-calculated quantities of passive treatment products used (Section C.2 above);

j. Site-specific performance testing results and the associated dosage/application rate(s) (Section C.2 above);

k. Site map of:

   i. Site area location(s) where the product(s) is used (treatment zone);

   ii. Treatment zone effluent discharge location(s);

   iii. Site location(s) where product(s) will be stored;

   iv. Locations of product recovery BMP(s), including but not limited to, ponds, chemicals and/or product recovery BMPs etc.; and

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7 Toronto and Region Conservation. Canada Anionic Polyacrylamide Application Guide for Urban Construction in Ontario. Web. June 2013. <https://sustainabletechnologies.ca/app/uploads/2013/02/Polymer-Guide-Final_NewFormat.pdf>. [as of May 20, 2021].

v. Surface water buffer between the passive treatment zone and receiving waters.

l. Treatment zone soil type(s);

m. Proposed application date(s) or schedule; and

n. Application method(s);

D.3. The discharger shall ensure a Qualified SWPPP Practitioner visually inspects the passive treatment zone surface condition within 72 hours before forecasted precipitation events and within 48 hours after qualifying precipitation events.

D.4. The discharger shall ensure that the trained person employed to implement the passive treatment completes a checklist with the following information during each passive treatment product application:

a. Application date(s);

b. Application method(s);

c. Weather condition(s) during application;

d. Estimated flow rate;

e. Estimated volume of water being treated;

f. Application rate(s), dosing, and mixing, consistent with the Passive Treatment Plan; and

g. Any other site-specific conditions or observations relevant to the functioning of the product.

D.5. The Regional Water Boards may use site-specific information to require additional sampling and monitoring[8] to confirm the toxicological requirements are being met and to ensure there are no adverse impacts to waters of the United States.

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E. PASSIVE TREATMENT REPORTING REQUIREMENTS

E.1. The discharger using passive treatment shall comply with the reporting requirements of the General Permit's Order and all other applicable Attachments.

E.2. The Passive Treatment Plan shall be electronically certified and submitted through SMARTS 14 days prior to passive treatment use. A copy shall be available on-site during active construction. The Passive Treatment Plan shall be updated in accordance with the SWPPP update schedule specified in the Standard Provisions of this General Permit (Section VI).

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8 Aquatic toxicity testing and applicable reporting, recordkeeping, and corrective action requirements; and/or residual chemical testing and applicable reporting, recordkeeping, and corrective action requirements.

E.3. The discharger shall ensure that all passive treatment application checklists are kept with the Passive Treatment Plan in accordance with Section VI.F in the Order.

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ATTACHMENT H

TOTAL MAXIMUM DAILY LOAD IMPLEMENTATION REQUIREMENTS APPLICABLE TO CONSTRUCTION STORMWATER DISCHARGES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED
WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES
(GENERAL PERMIT)

The following table contains a list of existing Total Maximum Daily Loads (TMDLs) that are identified as applicable to construction stormwater dischargers covered under this General Permit. The listed TMDLs were adopted by a Regional Water Quality Control Board or established by the U.S. EPA prior to the adoption date of this General Permit. The State Water Board may reopen this General Permit to update TMDL-specific requirements in this Attachment, or incorporate new applicable TMDLs adopted during the term of this General Permit.

Responsible Dischargers shall comply with the applicable TMDL-specific requirements by, and after, the Compliance Deadline date listed in Table H-2.

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Table H-1: List of Applicable TMDLs
North Coast Regional Water Quality Control Board (Region 1)

TMDL	Pollutant
Albion River Sediment TMDL	Sediment
Big River Sediment TMDL	Sediment
Eel River – Lower Main Sediment TMDL	Sediment
Eel River – Lower Main Temperature TMDL	Temperature
Eel River – Middle Fork Sediment TMDL	Sediment
Eel River – Middle Main Sediment TMDL	Sediment
Eel River – Middle Main Temperature TMDL	Temperature
Eel River – North Fork Sediment TMDL	Sediment
Eel River – North Fork Temperature TMDL	Temperature
Eel River – South Fork Sediment TMDL	Sediment
Eel River – Upper Main Sediment TMDL	Sediment
Eel River – Upper Main Temperature TMDL	Temperature
Gualala River Sediment TMDL	Sediment
Mad River Sediment TMDL	Sediment
Mattole River Sediment TMDL	Sediment
Mattole River Temperature TMDL	Temperature
Navarro River Sediment TMDL	Sediment
Navarro River Temperature TMDL	Temperature
Noyo River Sediment TMDL	Sediment
Scott River Sediment TMDL	Sediment
Scott River Temperature TMDL	Temperature

TMDL	Pollutant
Ten Mile River Sediment TMDL	Sediment
Trinity River Sediment TMDL	Sediment
Van Duzen River Sediment TMDL	Sediment

San Francisco Bay Regional Water Quality Control Board (Region 2)

TMDL	Pollutant
Lagunitas Creek Sediment TMDL	Sediment
Napa River Sediment TMDL	Sediment
Pescadero and Butano Creek Sediment TMDL	Sediment
Sonoma Creek Sediment TMDL	Sediment

Central Coast Regional Water Quality Control Board (Region 3)

TMDL	Pollutant
Pajaro River Nutrients TMDL	Nitrogen Compounds and Orthophosphate
San Lorenzo River Siltation TMDL	Sediment

Los Angeles Regional Water Quality Control Board (Region 4)

TMDL	Pollutant
Ballona Creek, Ballona Estuary and Sepulveda Channel Bacteria TMDL	Bacteria
Ballona Creek Metals TMDL	Metals
Ballona Creek Estuary Toxics TMDL	Toxics
Calleguas Creek Watershed Salts TMDL	Salts (Boron, Chloride, Sulfate, TDS)
Calleguas Creek Watershed Metals and Selenium TMDL	Metals and Selenium
Calleguas Creek Watershed OC Pesticides and PCBs TMDL	Organochlorine Pesticides and PCBs
Colorado Lagoon Toxics TMDL	Metals, Organochlorine Pesticides, PAHs, PCBs, and Sediment Toxicity
Harbor Beaches of Ventura County Bacteria TMDL	Bacteria
Long Beach City Beaches and Los Angeles River Estuary Bacteria TMDL	Bacteria
Los Angeles Area Lakes TMDLs	Mercury, Nitrogen, Organochlorine Pesticides, PCBs, and Phosphorus
Los Angeles and Long Beach Harbor Waters TMDL	Metals and Toxics
Los Angeles Harbor Bacteria TMDL	Bacteria
Los Angeles River Bacteria TMDL	Bacteria
Los Angeles River Metals TMDL	Metals
Los Angeles River Nutrients TMDL	Nutrients
Los Cerritos Channel Metals TMDL	Metals

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TMDL	Pollutant
Machado Lake Nutrients TMDL	Nutrients
Machado Lake Toxics TMDL	PCBs and Pesticides
Malibu Creek Bacteria TMDL	Bacteria
Marina del Rey Harbor Bacteria TMDL	Bacteria
Marina Del Rey Harbor Toxics TMDL	Toxics
Oxnard Drain No. 3 TMDL	PCBs, Pesticides, and Sediment Toxicity
San Gabriel River Metals and Selenium TMDL	Metals and Selenium
Santa Clara River Bacteria TMDL	Bacteria
Santa Clara River Nitrogen Compounds TMDL	Nutrients
Santa Clara River Reach 3 Chloride TMDL	Chloride
Santa Monica Bay Beaches Bacteria TMDL	Bacteria
Santa Monica Bay DDTs and PCBs TMDL	DDTs and PCBs
Upper Santa Clara River Chloride TMDL	Chloride
Ventura River Algae TMDL	Nutrients

Lahontan Regional Water Quality Control Board (Region 6)

TMDL	Pollutant
Squaw Creek Sediment TMDL	Sediment
Truckee River Sediment TMDL	Sediment

Santa Ana Regional Water Quality Control Board (Region 8)

TMDL	Pollutant
San Diego Creek and Newport Bay Nutrients TMDL	Nutrients
San Diego Creek and Newport Bay Organochlorine Compounds TMDL	Organochlorine Compounds
San Diego Creek and Newport Bay Sediment TMDL	Sediment
San Diego Creek and Newport Bay Toxics TMDL	Toxics

San Diego Regional Water Quality Control Board (Region 9)

TMDL	Pollutant
Chollas Creek Diazinon TMDL	Diazinon
Chollas Creek Metals TMDL	Metals
Los Peñasquitos Lagoon Sediment TMDL	Sediment

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Table H-2: Compliance Table for TMDL Implementation Requirements
North Coast Regional Water Quality Control Board (Region 1) [1]

Responsible dischargers for the TMDLs listed in this table are not subject to additional TMDL-related numeric action levels or numeric effluent limitations.

TMDL	Applicable Water Body/ Watershed	Pollutants	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Albion River Sediment TMDL	Albion River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*
Big River Sediment TMDL	Big River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*
Eel River – Lower Main Sediment TMDL	Lower Eel River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

1 Some TMDLs do not specifically state total concentrations for the constituents. Unless otherwise stated in Attachment H, Table H-2, the pollutant shall be reported in total concentrations.

TMDL	Applicable Water Body/ Watershed	Pollutants	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Eel River – Lower Main Temperature TMDL	Lower Eel River Watershed	Temperature	Comply with General Permit	September 1, 2023*
Eel River – Middle Fork Sediment TMDL	Middle Fork Eel River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*
Eel River – Middle Main Sediment TMDL	Middle Main Eel River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*
Eel River – Middle Main Temperature TMDL	Middle Main Eel River Watershed	Temperature	Comply with General Permit	September 1, 2023*
Eel River – North Fork Sediment TMDL	North Fork Eel River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*

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TMDL	Applicable Water Body/ Watershed	Pollutants	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Eel River – North Fork Temperature TMDL	North Fork Eel River Watershed	Temperature	Comply with General Permit	September 1, 2023*
Eel River – South Fork Sediment TMDL	South Fork Eel River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*
Eel River – Upper Main Sediment TMDL	Upper Eel River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*
Eel River – Upper Main Temperature TMDL	Upper Eel River Watershed	Temperature	Comply with General Permit	September 1, 2023*
Gualala River Sediment TMDL	Gualala River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*

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TMDL	Applicable Water Body/ Watershed	Pollutants	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Mad River Sediment TMDL	Mad River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*
Mattole River Sediment TMDL	Mattole River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*
Mattole River Temperature TMDL	Mattole River Watershed	Temperature	Comply with General Permit	September 1, 2023*
Navarro River Sediment TMDL	Navarra River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*
Navarro River Temperature TMDL	Navarro River Watershed	Temperature	Comply with General Permit	September 1, 2023*

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TMDL	Applicable Water Body/ Watershed	Pollutants	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Noyo River Sediment TMDL	Noyo River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*
Scott River Sediment TMDL	Scott River Watershed	Sediment	Comply with General Permit	September 1, 2023*
Scott River Temperature TMDL	Scott River Watershed	Temperature	Comply with General Permit	September 1, 2023*
Ten Mile River Sediment TMDL	Ten Mile River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*
Trinity River Sediment TMDL	Trinity River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*

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TMDL	Applicable Water Body/ Watershed	Pollutants	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Van Duzen River Sediment TMDL	Van Duzen River Watershed	Sediment	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.2 below.	September 1, 2023*

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San Francisco Bay Regional Water Quality Control Board (Region 2) [2]

Responsible dischargers for the TMDLs listed in this table are not subject to additional TMDL-related numeric action levels or numeric effluent limitations.

TMDL	Applicable Water Body/ Watershed	Pollutants	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Lagunitas Creek Sediment TMDL	Lagunitas Creek Watershed	Sediment	Comply with General Permit	September 1, 2023*
Napa River Sediment TMDL	Napa River Watershed	Sediment	Comply with General Permit	September 1, 2023*
Pescadero and Butano Creek Sediment TMDL	Pescadero-Butano Watershed	Sediment	Comply with General Permit	September 1, 2023*
Sonoma Creek Sediment TMDL	Sonoma Creek Watershed	Sediment	Comply with General Permit	September 1, 2023*

FOR BIDDING PURPOSES ONLY

2 Some of the TMDLs did not specifically state total concentrations for the constituents. Unless otherwise stated in Attachment H Table H-2, the pollutant should be reported in total concentrations.

Central Coast Regional Water Quality Control Board (Region 3) [3]

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Pajaro River Nutrients TMDL	Pajaro River Watershed	Un-ionized Ammonia	NAL of 0.025 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	July 12, 2041
Pajaro River Nutrients TMDL	Pajaro River Watershed Streams with MUN Beneficial Use	Nitrate-Nitrogen	NAL of 10.0 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	July 12, 2041

FOR BIDDING PURPOSES ONLY

3 Some of the TMDLs did not specifically state total concentrations for the constituents. Unless otherwise stated in Attachment H Table H-2, the pollutant should be reported in total concentrations.

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline ** Denotes Effective Date of this General Permit*
Pajaro River Nutrients TMDL	Pajaro River and Pajaro River Estuary Corralitos Creek and Salsipuedes Creek Beach Road Ditch and McGowan Ditch	Nitrate-Nitrogen	NAL of 8.0 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	July 12, 2041
Pajaro River Nutrients TMDL	Pajaro River and Pajaro River Estuary Corralitos Creek and Salsipuedes Creek Beach Road Ditch and McGowan Ditch	Orthophos-phate-Phosphorus	NAL of 0.3 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	July 12, 2041

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TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline ** Denotes Effective Date of this General Permit*
Pajaro River Nutrients TMDL	Llagas Creek (Downstream of Cheseboro Reservoir), Carnadero Creek, Uvas Creek, and Furlong Creek San Juan Creek and West Branch of San Juan Creek Tequisquita Slough Watsonville Slough, Harkins Slough, Gallighan Slough, and Struve Slough Millers Canal	Nitrate-Nitrogen	NAL of 8.0 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	July 12, 2041

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TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline ** Denotes Effective Date of this General Permit*
Pajaro River Nutrients TMDL	Llagas Creek (Downstream of Cheseboro Reservoir), Carnadero Creek, Uvas Creek, and Furlong Creek San Juan Creek and West Branch of San Juan Creek Tequisquita Slough Watsonville Slough, Harkins Slough, Gallighan Slough, and Struve Slough Millers Canal	Orthophos-phate-Phosphorus	NAL of 0.3 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	July 12, 2041
San Lorenzo River Siltation TMDL	San Lorenzo River Watershed	Sediment	None	Comply with General Permit	September 1, 2023*

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Los Angeles Regional Water Quality Control Board (Region 4) [4]

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Ballona Creek, Ballona Estuary, and Sepulveda Channel Bacteria TMDL	Ballona Creek	E. coli, Fecal Coliform	None	Comply with General Permit and the additional Bacteria TMDL Requirements in Section I.A below.	September 1, 2023*
Ballona Creek, Ballona Estuary, and Sepulveda Channel Bacteria TMDL	Ballona Estuary	Enterococcus, Fecal Coliform, Total Coliform	None	Comply with General Permit and the additional Bacteria TMDL Requirements in Section I.A below.	September 1, 2023*
Ballona Creek, Ballona Estuary, and Sepulveda Channel Bacteria TMDL	Sepulveda Channel	E. coli	None	Comply with General Permit and the additional Bacteria TMDL Requirements in Section I.A below.	September 1, 2023*

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4 Some of the TMDLs did not specifically state total concentrations for the constituents. Unless otherwise stated in Attachment H Table H-2, the pollutant should be reported in total concentrations.

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Ballona Creek Metals TMDL	Ballona Creek or Sepulveda Canyon Channel	Copper, Lead, and Zinc	None	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.2 below.	September 1, 2023*
Ballona Creek Estuary Toxics TMDL	Ballona Creek or Ballona Creek Estuary	Cadmium, Chlordane, Copper, DDT, Lead, PCBs, Silver, and Zinc	None	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.2 below.	September 1, 2023*
Calleguas Creek Watershed Salts TMDL	Calleguas Creek Watershed	Boron, Chloride, Sulfate, and Total Dissolved Solids (TDS)	None	Comply with General Permit	September 1, 2023*
Calleguas Creek Watershed Metals and Selenium TMDL	Calleguas Creek or Conejo Creek	Total Copper	Interim NAL of 0.204 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*

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TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Calleguas Creek Watershed Metals and Selenium TMDL	Calleguas Creek or Conejo Creek	Copper, Nickel, and Selenium	None	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.2 below.	September 1, 2023*
Calleguas Creek Watershed Metals and Selenium TMDL	Calleguas Creek or Conejo Creek	Mercury	None	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.2 below.	September 1, 2023*
Calleguas Creek Watershed Metals and Selenium TMDL	Revolon Slough	Total Copper	Interim NAL of 0.204 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
Calleguas Creek Watershed Metals and Selenium TMDL	Revolon Slough	Copper, Nickel, and Selenium	None	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.2 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Calleguas Creek Watershed Metals and Selenium TMDL	Revolon Slough	Mercury	None	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.2 below.	September 1, 2023*
Calleguas Creek Watershed Organo-chlorine Pesticides and PCBs TMDL	Calleguas Creek Watershed	Chlordane, 4,4-DDD, 4,4-DDE, 4,4-DDT, Dieldrin, PCBs, and Toxaphene	None	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.2 below.	September 1, 2023*
Colorado Lagoon Toxics TMDL	Colorado Lagoon Watershed	Chlordane, Dieldrin, DDT, Lead, PAHs, PCBs, and Zinc	None	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.2 below.	September 1, 2023*
Harbor Beaches of Ventura County Bacteria TMDL	Kiddie and Hobie Beaches in the Channel Islands Harbor	Enterococcus, Fecal Coliform, Total Coliform	None	Comply with General Permit and the additional Bacteria TMDL Requirements in Section I.A below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Long Beach City Beaches and Los Angeles River Estuary Bacteria TMDL	Long Beach City Beaches or Los Angeles River Estuary	Enterococcus, Fecal Coliform, Total Coliform	None	Comply with General Permit and the additional Bacteria TMDL Requirements in Section I.A below.	September 1, 2023*
Los Angeles Area Lakes TMDL	Echo Park Lake	Total Nitrogen	NAL of 1.33 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*
Los Angeles Area Lakes TMDL	Echo Park Lake	Total Phosphorous	NEL of 0.16 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.4 below.	September 1, 2023*
Los Angeles Area Lakes TMDL	Echo Park Lake	Chlordane	NEL of 100 mg/L TSS (if applicable per Section I.G.5 below)	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.5 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Angeles Area Lakes TMDL	Echo Park Lake	Dieldrin	NEL of 100 mg/L TSS (if applicable per Section I.G.5 below)	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.5 below.	September 1, 2023*
Los Angeles Area Lakes TMDL	Echo Park Lake	Total PCBs	NEL of 100 mg/L TSS (if applicable per Section I.G.5 below)	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.5 below.	September 1, 2023*
Los Angeles Area Lakes TMDL	Legg Lakes	Total Nitrogen	NAL of 1.8 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*
Los Angeles Area Lakes TMDL	Legg Lakes	Total Phosphorous	NEL of 0.64 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.4 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Angeles Area Lakes TMDL	Peck Road Park Lake	Total Nitrogen	NAL of 3.61 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*
Los Angeles Area Lakes TMDL	Peck Road Park Lake	Total Phosphorous	NEL of 0.37 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.4 below.	September 1, 2023*
Los Angeles Area Lakes TMDL	Peck Road Park Lake	Chlordane	NEL of 100 mg/L TSS (if applicable per Section I.G.5 below)	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.5 below.	September 1, 2023*
Los Angeles Area Lakes TMDL	Peck Road Park Lake	Dieldrin	NEL of 100 mg/L TSS (if applicable per Section I.G.5 below)	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.5 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Angeles Area Lakes TMDL	Peck Road Park Lake	Total DDTs	NEL of 100 mg/L TSS (if applicable per Section I.G.5 below)	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.5 below.	September 1, 2023*
Los Angeles Area Lakes TMDL	Peck Road Park Lake	Total PCBs	NEL of 100 mg/L TSS (if applicable per Section I.G.5 below)	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.5 below.	September 1, 2023*
Los Angeles Area Lakes TMDL	Pudding-stone Reservoir	Total Nitrogen	NAL of 2.0 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*
Los Angeles Area Lakes TMDL	Pudding-stone Reservoir	Total Phosphorous	NEL of 0.4 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.4 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Angeles Area Lakes TMDL	Pudding-stone Reservoir	Chlordane	NEL of 100 mg/L TSS (if applicable per Section I.G.5 below)	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.5 below.	September 1, 2023*
Los Angeles Area Lakes TMDL	Pudding-stone Reservoir	Dieldrin	NEL of 100 mg/L TSS (if applicable per Section I.G.5 below)	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.5 below.	September 1, 2023*
Los Angeles Area Lakes TMDL	Pudding-stone Reservoir	Total DDTs	NEL of 100 mg/L TSS (if applicable per Section I.G.5 below)	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.5 below.	September 1, 2023*
Los Angeles Area Lakes TMDL	Pudding-stone Reservoir	Total PCBs	NEL of 100 mg/L TSS (if applicable per Section I.G.5 below)	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.5 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel or Torrance Lateral	Total Copper	Interim NAL of 0.20751 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel or Torrance Lateral	Total Lead	Interim NAL of 0.12288 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel or Torrance Lateral	Total Zinc	Interim NAL of 0.89887 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel or Torrance Lateral	Total Copper	NEL of 100 mg/L TSS (if applicable per Section I.G.5 below)	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.5 and I.G.6 below.	March 23, 2032

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel or Torrance Lateral	Total Lead	NEL of 100 mg/L TSS (if applicable per Section I.G.5 below)	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.5 and I.G.6 below.	March 23, 2032
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel or Torrance Lateral	Total Zinc	NEL of 100 mg/L TSS (if applicable per Section I.G.5 below)	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.5 and I.G.6 below.	March 23, 2032

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel Estuary and Greater Los Angeles/ Long Beach Harbor Waters including: Inner and Outer Harbor Main Channel Southwest Slip Cabrillo Marina Inner Cabrillo Beach Los Angeles River Estuary San Pedro Bay	Copper, DDT, Lead, PAHs, PCBs, and Zinc	None	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.2 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel Estuary	4,4-DDT	Final NAL of $5.9 X10^{-7}$ mg/L	Comply with General Permit and the additional Metals and Toxics TMDL Requirements in Section I.G.3 below.	March 23, 2032
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel Estuary	Chlordane	Final NAL of $5.9 X10^{-7}$ mg/L	Comply with General Permit and the additional Metals and Toxics TMDL Requirements in Section I.G.3 below.	March 23, 2032
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel Estuary	Dieldrin	Final NAL of $1.4 X10^{-7}$ mg/L	Comply with General Permit and the additional Metals and Toxics TMDL Requirements in Section I.G.3 below.	March 23, 2032

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel Estuary	Total Copper	Final NAL of 0.0058 mg/L	Comply with General Permit and the additional Metals and Toxics TMDL Requirements in Section I.G.3 below.	March 23, 2032
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel Estuary	Total Lead	Final NAL of 0.221 mg/L	Comply with General Permit and the additional Metals and Toxics TMDL Requirements in Section I.G.3 below.	March 23, 2032
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel Estuary	PAHs	Final NAL of $4.9 X10^{-5}$ mg/L	Comply with General Permit and the additional Metals and Toxics TMDL Requirements in Section I.G.3 below.	March 23, 2032

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel Estuary	Total PCBs	Final NAL of $1.7 X10^{-7}$ mg/L	Comply with General Permit and the additional Metals and Toxics TMDL Requirements in Section I.G.3 below.	March 23, 2032
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel Estuary	Total Zinc	Final NAL if 0.095 mg/L	Comply with General Permit and the additional Metals and Toxics TMDL Requirements in Section I.G.3 below.	March 23, 2032
Los Angeles and Long Beach Harbor Waters TMDL	Dominguez Channel Estuary	Cadmium	None	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.2 below.	March 23, 2032

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Angeles and Long Beach Harbor Waters TMDL	Consoli-dated Slip	Cadmium, Chromium, and Mercury	None	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.2 below.	March 23, 2032
Los Angeles and Long Beach Harbor Waters TMDL	Fish Harbor	Mercury	None	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.2 below.	March 23, 2032
Los Angeles Harbor Bacteria TMDL	Los Angeles Harbor (Inner Cabrillo Beach and Main Ship Channel)	Enterococcus, Fecal Coliform, Total Coliform	None	Comply with General Permit and the additional Bacteria TMDL Requirements in Section I.A below.	September 1, 2023*
Los Angeles River Bacteria TMDL	Los Angeles River Watershed	E. coli	None	Comply with General Permit and the additional Bacteria TMDL Requirements in Section I.A below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Angeles River Metals TMDL	Los Angeles River Watershed	Total Cadmium	NAL of 0.0031 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
Los Angeles River Metals TMDL	Los Angeles River Watershed	Total Copper	NAL of 0.06749 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
Los Angeles River Metals TMDL	Los Angeles River Watershed	Total Lead	NAL of 0.094 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
Los Angeles River Metals TMDL	Los Angeles River Watershed	Total Zinc	NAL of 0.159 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Angeles River Nutrients TMDL	Los Angeles River above the LA-Glendale WRP	Ammonia	NAL of 4.7 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*
Los Angeles River Nutrients TMDL	Los Angeles River below the LA-Glendale WRP	Ammonia	NAL of 8.7 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*
Los Angeles River Nutrients TMDL	Los Angeles River Watershed	Ammonia	NAL of 10.1 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*
Los Angeles River Nutrients TMDL	Los Angeles River Watershed	Nitrate-Nitrogen	NAL of 8.0 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Angeles River Nutrients TMDL	Los Angeles River Watershed	Nitrite-Nitrogen	NAL of 1.0 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*
Los Angeles River Nutrients TMDL	Los Angeles River Watershed	Nitrate-Nitrogen + Nitrite-Nitrogen	NAL of 8.0 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*
Los Cerritos Channel Metals TMDL	Los Cerritos Channel	Total Copper	NAL of 0.0098 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
Los Cerritos Channel Metals TMDL	Los Cerritos Channel	Total Lead	NAL of 0.0558 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Cerritos Channel Metals TMDL	Los Cerritos Channel	Total Zinc	NAL of 0.0956 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
Machado Lake Nutrients TMDL	Machado Lake, Drain 553, Wilmington Drain, Project 77/510, and Walteria Lake	Total Nitrogen	NAL of 1.0 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*
Machado Lake Nutrients TMDL	Machado Lake, Drain 553, Wilmington Drain, Project 77/510, and Walteria Lake	Total Phosphorus	NAL of 0.1 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Machado Lake Toxics TMDL	Machado Lake, Drain 553, Wilmington Drain, Project 77/510, and Walteria Lake	Chlordane, DDD (all cogeners), DDE (all cogeners), DDT (all cogeners), Dieldrin, Total DDTs, and Total PCBs	None	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.2 below.	September 1, 2023*
Malibu Creek Watershed Bacteria TMDL	Malibu Creek Watershed	E. coli	None	Comply with General Permit and the additional Bacteria TMDL Requirements in Section I.A below.	September 1, 2023*
Malibu Creek Watershed Bacteria TMDL	Malibu Lagoon and Adjacent Beach	Enterococcus, Fecal Coliform, Total Coliform	None	Comply with General Permit and the additional Bacteria TMDL Requirements in Section I.A below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Marina del Rey Harbor Bacteria TMDL	Marina del Rey Harbor Mother's Beach and Back Basins D, E, and F	Enterococcus, Fecal Coliform, Total Coliform	None	Comply with General Permit and the additional Bacteria TMDL Requirements in Section I.A below.	September 1, 2023*
Marina del Rey Harbor Toxics TMDL	Marina del Rey Harbor	Chlordane, Copper, Lead, p,p'-DDE, Total DDTs, Total PCBs, and Zinc	None	Comply with General Permit and the additional Metals and Toxics TMDL Requirements in Section I.G.2 below.	September 1, 2023*
Oxnard Drain No. 3 TMDL	Oxnard Drain No. 3	4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Bifenthrin, Chlordane, Chlorpyrifos, Dieldrin, PCBs, Sediment Toxicity, and Toxaphene	None	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.2 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
San Gabriel River Metals and Selenium	San Gabriel River Reach 2 and Upper Reaches Watersheds	Total Lead	NAL 0.166 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
San Gabriel River Metals and Selenium	Coyote Creek Watershed	Total Copper	NAL 0.027 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
San Gabriel River Metals and Selenium	Coyote Creek Watershed	Total Lead	NAL 0.106 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
San Gabriel River Metals and Selenium	Coyote Creek Watershed	Total Zinc	NAL 0.158 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Santa Clara River Bacteria	Santa Clara River Estuary	Enterococcus, Fecal Coliform, Total Coliform	None	Comply with General Permit and the additional Bacteria TMDL Requirements in Section I.A below.	September 1, 2023*
Santa Clara River Bacteria	Santa Clara River Reaches 3, 4, 5, 6, 7	E. coli	None	Comply with General Permit and the additional Bacteria TMDL Requirements in Section I.A below.	September 1, 2023*
Santa Clara River Nitrogen Com-pounds TMDL	Santa Clara River Reach 3	Ammonia	NAL of 4.2 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*
Santa Clara River Nitrogen Com-pounds TMDL	Santa Clara River Reach 7	Ammonia	NAL of 5.2 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Santa Clara River Reach 3 Chloride TMDL	Santa Clara River Reach 3	Chloride	None	Comply with General Permit	September 1, 2023*
Santa Monica Bay Beaches Bacteria TMDL	Santa Monica Bay Watershed Manage-ment Area	Enterococcus, Fecal Coliform, Total Coliform	None	Comply with General Permit and the additional Bacteria TMDL Requirements in Section I.A below.	September 1, 2023*
Santa Monica Bay DDTs and PCBs TMDL	Santa Monica Bay	DDT and PCBs	None	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.2 below.	September 1, 2023*
Upper Santa Clara River Chloride TMDL	Santa Clara River Reach 5 and 6	Chloride	Chloride NAL of 100 mg/L	Comply with General Permit and the additional TMDL Requirements in Section I.B below.	September 1, 2023*

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TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Ventura River Algae TMDL	Ventura River Estuary and Ventura River Reach 1	Total Nitrogen	NAL of 7.4 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*
Ventura River Algae TMDL	Ventura River Reach 2 and Cañada Larga	Nitrate-Nitrogen + Nitrite-Nitrogen	NAL of 10 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*
Ventura River Algae TMDL	Ventura River Reaches 3, 4, 5, and San Antonio Creek	Nitrate-Nitrogen + Nitrite-Nitrogen	NAL of 5 mg/L	Comply with General Permit and the additional Nutrients TMDL Requirements in Section I.D.3 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

Lahontan Regional Water Quality Control Board (Region 6) [5]

TMDL	Applicable Water Body/ Watershed	Pollutants	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Squaw Creek Sediment TMDL	Squaw Creek Watershed	Sediment	Comply with General Permit	September 1, 2023*
Truckee River Sediment TMDL	Middle Truckee River Watershed	Sediment	Comply with General Permit	September 1, 2023*

FOR BIDDING PURPOSES ONLY

5 Some of the TMDLs did not specifically state total concentrations for the constituents. Unless otherwise stated in Attachment H Table H-2, the pollutant should be reported in total concentrations.

Santa Ana Regional Water Quality Control Board (Region 8) [6]

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation(s) (NAL/NEL)	Compliance Actions	Compliance Deadline ** Denotes Effective Date of this General Permit*
San Diego Creek and Newport Bay Nutrients TMDL	San Diego Creek, Newport Bay Watershed	Total Phosphorus	None	Comply with General Permit and the additional TMDL Requirements in Section I.D.2 below.	September 1, 2023*
San Diego Creek and Newport Bay Organo-chlorine Compounds TMDL	San Diego Creek Watershed	Total DDT and Toxaphene	None	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.2 below.	September 1, 2023*
San Diego Creek and Newport Bay Organo-chlorine Compounds TMDL	Upper Newport Bay	Chlordane, Total DDT, and Total PCBs	None	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.2 below.	September 1, 2023*

FOR BIDDING PURPOSES ONLY

6 Some of the TMDLs did not specifically state total concentrations for the constituents. Unless otherwise stated in Attachment H Table H-2, the pollutant should be reported in total concentrations.

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation(s) (NAL/NEL)	Compliance Actions	Compliance Deadline ** Denotes Effective Date of this General Permit*
San Diego Creek and Newport Bay Organo-chlorine Compounds TMDL	Lower Newport Bay	Chlordane, Total DDT, and Total PCBs	None	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.2 below.	September 1, 2023*
San Diego Creek and Newport Bay Sediment TMDL	Newport Bay/San Diego Creek Watershed	Sediment	None	Comply with General Permit	September 1, 2023*
San Diego Creek and Newport Bay Toxics TMDL	San Diego Creek Watershed	Total Cadmium	NAL of 0.0097 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
San Diego Creek and Newport Bay Toxics TMDL	San Diego Creek Watershed	Total Copper	NAL of 0.027 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*

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TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation(s) (NAL/NEL)	Compliance Actions	Compliance Deadline ** Denotes Effective Date of this General Permit*
San Diego Creek and Newport Bay Toxics TMDL	San Diego Creek Watershed	Total Lead	NAL of 0.194 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
San Diego Creek and Newport Bay Toxics TMDL	San Diego Creek Watershed	Total Zinc	NAL of 0.21 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
San Diego Creek and Newport Bay Toxics TMDL	Upper Newport Bay	Total Cadmium	NAL of 0.042 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
San Diego Creek and Newport Bay Toxics TMDL	Upper Newport Bay	Total Copper	NAL of 0.00578 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*

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TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation(s) (NAL/NEL)	Compliance Actions	Compliance Deadline ** Denotes Effective Date of this General Permit*
San Diego Creek and Newport Bay Toxics TMDL	Upper Newport Bay	Total Lead	NAL of 0.221 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
San Diego Creek and Newport Bay Toxics TMDL	Upper Newport Bay	Total Zinc	NAL of 0.095 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
San Diego Creek and Newport Bay Toxics TMDL	Lower Newport Bay, Bay Segments (including Costa Mesa Channel and Santa Ana Delhi Channel), and Rhine Channel Area	Total Copper	NAL of 0.00578 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*

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TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation(s) (NAL/NEL)	Compliance Actions	Compliance Deadline ** Denotes Effective Date of this General Permit*
San Diego Creek and Newport Bay Toxics TMDL	Lower Newport Bay, Bay Segments (including Costa Mesa Channel and Santa Ana Delhi Channel), and Rhine Channel Area	Total Lead	NAL of 0.221 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*
San Diego Creek and Newport Bay Toxics TMDL	Lower Newport Bay, Bay Segments (including Costa Mesa Channel and Santa Ana Delhi Channel), and Rhine Channel Area	Total Zinc	NAL of 0.095 mg/L	Comply with General Permit and the additional Metals TMDL Requirements in Section I.G.3 below.	September 1, 2023*

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San Diego Regional Water Quality Control Board (Region 9) [7]

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation(s) (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Chollas Creek Diazinon TMDL	Chollas Creek Watershed	Diazinon	None	Comply with General Permit and the use of Diazinon at the site is prohibited.	September 1, 2023*
Chollas Creek Metal TMDL	Chollas Creek	Dissolved Copper	Interim NAL of 0.083 mg/L	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.3 below.	September 1, 2023*
Chollas Creek Metal TMDL	Chollas Creek	Dissolved Lead	Interim NAL of 0.068 mg/L	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.3 below.	September 1, 2023*

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7 Some of the TMDLs did not specifically state total concentrations for the constituents. Unless otherwise stated in Attachment H Table H-2, the pollutant should be reported in total concentrations.

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation(s) (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Chollas Creek Metal TMDL	Chollas Creek	Dissolved Zinc	Interim NAL of 0.175 mg/L	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.3 below.	September 1, 2023*
Chollas Creek Metal TMDL	Chollas Creek	Dissolved Copper	Final NEL of 0.083 mg/L	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.4 below.	October 22, 2028
Chollas Creek Metal TMDL	Chollas Creek	Dissolved Lead	Final NEL of 0.068 mg/L	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.4 below.	October 22, 2028
Chollas Creek Metal TMDL	Chollas Creek	Dissolved Zinc	Final NEL of 0.175 mg/L	Comply with General Permit and the additional Toxics TMDL Requirements in Section I.G.4 below.	October 22, 2028

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TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related Numeric Action Level(s) or Numeric Effluent Limitation(s) (NAL/NEL)	Compliance Actions	Compliance Deadline * *Denotes Effective Date of this General Permit*
Los Peñasquitos Lagoon Sediment TMDL	Los Peñasquitos Lagoon Watershed	Sediment	None	Comply with General Permit and the additional Sediment TMDL Requirements in Section I.E.3 below.	July 14, 2034

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I. TOTAL MAXIMUM DAILY LOAD (TMDL) IMPLEMENTATION REQUIREMENTS

This Section contains the TMDL-specific requirements that Responsible Dischargers shall implement to comply with applicable TMDLs by the TMDL Compliance Deadline provided in Table H-2. The requirements in this Section are listed in order of pollutant category, whereas Table H-2 is organized by Regional Water Board jurisdiction and watershed. The terms including, but not limited to, Responsible Discharger, numeric action levels and exceedances, and numeric effluent limitations and exceedances, are defined in Attachment B, Glossary, of this General Permit.

I.A. Bacteria TMDL Implementation Requirements

I.A.1. Compliance with General Permit

All Responsible Dischargers for the Bacteria TMDLs listed in Table H-2 shall comply with the requirements of this General Permit.

I.A.2. Bacteria TMDL BMPs

I.A.2.a. Minimum BMPs

I.A.2.a.i. The Responsible Discharger that identifies on-site sources of indicator bacteria in their pollutant source assessment shall implement BMPs specific to preventing or controlling stormwater exposure to indicator bacteria in addition to complying with this General Permit's requirements. The minimum bacteria source control BMPs include the following:

1. Qualified SWPPP Practitioner-conducted training for construction site staff; and
2. Routine housekeeping and sanitary waste management of identified sources of bacteria (e.g., portable toilets, dumpsters, etc.).

I.A.2.b. Structural BMPs

The Responsible Discharger shall evaluate and implement any necessary structural BMPs designed for retention, infiltration, or diversion of stormwater when the implemented minimum BMPs are inadequate to reduce bacteria loading to receiving waters.

I.A.2.c. The Responsible Discharger shall ensure all BMPs are implemented and address Bacteria TMDL requirements. The BMPs shall be visually inspected, maintained, repaired, and kept updated in the SWPPP in accordance with General Permit requirements specified in the Order and applicable requirements in Attachments D or Attachment E (per project Risk or Type.

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I.B. Chloride and Salts TMDL Implementation Requirements

I.B.1. Compliance with this General Permit

All Responsible Dischargers for the Chloride and Salts TMDLs listed in Table H-2 shall comply with the requirements of this General Permit. Compliance with the requirements of this General Permit is consistent with the requirements and assumptions of the Chloride and Salts TMDL(s), unless specified below.

I.B.2. Numeric Action Level

I.B.2.a. The Responsible Discharger shall implement BMPs to address chloride and salts and prevent exceedances of the applicable numeric action levels to the extent possible. The BMPs shall be visually inspected, maintained, repaired, and updated in the SWPPP in accordance with this General Permit's requirements specified in the Order and applicable requirements in Attachments D or E for the site's Risk or Type.

I.B.2.b. The Responsible Discharger shall conduct non-visible pollutant monitoring, as required in Attachment D or E Section III.D.3, when the TMDL-specific pollutant may be discharged due to a failure to implement BMPs, a container spill or leak, or a BMP breach, failure, or malfunction.

I.B.2.c. The Responsible Discharger shall compare the non-visible pollutant monitoring analytical results to the applicable numeric action level(s) in Table H-2.

I.B.2.d. The Responsible Discharger shall certify and submit all analytical results in SMARTS within 30 days of receiving the results, or within 10 days of receiving results above an applicable numeric action level.

I.B.2.e. A TMDL-related numeric action level exceedance occurs on the second, and each subsequent, analytical result for samples taken from any and all discharge location(s) within the same drainage area, during the same reporting year and taken in accordance with Attachment D or E Section III.D.3, that is above the concentration set forth in the applicable numeric action level. A numeric action level exceedance is not a violation of this General Permit; however, it is a violation when the discharger fails to report and respond to the numeric action level exceedance(s).

I.B.2.f. The Regional Water Boards may assign additional monitoring, reporting, and BMP requirements upon obtaining site-specific information, including information about numeric action level exceedance(s).

I.C. Diazinon TMDL Implementation Requirements

I.C.1. Compliance with this General Permit

All Responsible Dischargers for the Diazinon TMDLs listed in Table H-2 shall comply with the requirements of this General Permit. Compliance with the requirements of this General Permit is consistent with the requirements and

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assumptions of the TMDL. The use of diazinon has been banned for non-agricultural use by the California Department of Pesticide Regulation and the use is prohibited at construction sites.

I.D. Nutrient TMDL Implementation Requirements

I.D.1. Compliance with this General Permit

All Responsible Dischargers for the Nutrient TMDLs listed in Table H-2 shall comply with the requirements of this General Permit.

I.D.2. Erosion and Sediment Control and RUSLE2[8] Modeling

I.D.2.a A Responsible Discharger that identifies on-site sources of nutrients in their pollutant source assessment and that were assigned a mass-based waste load allocation in an applicable Nutrient TMDL(s),[9] shall address the TMDL through the following in addition to complying with this General Permit:

i. Comply with the site-specific erosion and sediment control, post-construction, and all other requirements in this General Permit;

ii. Install erosion and sediment controls that will result in predicted erosion rates that are equal to pre-construction conditions (e.g., undisturbed vegetation for the area) for each phase of the construction project; and

iii. Use RUSLE2 modeling to calculate the predicted soil losses and sediment delivery rates when selecting temporary BMPs and controls to be applied during each phase of the project. The RUSLE2 modeling included in the SWPPP shall include:

1. Appropriate climatic variables, soil types, and slope topography for the area disturbed; and

2. Calculated soil loss and sediment delivery rates for the selected BMPs and controls equal to, or less than, the soil loss and sediment delivery rates for pre-construction conditions during each phase of the construction project.

I.D.3. Numeric Action Level

I.D.3.a. The Responsible Discharger shall implement BMPs to address nutrients listed in the TMDL and prevent exceedances of the applicable numeric action levels to the extent possible. The BMPs shall be visually inspected, maintained, repaired, and updated in the SWPPP in accordance with this General Permit's

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8 Revised Universal Soil Loss Equation, Version 2

9 Table H-2 specifies this section in the Compliance Action column for these TMDLs.

requirements specified in the Order and applicable requirements in Attachments D or E for the site's Risk or Type.

I.D.3.b. The Responsible Discharger shall conduct non-visible pollutant monitoring, as required in Attachment D or E Section III.D.3, when the TMDL-specific pollutant may be discharged due to a failure to implement BMPs, a container spill or leak, or a BMP breach, failure, or malfunction.

I.D.3.c. The Responsible Discharger shall compare the non-visible pollutant monitoring analytical results to the applicable numeric action level(s) in Table H-2.

I.D.3.d. The Responsible Discharger shall certify and submit all analytical results in SMARTS within 30 days of receiving the results, or within 10 days of receiving results above an applicable numeric action level.

I.D.3.e. A TMDL-related numeric action level exceedance occurs on the second, and each subsequent, analytical result for samples taken from any and all discharge location(s) within the same drainage area, during the same reporting year and taken in accordance with Attachment D or E Section III.D.3, that is above the concentration set forth in the applicable numeric action level. A numeric action level exceedance is not a violation of this General Permit; however, it is a violation when the discharger fails to report and respond to the numeric action level exceedance(s).

I.D.3.f. The Regional Water Boards may assign additional monitoring, reporting, and BMP requirements upon obtaining site-specific information, including information about the numeric action level exceedance(s).

I.D.4. Numeric Effluent Limitation

I.D.4.a. The Responsible Discharger shall implement BMPs to address nutrients and prevent exceedances of the applicable numeric effluent limitations. The BMPs shall be visually inspected, maintained, repaired, and updated in the SWPPP in accordance with this General Permit's requirements specified in the Order and applicable requirements in Attachments D or E for the site's Risk or Type.

I.D.4.b. The Responsible Discharger shall conduct non-visible pollutant monitoring, as required in Attachment D or E Section III.D.3, when the TMDL-specific pollutant may be discharged due to a failure to implement BMPs, a container spill or leak, or a BMP breach, failure, or malfunction.

I.D.4.c. The Responsible Discharger shall compare the non-visible pollutant monitoring analytical results to the applicable numeric effluent limitation(s) in Table H-2.

I.D.4.d. The Responsible Discharger shall certify and submit the analytical results in SMARTS within 30 days of receiving the results, or within 10 days of receiving results above an applicable numeric effluent limitation.

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I.D.4.e. A TMDL-related numeric effluent limitation exceedance occurs on the second, and each subsequent, analytical result for samples taken from any and all discharge location(s) within the same drainage area, during the same reporting year and taken in accordance with Attachment D or E Section III.D.3, that is above the concentration set forth in the applicable numeric effluent limitation. Upon exceedance of the applicable numeric effluent limitation, the Responsible Discharger shall comply with the Water Quality Based Corrective Actions in Section VI.Q of this General Permit's Order. A numeric effluent limitation exceedance is a violation of this General Permit and is subject to mandatory minimum penalties.

I.D.4.f. The Regional Water Boards may assign additional monitoring, reporting, and BMP requirements upon obtaining site-specific information, including information about exceedances of the numeric effluent limitation(s).

I.E. Sediment TMDL Implementation Requirements

I.E.1. Compliance with this General Permit

All Responsible Dischargers for the Sediment TMDLs listed in Table H-2 are to comply with the requirements of this General Permit. Compliance with the requirements of this General Permit is consistent with the requirements and assumptions of the Sediment TMDLs, unless specified below.

I.E.2. Erosion and Sediment Control BMPs and RUSLE2 Modeling

I.E.2.a. A Responsible Discharger assigned a mass-based sediment waste load allocation for sediment shall address the TMDL through the following in addition to complying with this General Permit:

I.E.2.a.i. Comply with the site-specific erosion and sediment control, post-construction, and all other requirements in this General Permit; and

I.E.2.a.ii. Use RUSLE2 modeling to calculate the predicted soil losses and sediment delivery rates when selecting temporary BMPs and controls to be applied during each phase of the project. The RUSLE2 modeling included in the SWPPP shall include:

1. Appropriate climatic variables, soil types, and slope topography for the area disturbed; and
2. Calculated soil loss and sediment delivery rates for the selected BMPs and controls equal to, or less than, the soil loss and sediment delivery rates for pre-construction conditions during each phase of the construction project.

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I.E.2.a.iii. A Responsible Discharger that is assigned a mass-based sediment waste load allocation of zero (0),[10] shall install erosion and sediment controls that will result in predicted erosion rates that are as protective as pre-construction conditions (e.g., undisturbed vegetation for the area). The calculated RUSLE2 soil loss and sediment delivery rates for the selected BMPs and controls shall be equal to, or less than, the soil loss and sediment delivery rates for pre-construction conditions during each phase of the construction project.

I.E.2.a.iv. A Responsible Discharger that is assigned a site-specific mass-based sediment waste load allocation,[11] shall install erosion and sediment controls that will result in predicted erosion rates that are equal to or less than the site-specific allocation for sediment loading. The calculated RUSLE2 soil loss and sediment delivery rates for the selected BMPs and controls shall be equal to, or less than, the site-specific mass-based sediment waste load allocation. The Responsible Discharger is required to calculate their site-specific mass-based sediment waste load allocation by multiplying the construction site's area by the water body's applicable load allocation, provided in Table H-3.

Table H-3: TMDL Watersheds with Site-Specific Mass-Based Sediment Waste Load Allocations[12]

TMDL Watershed	Waste Load Allocation (tons/mi^2/yr)
Lower Eel River Watershed (Road, Episodic)[13]	9
Lower Eel River Watershed (Road, Chronic)	17
Lower Eel River Watershed (Bank Erosion)	6
Middle Fork Eel River – Black Butte Subwatershed	7
Middle Fork Eel River – Elk Creek Subwatershed	41
Middle Fork Eel River – Round Valley Subwatershed	9
Middle Fork Eel River – Upper Middle Fork Subwatershed	9
Middle Fork Eel River – Williams/Thatcher Subwatershed	19
Middle Fork Eel River Watershed	23
Upper Main Eel River Watershed (Large Features >3,000 yds^3)	36
Upper Main Eel River Watershed (Road Related – Small Features)	14
Mad River Watershed (Roads)	174

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10 Table H-2 specifies this section in the Compliance Action column for these TMDLs.

11 Table H-2 specifies this section in the Compliance Action column for these TMDLs.

12 More information for specific TMDL watersheds and site-specific mass-based sediment TMDLs can be found in Section W.6.e of this General Permit's Fact Sheet.

13 Some waste load allocations may only apply to certain projects (e.g., roads, along banks, small or large features). Waste load allocations that only apply to certain projects are noted in parentheticals.

TMDL Watershed	Waste Load Allocation (tons/mi^2/yr)
Scott River Watershed (Roads and Small Streamside Features)	69
Trinity River – Upper Area Reference Subwatersheds[14]	281
Trinity River – Westside Tributaries Subwatershed	105
Trinity River – Upper Trinity Subwatershed	690
Trinity River – East Fork Tributaries Subwatershed	65
Trinity River – Eastside Tributaries Subwatershed	60
Trinity River – Weaver and Rush Creeks Subwatershed	169
Trinity River – Deadwood Creek, Hoadley Gulch, and Poker Bar Area Subwatershed	68
Trinity River – Lewiston Lake Area Subwatershed	49
Trinity River – Grass Valley Creek Subwatershed	44
Trinity River – Indian Creek Subwatershed	81
Trinity River – Reading and Browns Creek Subwatershed	66
Trinity River – Lower Middle Area Reference Subwatersheds[15]	24
Trinity River – Canyon Creek Subwatershed	326
Trinity River – Upper Tributaries Subwatershed	67
Trinity River – Middle Tributaries Subwatershed	53
Trinity River – Lower Tributaries Subwatershed	55
Trinity River – Lower Area Reference Subwatersheds[16]	528
Trinity River – Mill Creek and Tish Tang Subwatershed	210
Trinity River – Willow Creek Subwatershed	94
Trinity River – Campbell Creek and Supply Creek Subwatershed	1961
Trinity River – Lower Mainstem Area and Coon Creek Subwatershed	63

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I.E.3. Los Peñasquitos Lagoon Sediment TMDL

I.E.3.a. All Responsible Dischargers for the Los Peñasquitos Lagoon Sediment TMDL shall provide an estimate of the representative flow rate of discharge from the construction project for at least one precipitation event each reporting year, in addition to complying with this General Permit.

I.E.3.b. The Responsible Discharger shall submit the representative flow estimate as a PDF attachment to the Annual Report (due in SMARTS no later than September 1 of each year).

14 Stuarts Fork, Swift Creek, and Coffee Creek

15 New River, Big French, Manzanita, North Fork, East Fork, North Fork

16 Horse Linto Creek

I.F. Temperature TMDL Implementation Requirements

I.F.1. Compliance with this General Permit

All Responsible Dischargers for the Temperature TMDLs listed in Table H-2 shall comply with the requirements of this General Permit. Compliance with this General Permit is consistent with the requirements and assumptions of the North Coast Temperature TMDL Implementation Policy and no additional requirements are incorporated into this General Permit to implement Temperature TMDLs listed in Table H-2.

I.G. Metals and Toxics TMDL Implementation Requirements

I.G.1. Compliance with this General Permit

All Responsible Dischargers for the Metals or Toxics TMDLs listed in Table H-2 shall comply with the requirements of this General Permit. Compliance with the requirements of this General Permit is consistent with the requirements and assumptions of the Metals or Toxics TMDLs, unless specified below.

I.G.2. Erosion and Sediment Control BMPs and RUSLE2 Modeling

I.G.2.a. A Responsible Discharger that identifies on-site sources of metals or toxics in their pollutant source assessment and are assigned a mass-based waste load allocation, shall address the TMDL through the following in addition to complying with this General Permit:

i. Comply with the site-specific erosion and sediment control, post-construction, and all other requirements in this General Permit;

ii. Install erosion and sediment controls that will result in predicted erosion rates that are as protective as pre-construction conditions (e.g., undisturbed vegetation for the area) for each phase of the construction project; and

iii. Use RUSLE2 modeling to calculate the predicted soil losses and sediment delivery rates when selecting temporary BMPs and controls to be applied during each phase of the project. The RUSLE2 modeling included in the SWPPP shall include:

1. Appropriate climatic variables, soil types, and slope topography for the area disturbed; and

2. Calculated soil loss and sediment delivery rates for the selected BMPs and controls equal to, or less than, the soil loss and sediment delivery rates for pre-construction conditions during each phase of the construction project.

I.G.3. Numeric Action Level

I.G.3.a. The Responsible Discharger shall implement BMPs to address the metals or toxics listed in the TMDL and prevent exceedances of the applicable numeric

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action levels to the extent possible. The BMPs shall be visually inspected, maintained, repaired, and updated in the SWPPP in accordance with this General Permit's requirements specified in the Order and applicable requirements in Attachments D or E for the site's Risk or Type.

I.G.3.b. The Responsible Discharger shall conduct non-visible pollutant monitoring, as required in Attachment D or E Section III.D.3, when the TMDL-specific pollutant may be discharged due to a failure to implement BMPs, a container spill or leak, or a BMP breach, failure, or malfunction.

I.G.3.c. The Responsible Discharger shall compare the non-visible pollutant monitoring analytical results to the applicable numeric action level(s) in Table H-2. The Responsible Discharger may provide the Water Boards adequate information demonstrating that it is infeasible to analyze the samples for compliance with a numeric action level using an ELAP-accredited laboratory for methods compliant with 40 Code of Federal Regulations Part 136. The Water Boards will specify the appropriate monitoring methods to determine compliance if it is demonstrated that it is infeasible to analyze samples for compliance with a numeric effluent limitation.

I.G.3.d. The Responsible Discharger shall certify and submit all analytical results in SMARTS within 30 days of receiving the results, or within 10 days of receiving results above an applicable numeric action level.

I.G.3.e. A TMDL-related numeric action level exceedance occurs on the second, and each subsequent, analytical result for samples taken from any and all discharge location(s) within the same drainage area, during the same reporting year and taken in accordance with Attachment D or E Section III.D.3, that is above the concentration set forth in the applicable numeric action level. A numeric action level exceedance is not a violation of this General Permit; however, it is a violation when the discharger fails to report and respond to the numeric action level exceedance(s).

I.G.3.f. The Regional Water Boards may assign additional monitoring, reporting, and BMP requirements upon obtaining site-specific information, including information about the numeric action level exceedance(s).

I.G.4. Numeric Effluent Limitation

I.G.4.a. The Responsible Discharger shall implement BMPs to address the metals or toxics listed in the TMDL and prevent exceedances of the applicable numeric effluent limitations. The BMPs shall be visually inspected, maintained, repaired, and updated in the SWPPP in accordance with this General Permit's requirements specified in the Order and applicable requirements in Attachments D or E for the site's Risk Level or Type.

I.G.4.b. The Responsible Discharger shall conduct non-visible pollutant monitoring, as required in Attachment D or E Section III.D.3, when the TMDL specific pollutant

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may be discharged due to a failure to implement BMPs, a container spill or leak, or a BMP breach, failure, or malfunction.

I.G.4.c. The Responsible Discharger shall compare the non-visible pollutant monitoring analytical results to the applicable numeric effluent limitation(s) in Table H-2. The Responsible Discharger may provide the Water Boards information demonstrating that it is infeasible to analyze the samples for compliance with a numeric effluent limitation using an ELAP-accredited laboratory for methods compliant with 40 Code of Federal Regulations Part 136. The Water Boards will specify the appropriate monitoring methods to determine compliance if it is demonstrated that it is infeasible to analyze samples for compliance with a numeric effluent limitation. See the TMDL-related soil screening investigation and associated total suspended solids (TSS) numeric effluent limitations for the Los Angeles Area Lakes TMDL and the Los Angeles and Long Beach Harbor Waters TMDL in Section I.G.5 below, if applicable.

I.G.4.d. The Responsible Discharger shall certify and submit the analytical results in SMARTS within 30 days of receiving the results, or within 10 days of receiving results above an applicable numeric effluent limitation.

I.G.4.e. A TMDL-related numeric effluent limitation exceedance occurs on the second, and each subsequent, analytical result for samples taken from any and all discharge location(s) within the same drainage area, during the same reporting year and taken in accordance with Attachment D or E Section III.D.3, that is above the concentration set forth in the applicable numeric effluent limitation. Upon exceedance of the applicable numeric effluent limitation, the Responsible Discharger shall comply with the Water Quality Based Corrective Actions in Section VI.Q of this General Permit's Order. A numeric effluent limitation exceedance is a violation of this General Permit and is subject to mandatory minimum penalties.

I.G.4.f. The Regional Water Boards may assign additional monitoring, reporting, and BMP requirements upon obtaining site-specific information, including information about exceedances of the numeric effluent limitation(s).

I.G.5. TMDL-related Soil Screening Investigation and Associated TSS Numeric Effluent Limitations

I.G.5.a. To comply with the Los Angeles Area Lakes TMDL for chlordane, DDT, dieldrin, and PCBs and, beginning March 23, 2032, the Los Angeles and Long Beach Harbor Waters TMDL for copper, lead, and zinc, dischargers that discharge to: 1) Peck Road Park Lake, Echo Park Lake, or Puddingstone Reservoir; or 2) Dominguez Channel or Torrance Lateral Channel shall use the following soil screening investigation as part of their pollutant source assessment and comply with the numeric effluent limitation for TSS, if applicable. As set forth in Order, Section VI.O.4, this General Permit may be reopened prior to March 23, 2032,

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to revise the requirements implementing the Los Angeles and Long Beach Harbor Waters TMDL for copper, lead, and zinc. As set forth in Order, Section VI.O.5, this General Permit may be reopened to revise the requirements implementing the Los Angeles Lakes TMDL for chlordane, DDT, dieldrin, and PCBs at a publicly noticed Board meeting.

I.G.5.a.i. The discharger shall conduct a soil screening investigation as part of the pollutant source assessment, prior to initiation of land disturbance activities at the site, to determine whether subsequent numeric effluent limitation sampling is required. The soil screening investigation shall be conducted by, or under the direction of, a California Professional Engineer (PE), California Professional Geologist (PG), or Qualified SWPPP Developer (QSD).

I.G.5.a.ii. Soil Sampling Locations[17]

I.G.5.a.ii.1. The discharger shall determine sampling plots by graphically applying a sampling grid with perpendicular line intersections to a map or other representation of the entire parcel or construction site. Each plot or block of the grid overlay must be sized in accordance with the scale specifications in Table H-4 below.

Table H-4: Soil Sampling Plot Specifications

Total Parcel or Site Area	>1 to 5 acres	>5 to 20 acres	>20 acres
Sampling Grid Scale	One-quarter acre	One-half acre	One acre

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I.G.5.a.ii.2. The discharger shall collect at least one soil sample from a randomly selected location within each sampling plot. To ensure randomness, each plot shall be further divided into nine equal subsections, each assigned a unique number from one to nine. The discharger shall use a random number generator to select which subsection will be sampled; the soil sample location may be anywhere within the selected subsection.

I.G.5.a.iii. Soil Sample Collection

I.G.5.a.iii.1. The discharger may utilize hand sampling methods or devices such as mechanical or hydraulic earth drills to collect soil samples. Hand methods may be economically preferable as the required soil sample depths are less than two feet.

I.G.5.a.iii.2. The discharger shall obtain a three-point composite sample of in-situ soil, consisting of roughly equal volumes from 6 inches, 12 inches, and 18 inches

17 The sampling protocol was modified from United States Environmental Protection Agency "Superfund Soil Screening Guidance" and United States Department of Agriculture and Natural Resource Conservation Service "Sampling Soils for Nutrient Management".

below surface at each soil sample location. The listed depths are the 'start depths' or 'top depths' for each composite portion. Soil samples shall be obtained from below the grass or forb root zone if present. The total quantity of each soil sample shall be approximately 20 cubic inches of volume, or one pound (0.5 kilograms) by weight.

I.G.5.a.iii.3. The discharger shall immediately seal brass or acrylic sampling tubes sealed with Teflon™ squares and plastic caps. Otherwise, soil samples shall be placed in 500 milliliter glass jars with tightly sealable caps.

I.G.5.a.iii.4. The discharger shall label each soil sample with a unique identifier, the address or location of the site, the name of the person that collected the sample, and the collection date.

I.G.5.a.iii.5. The Responsible Discharger shall maintain soil samples at a temperature of 4°Celsius until delivered to an ELAP-accredited analytical laboratory under chain-of-custody for analysis.

I.G.5.a.iv. Soil Sample Analysis

I.G.5.a.iv.1. For total copper, total lead, and total zinc, the discharger shall use EPA method 6010D, 6020B, or a comparable method validated for the analysis of metals in soil samples. For chlordane, DDT, and dieldrin, the discharger shall use EPA method 8081B or a comparable method validated for the analysis of chlordane, DDT, and dieldrin in soil samples. For PCBs, the discharger shall use EPA method 8082A or a comparable method validated for the analysis of PCBs in soil samples.

I.G.5.a.iv.2. The laboratory report must include the reporting limit for each analyte.

I.G.5.a.v. Soil Sample Reporting

The discharger shall submit soil sample analytical results via SMARTS prior to initiation of land disturbance activities.

I.G.5.a.vi. TSS Numeric Effluent Limitation

I.G.5.a.vi.1. If all soil sample analysis results for each applicable TMDL analyte are below their respective analytical reporting limits, the discharger is not considered a Responsible Discharger and does not have to sample for the TMDL-specific pollutant(s) under the non-visible pollutant monitoring requirements in Attachments D or E Section III.D.3, of this General Permit.

I.G.5.a.vi.2. If one or more of the specified TMDL analytes are measured above the respective analytical reporting limits, the discharger is considered a Responsible Discharger and shall:

a. Implement sediment control BMPs that are effective at removing the applicable TMDL-specific pollutant, such as, but not limited to, media filter socks or fiber rolls, advanced silt fencing, and sedimentation

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basins. The BMPs shall be visually inspected, maintained, repaired, and updated in the SWPPP in accordance with this General Permit's requirements specified in the Order and applicable requirements in Attachments D or E for the site's Risk Level or Type.

b. Comply with a TSS numeric effluent limitation of 100 mg/L, as follows:

i. Collect samples for TSS following the same procedure as non-visible pollutant monitoring, as required in Attachment D or E Section III.D.3, when the TMDL-specific pollutants may be discharged due to failure to implement BMPs, a container spill or leak, or a BMP breach, failure, or malfunction.

ii. Analyze the collected samples using the current version of Standard Method 2540 D.

iii. Compare the analytical results to a numeric effluent limitation of 100 mg/L of TSS[18], as the applicable limitation for each of the applicable TMDL-specific pollutants identified in the soil screening investigation process described above.

iv. Certify and submit the analytical results in SMARTS within 30 days of receiving the results or within 10 days of receiving results above the numeric effluent limitation for TSS.

I.G.5.a.vi.3. A TMDL-related numeric effluent limitation exceedance occurs on the second, and each subsequent, analytical result for samples taken from any and all discharge location(s) within the same drainage area, during the same reporting year and taken in accordance with Attachment D or E Section III.D.3, that is above the concentration set forth in the numeric effluent limitation. For the second and each subsequent analytical result that is above the TSS numeric effluent limitation, the exceedance shall apply to every TMDL-specific pollutant identified in the soil screening investigation process, regardless of any results from the informational monitoring described in I.G.6 below. Upon exceedance of the numeric effluent limitation, the Responsible Discharger shall comply with the Water Quality Based Corrective Actions in Section VI.Q of this General Permit's Order. A

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[18] Nasrabadi T, Ruegner H, Schwientek M, Bennett J, Fazel Valipour S, Grathwohl P (2018) "Bulk metal concentrations versus total suspended solids in rivers: Time-invariant & catchment-specific relationships."

Washington Department of Ecology (2004) "A Total Maximum Daily Load Evaluation for Chlorinated Pesticides and PCBs in the Walla Walla River."

Angela Gorgoglione, Fabián A. Bombardelli, Bruno J. L. Pitton, Lorence R. Oki, Darren L. Haver and Thomas M. Young (2018), "Role of Sediments in Insecticide Runoff from Urban Surfaces: Analysis and Modeling."

numeric effluent limitation exceedance is a violation of this General Permit and is subject to mandatory minimum penalties.

I.G.5.a.vi.4. The Regional Water Boards may require additional monitoring, reporting, and BMP requirements upon obtaining site-specific information, including information about exceedances of the numeric effluent limitation.

I.G.6. Water Quality Sampling for Los Angeles and Long Beach Harbor Waters Metals TMDL starting March 23, 2032

This General Permit implements TSS numeric effluent limitations as a surrogate for limiting discharges of sediment-bound total copper, total lead, and total zinc. Starting March 23, 2032, to correlate and quantify actual discharges of copper, lead, and zinc concentrations in construction stormwater discharges with measured discharge concentrations of TSS, the Responsible Dischargers for the Los Angeles and Long Beach Harbor Waters Metals TMDL, as determined by Section I.G.5 above, shall:

a. Collect effluent water quality samples following the same procedure as non-visible pollutant monitoring, as required in Attachment D or E Section III.D.3, when the pollutants may be discharged due to failure to implement BMPs, a container spill or leak, or a BMP breach, failure, or malfunction.

b. Analyze the collected samples for total copper, total lead, and total zinc, using an ELAP-accredited laboratory for methods compliant with 40 Code of Federal Regulations Part 136.

c. Certify and submit the analytical results in SMARTS within 30 days of receiving the results.

d. The analytical results are informational only and will not be used to assess compliance with any limitation in this General Permit.

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ATTACHMENT I

REQUIREMENTS FOR DISCHARGERS GRANTED A REGULATORY EXCEPTION FOR DISCHARGES TO AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED
WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES
(GENERAL PERMIT)

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A. AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE

A.1. Areas of Special Biological Significance (ASBS) are defined in the Water Quality Control Plan for Ocean Waters of California (California Ocean Plan) as "those areas designated by the State Water Resources Control Board (State Water Board) as ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable."

A.2. The California Ocean Plan prohibits the discharge of waste to an ASBS.

A.3. The California Ocean Plan authorizes the State Water Board to grant an exception to California Ocean Plan provisions where the Board determines that the exception will not compromise protection of ocean waters for beneficial uses and the public interest will be served.

A.4. On March 20, 2012, the State Water Board adopted Resolution 2012-0012 (amended by Resolution 2012-0031) which contained a general exception to the California Ocean Plan for discharges of stormwater and non-point sources (ASBS Exception). This resolution also contains the Special Protections that are to be implemented for discharges directly to an ASBS. Resolution 2012-0012 (as amended by Resolution 2012-0031) is hereby incorporated by reference and construction stormwater dischargers discharging directly to an ASBS must comply with its requirements.

A.5. This General Permit requires dischargers who have been granted a California Ocean Plan exception for discharges to an ASBS to comply with the requirements contained in the Special Protections. These requirements are contained below.

B. ASBS NON-STORMWATER DISCHARGES

B.1. The term "ASBS Non-Stormwater Discharges" means any waste discharges from a municipal separate storm sewer system (MS4) or other NPDES permitted storm drain system to an ASBS that are not comprised entirely of stormwater.

B.2. Only the following ASBS Non-Stormwater Discharges are allowed, provided that the discharges are essential for emergency response purposes, structural stability, slope stability, or occur naturally:

a. Discharges associated with emergency firefighting operations.

b. Foundation and footing drains.

c. Water from crawl space or basement pumps.

d. Hillside dewatering.

e. Naturally occurring groundwater seepage via a storm drain.

f. Non-anthropogenic flows from a naturally occurring stream via a culvert or storm drain, as long as there are no contributions of anthropogenic runoff.

B.3. Authorized ASBS Non-Stormwater Discharges shall not cause or contribute to a violation of the water quality objectives in Chapter II of the California Ocean Plan nor alter natural ocean water quality in an ASBS.

B.4. In the San Clemente Island ASBS, discharges incidental to military training and research, development, test, and evaluation operations are allowed. Discharges incidental to underwater demolition and other in-water explosions are not allowed in the two military closure areas in the vicinity of Wilson Cove and Castle Rock. Discharges must not result in a violation of the water quality objectives, including the protection of the marine aquatic life beneficial use, anywhere in the ASBS.

B.5. In the San Nicolas Island and Begg Rock ASBS, discharges incidental to military research, development, testing, and evaluation of, and training with, guided missile and other weapons systems, fleet training exercises, small-scale amphibious warfare training, and special warfare training are allowed. Discharges incidental to underwater demolition and other in-water explosions are not allowed. Discharges must not result in a violation of the water quality objectives, including the protection of the marine aquatic life beneficial use, anywhere in the ASBS.

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C. ASBS COMPLIANCE PLAN

C.1. State Water Board Resolution 2012-0012 grants an exception to the California Ocean Plan's prohibition on discharges to an ASBS (ASBS Exception) to applicants who were identified as dischargers of construction stormwater to an ASBS (ASBS dischargers). Each ASBS discharger shall specifically address the prohibition of ASBS Non-Stormwater Discharges and the requirement to maintain natural water quality for construction stormwater discharges to an ASBS in an ASBS Compliance Plan to be included in the ASBS discharger's Stormwater Pollution Prevention Plan (SWPPP). The ASBS Compliance Plan is subject to approval by the Executive Director of the State Water Board. The ASBS Compliance Plan shall include:

a. A map of surface drainage of stormwater runoff, showing areas of sheet runoff and priority discharges, and a description of any structural Best Management Practices (BMPs) already employed and/or BMPs to be employed in the future. Priority discharges are those that pose the greatest water quality threat, and which are identified as requiring installation of structural BMPs. The map shall also show the stormwater conveyances in relation to other features such as service areas, sewage conveyances and treatment facilities, landslides, areas prone to erosion, and waste and hazardous material storage areas, if applicable. The SWPPP shall also include a procedure for updating the map and plan when changes are made to the stormwater conveyance facilities.

b. A description of the measures by which all unauthorized ASBS Non-Stormwater Discharges (e.g., dry weather flows) has been eliminated, how these measures will be maintained over time, and how these measures are monitored and documented.

c. A description of how pollutant reductions in stormwater runoff, that are necessary to comply with these special conditions, will be achieved through BMPs. Structural BMPs need not be installed if the discharger can document to the satisfaction of the Executive Director that such installation would pose a threat to health or safety. BMPs to control stormwater runoff discharges (at the end-of-pipe) during a design storm shall be designed to achieve on average the following target levels:

   i. Instantaneous Maximum Water Quality Objectives in Table 1 (provided at the end of this Attachment); or

   ii. A 90 percent reduction in pollutant loading during storm events, for the applicant's total discharges.

d. A description of how the ASBS discharger will address erosion and the prevention of anthropogenic sedimentation in the ASBS. The natural habitat conditions in the ASBS shall not be altered as a result of anthropogenic sedimentation.

e. A description of the non-structural BMPs currently employed and planned in the future (including those for construction activities), and an implementation schedule. The ASBS Compliance Plan shall also describe the structural BMPs, including any low impact development measures, currently employed and planned for higher threat discharges and include an implementation schedule. To control stormwater runoff discharges (at the end-of-pipe) during a design storm, ASBS dischargers must first consider using low impact development practices to infiltrate, use, or evapotranspiration stormwater runoff on-site. The BMPs and implementation schedule shall be designed to ensure that natural water quality conditions in the receiving water are achieved and maintained by either reducing flows from impervious surfaces or reducing pollutant loading, or some combination thereof.

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D. REPORTING

If the results of the receiving water monitoring described in Section E below (Sampling and Analysis Requirements) indicate that the stormwater runoff is causing or contributing to an alteration of natural ocean water quality in the ASBS, the ASBS discharger shall submit a report to the State Water Board within 30 days of receiving the results.

D.1. The report shall identify the constituents in stormwater runoff that alter natural ocean water quality and the sources of these constituents.

D.2. The report shall describe BMPs that are currently being implemented, BMPs that are identified in the SWPPP for future implementation, and any additional BMPs

that may be added to the SWPPP to address the alteration of natural water quality. The report shall include a new or modified implementation schedule for the BMPs.

D.3. The ASBS discharger shall revise its ASBS Compliance Plan to incorporate any new or modified BMPs that have been or will be implemented, the implementation schedule, and any additional monitoring required within 30 days of the approval of the report by the Executive Director.

D.4. The discharger does not have to repeat the same procedure for continuing or recurring exceedances of natural ocean water quality conditions due to the same constituent when the ASBS discharger is in compliance with the procedures described above and is implementing the revised SWPPP.

D.5. Compliance with this Section does not excuse violations of any term, prohibition, or special condition contained in the Special Protections of the ASBS Exception.

E. SAMPLING AND ANALYSIS REQUIREMENTS

E.1. Monitoring is mandatory for all ASBS dischargers to assure compliance with the California Ocean Plan. Monitoring requirements include both: (1) Core Discharge Monitoring and (2) Ocean Receiving Water Monitoring (see sections below). The State Water Board and Regional Water Quality Control Boards (Regional Water Boards) must approve sampling site locations and any adjustments to the monitoring programs. All ocean receiving water and reference area monitoring must be comparable with the Water Boards' Surface Water Ambient Monitoring Program (SWAMP).

E.2. Sample locations and sampling periods must be determined considering safety issues. Sampling may be postponed upon notifying the State Water Board Executive Director or the appropriate Regional Water Board Executive Officer that hazardous conditions prevail.

E.3. All constituents must be analyzed using the lowest minimum detection limits comparable to the California Ocean Plan water quality objectives and in compliance with U.S. EPA sufficiently sensitive method requirements in 40 Code of Federal Regulations Part 136. All samples being analyzed for metals (including stormwater effluent, reference samples, and ocean receiving water samples) must use an approved analytical method with the lowest minimum detection limits (currently Inductively Coupled Plasma/Mass Spectrometry) described in the California Ocean Plan.

F. CORE DISCHARGE MONITORING PROGRAM

F.1. General Sampling Requirements for Timing and Storm Size

Runoff must be collected during a storm event that is greater than 0.1 inch and generates runoff, and at least 72 hours from the previously measurable storm event. Runoff samples shall be collected during the same storm and approximately at the same time as the post-storm receiving water and reference site samples being analyzed for the same constituents as described in Section G below.

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F.2. Runoff Samples – Storm Events

F.2.a. For outfalls[1] equal to or greater than 18 inches (0.46 meter) in diameter or width, samples of stormwater runoff shall be:

i. Collected during the same storm as receiving water samples and analyzed for oil and grease, total suspended solids, and, if within the range of the southern sea otter, indicator bacteria or some other measure of fecal contamination; and

ii. Collected and analyzed for critical life stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS.

F.2.b. For outfalls equal to or greater than 36 inches (0.91 meter) in diameter or width, samples of stormwater runoff shall be:

i. Collected during the same storm as receiving water samples and analyzed for turbidity, pH, and, if within the range of the southern sea otter, indicator bacteria or some other measure of fecal contamination;

ii. Collected during the same storm as receiving water samples and analyzed for the metals in Table 1 (provided at the end of this Attachment) for protection of marine life, California Ocean Plan polynuclear aromatic hydrocarbons (PAHs), currently used pesticides (pyrethroids and organophosphate pesticides), and nutrients (ammonia, nitrate, and phosphates); and

iii. Collected and analyzed for critical life stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS.

F.2.c. If an ASBS discharger has no outfall greater than 36 inches, then stormwater runoff from the discharger's largest outfall shall be further collected during the same storm as receiving water samples and analyzed for the metals in Table 1 (provided at the end of this Attachment) for protection of marine life, California Ocean Plan polynuclear aromatic hydrocarbons (PAHs), current use pesticides (pyrethroids and organophosphate pesticides), and nutrients (ammonia, nitrate, and phosphates).

F.2.d. For a General Permit applicant not participating in a regional integrated monitoring program (see below in Section G.3), in addition to the sampling requirements in Section F.2.a and b above, a minimum of the two largest outfalls or 20 percent of the larger outfalls, whichever is greater, shall be sampled (flow weighted composite samples) at least three times annually during wet weather (storm event) and analyzed for all Table 2 constituents, Table 1 constituents (Table 1 and 2 constituents are provided at the end of this Attachment) for marine aquatic life protection (except for toxicity, only chronic toxicity for three

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1 Outfalls mean a discharge location, including, but not limited to pipes, ditches, swales, and other points of concentrated flow.

species shall be required), dichlorodiphenyltrichloroethane (DDT), polychlorinated biphenyls (PCBs), California Ocean Plan PAHs, organophosphate pesticides, pyrethroids, nitrates, phosphates, and California Ocean Plan indicator bacteria. For parties discharging to an ASBS in more than one Regional Water Board region, at a minimum, one (the largest) such discharge shall be sampled annually in each region.

F.2.e. The Executive Director may reduce or suspend core monitoring once the storm runoff is fully characterized. This determination may be made at any point after the discharge is fully characterized but is best made after the monitoring results from the first permit cycle are assessed.

G. OCEAN RECEIVING WATER AND REFERENCE AREA MONITORING PROGRAM

G.1. All ASBS dischargers must perform ocean receiving water monitoring in addition to performing the Core Discharge Monitoring Program in Section F above. ASBS dischargers may choose either: (1) an individual monitoring program, or (2) participation in a regional integrated monitoring program to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within their ASBS.

G.2. Individual Monitoring Program

G.2.a. The requirements listed below are for those ASBS dischargers who elect to perform an individual monitoring program to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within the affected ASBS. In addition to Core Discharge Monitoring, the following additional monitoring requirements shall be met.

G.2.a.i. The receiving water at the point of discharge from the outfalls described in Section F.2 above shall be: sampled three times annually during wet weather (storm events); analyzed for Table 1 constituents and Table 2 constituents (provided at the end of this Attachment) for marine aquatic life, DDT, PCBs, California Ocean Plan PAHs, organophosphate pesticides, pyrethroids, nitrates, phosphates, salinity, chronic toxicity (three species), and California Ocean Plan indicator bacteria.

G.2.a.ii. The sample location for the ocean receiving water shall be in the surf zone at the point of discharges; this must be at the same location where stormwater runoff is sampled. Receiving water shall be sampled prior to (pre-storm), and during (or immediately after) the same storm (post-storm). Post-storm sampling shall be representative of the same storm and at approximately the same time as when the runoff is sampled. Reference water quality shall also be sampled three times annually and analyzed for the same constituents as the pre-storm and post-storm sampling, during the same storm seasons when receiving water is sampled. Reference stations will be determined by the State Water Board, Division of Water Quality staff and applicable Regional Water Board(s) staff.

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G.2.a.iii. The sediment sampling shall occur at least three times during every five-year period. The subtidal sediment (sand or finer, if present) at the discharge shall be sampled and analyzed for Table 1 constituents (provided at the end of this Attachment) for marine aquatic life, DDT, PCBs, PAHs, pyrethroids, and organophosphate pesticides. Only an acute toxicity test using the amphipod *Eohaustorius estuarius* must be performed for sediment toxicity testing.

G.2.a.iv. A quantitative survey of intertidal benthic marine life shall be performed at the discharge and reference site(s). The survey shall be performed at least once during every five-year period. The survey design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The results of the survey shall be completed and submitted to the State Water Board and Regional Water Board at least six months prior to the end of the permit cycle.

G.2.a.v. A bioaccumulation study shall be conducted to determine the concentrations of metals and synthetic organic pollutants at representative discharge and reference sites once during each five-year period. The study design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The bioaccumulation study may include California mussels (*Mytilus californianus*) and/or sand crabs (*Emerita analoga* or *Blepharipoda occidentalis*). Based on the study results, the Regional Water Board and the State Water Board's Division of Water Quality, may adjust the study design in subsequent permits, add or modify additional test organisms (such as shore crabs or fish), or modify the study design appropriate for the area and best available sensitive measures of contaminant exposure.

G.2.a.vi. Representative quantitative observations for debris/trash by type and source shall be performed along the coast of the ASBS within the influence of the ASBS discharger's outfall(s). The design, including locations and frequency, of the trash/debris observations is subject to approval by the Regional Water Board and State Water Board's Division of Water Quality.

G.2.a.vii. The monitoring requirements of this section G.2. Individual Monitoring Program, are minimum requirements. After a minimum of one year of continuous water quality monitoring of the discharges and ocean receiving waters, the Executive Director of the State Water Board may require additional monitoring, or adjust, reduce, or suspend receiving water and reference station monitoring. This determination may be made at any point after the discharge and receiving water is fully characterized but is best made after the monitoring results from the first permit cycle are assessed.

G.3. Regional Integrated Monitoring Program

G.3.a. An ASBS discharger may elect to participate in a regional integrated monitoring program, in lieu of an individual monitoring program, to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within their ASBS. This regional approach shall characterize natural water quality, pre- and post-storm, in-ocean reference areas near the mouths of identified open space watersheds and the effects of the discharges on

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natural water quality (physical, chemical, and toxicity) in the ASBS receiving waters, and should include benthic marine aquatic life and bioaccumulation components. The design of the ASBS stratum of a regional integrated monitoring program may deviate from the otherwise required individual monitoring program approach (Section G.2 of this Attachment) if approved by the State Water Board's Executive Director and/or the applicable Regional Water Board(s) Executive Officer(s).

G.3.b. Ocean reference areas shall be located at the drainages of flowing watersheds with minimal development (in no instance more than 10 percent development) and shall not be located in Clean Water Act § 303(d) listed waterbodies or have tributaries that are 303(d) listed. Reference areas shall be free of wastewater discharges and anthropogenic non-stormwater runoff. A minimum of low threat stormwater runoff discharges (e.g., stream highway overpasses and campgrounds) may be approved by the Regional Water Board(s) Executive Officer(s)and the State Water Board Executive Director on a case-by-case basis. Reference areas shall be located in the same region as where the ASBS receiving water monitoring occurs. The reference areas for each region are subject to approval by the participants in the regional integrated monitoring program, the State Water Board Executive Director, and the applicable Regional Water Board(s) Executive Officer(s). A minimum of three ocean reference water samples must be collected from each station, each from a separate storm during the same storm season that receiving water is sampled. A minimum of one reference location shall be sampled for each ASBS receiving water site sampled per responsible party. For parties discharging to an ASBS in more than one Regional Water Board region, at a minimum, one reference station and one receiving water station shall be sampled in each region.

G.3.c. The ASBS ocean receiving water must be sampled in the surf zone at the location where the runoff makes contact with ocean water (i.e., at "point zero"). Ocean receiving water stations must be representative of worst-case discharge conditions (i.e., co-located at a large drain greater than 36 inches, or if drains greater than 36 inches are not present in the ASBS then the largest drain greater than 18 inches.) Ocean receiving water stations are subject to approval by the participants in the regional monitoring program and the State Water Board Executive Director and the applicable Regional Water Board(s) Executive Officer(s). A minimum of three ocean receiving water samples must be collected during each storm season from each station, each from a separate storm. A minimum of one receiving water location shall be sampled in each ASBS per responsible party in that ASBS. For parties discharging to an ASBS in more than one Regional Water Board region, at a minimum, one reference station and one receiving water station shall be sampled in each region.

G.3.d. Reference and receiving water sampling shall commence during the first full storm season following the adoption of these special conditions, and post-storm samples shall be collected during the same storm event when stormwater runoff is sampled. Sampling shall occur in a minimum of two storm seasons. Sampling may be limited to only one storm season for ASBS dischargers that have already

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participated in the Southern California Bight 2008 ASBS regional monitoring effort.

G.3.e. Receiving water and reference samples shall be analyzed for the same constituents as stormwater runoff samples. At a minimum, constituents to be sampled and analyzed in reference and discharge receiving waters must include turbidity, pH, Table 1 metals (provided at the end of this Attachment) for protection of marine life, California Ocean Plan PAHs, pyrethroids, organophosphate pesticides, ammonia, nitrate, phosphates, and critical life stage chronic toxicity for three species. In addition, within the range of the southern sea otter, indicator bacteria or some other measure of fecal contamination shall be analyzed. The following flowchart depicts how a discharger determines if their discharge is in compliance with natural water quality.

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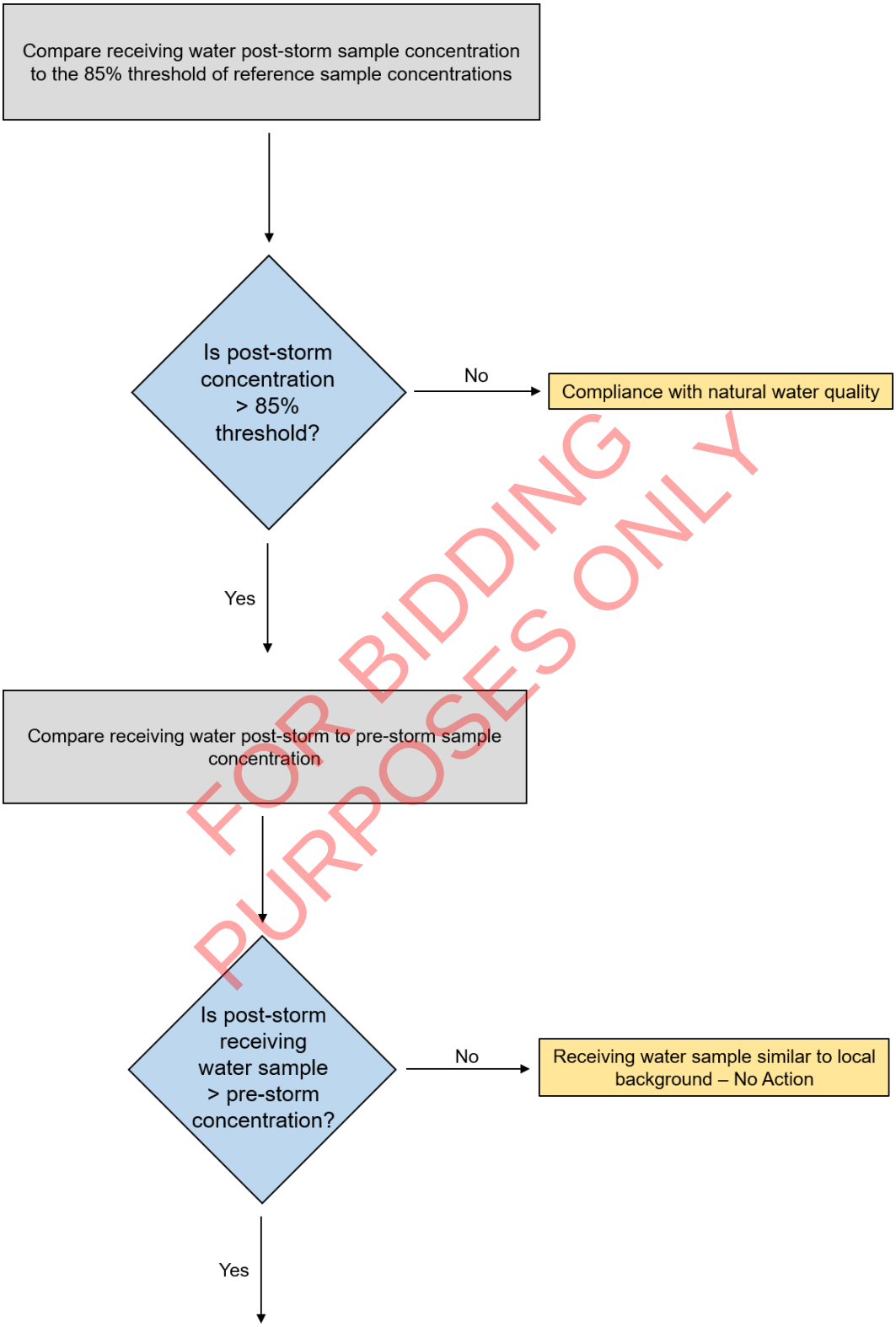
Flowchart to Determine Compliance with Natural Water Quality



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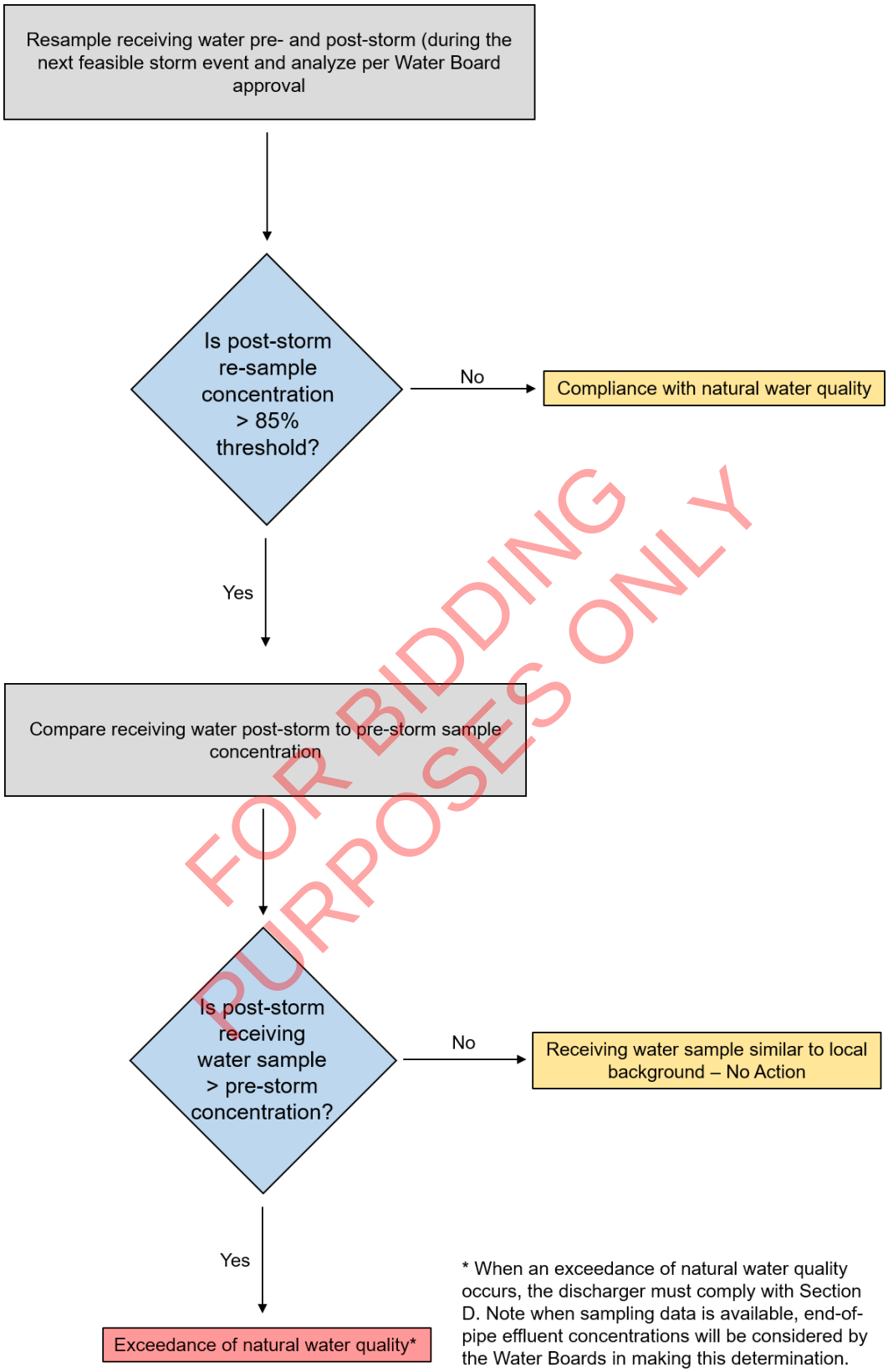

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Table 1 - Monitoring Constituent List
(Excerpted from the 2019 California Ocean Plan Table 3)

Constituent	Units
Arsenic	µg/L
Cadmium	µg/L
Chromium (Hexavalent)	µg/L
Copper	µg/L
Lead	µg/L
Mercury	µg/L
Nickel	µg/L
Selenium	µg/L
Silver	µg/L
Zinc	µg/L
Cyanide	µg/L
Total Chlorine Residual	µg/L
Ammonia (as N)	µg/L
Acute Toxicity	TUa
Chronic Toxicity	TUc
Phenolic Compounds (non-chlorinated)	µg/L
Chlorinated Phenolics	µg/L
Endosulfan	µg/L
Endrin	µg/L
Hexachlorocyclohexane	µg/L
Radioactivity	

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Table 2 - Monitoring Constituent List
(Excerpted from the 2019 California Ocean Plan Table 4)

Constituent	Units
Grease and Oil	mg/L
Suspended Solids	mg/L
Settleable Solids	mL/L
Turbidity	NTU
pH	

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ATTACHMENT J

DEWATERING REQUIREMENTS

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED
WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES
(GENERAL PERMIT)

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A. AUTHORIZED CONSTRUCTION DEWATERING DISCHARGES

A.1. Dischargers with dewatering activities subject to a separate NPDES permit for dewatering activities are not subject to the provisions in this Attachment, and shall obtain separate NPDES coverage as required by the State or Regional Water Board. Dischargers shall include in its Stormwater Pollution Prevention Plan (SWPPP), the separate NPDES permit coverage it holds for dewatering discharges.

A.2. Dewatering discharges authorized by this General Permit include mechanical pumping or syphoning of non-potable water from sources including, but not limited to: excavations, trenches, foundations, vaults, groundwater removal specifically related to the construction activities, and/or water collected in impoundments (e.g., ponds, puddles, low points on the active site, or other similar accumulation points).

A.3. This General Permit does not limit the State or Regional Water Boards' authority to modify dewatering discharge requirements upon providing written notice to the discharger, including but not limited to the following:

a. Adding constituents to be monitored;

b. Adding or modifying frequency of monitoring;

c. Adding or modifying sampling locations;

d. Requiring all or part of the discharge to be treated by an active treatment system (in accordance with Attachment F) prior to discharge; and/or

e. Revoking authorization of dewatering dischargers under this General Permit and requiring the discharger to obtain different NPDES permit coverage for dewatering discharges to waters of the United States.

B. GENERAL DEWATERING DISCHARGE REQUIREMENTS

B.1. Dischargers shall comply with the following dewatering discharge requirements:

a. The discharge complies with receiving water limitations in Section IV.D of this General Permit's Order;

b. The discharge is absent of pollutants in quantities that threaten to cause pollution or a nuisance[1];

c. The dewatering activity takes place in an area without known (including, but not limited to information from: Geotracker, local permitting authorities, Water Boards, etc.) soil and/or groundwater contamination where that contamination could cause an exceedance of receiving water limitations;

d. The discharger shall utilize outlet structures that withdraw water from the surface when conducing dewatering activity from sediment basins or similar impoundments, unless infeasible; and

e. The discharger shall cease discharge if necessary, as follows:

i. Through an automated sampling device capable of ceasing the discharge if a single sample concentration/level exceeds the numeric action level(s); or

ii. By a Qualified SWPPP Practitioner (QSP) or trained delegate who is present during the operation of the mechanical pumping and/or syphoning of the dewatering activity and is able to halt dewatering if a numeric action level is exceeded for a single sample.

C. DEWATERING DISCHARGE MONITORING REQUIREMENTS

C.1. The discharge shall be analyzed for pH and turbidity at the discharge location within the first hour of discharge and daily for continuous dewatering discharges. Each sample must instantaneously comply with the numerical action levels for pH (within 6.5 – 8.5 standard pH units) and turbidity (250 nephelometric turbidity units);

C.2. Dewatering discharge(s) exceeding the numeric action levels for pH and turbidity shall immediately cease until the dewatering discharge complies with the requirements in Sections B.1.a through e and D.5 and 6.

D. DEWATERING DISCHARGE REPORTING REQUIREMENTS

D.1. At least 24 hours prior to the beginning of a dewatering discharge, the discharger shall notify the applicable Regional Water Board stormwater staff via email[2] of the anticipated dewatering discharge.

D.2. The discharger shall notify the corresponding Regional Water Board and the applicable municipal separate storm sewer system within 24 hours of a discharge occurring if an exception to the requirement to cease discharge, as outlined in Section B.1.e, is necessary to protect human life and health or prevent severe property damage.

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1 40 Code of Federal Regulations section 131.12, and State Water Board Resolution No. 68-16.

2 Regional Water Board stormwater staff contacts listed in Attachment C of this General Permit.

D.3. The Qualified SWPPP Developer (QSD) shall update the site-specific SWPPP on-site at least 24 hours prior to the beginning of a dewatering discharge and upload the amended SWPPP to SMARTS within 14 days with current information required in Section D.4 below, if necessary. The revised SWPPP shall be uploaded as part of a Change of Information through SMARTS.

D.4. The QSD shall include the following site-specific SWPPP updates to address dewatering discharges:

a. On-site BMPs that are selected and implemented:

i. To prevent the dewatering discharge from contacting construction materials or equipment;

ii. That do not use waters of the United States as part of the treatment area, at all areas or points where dewatering is discharged; and

iii. To decelerate the velocity of dewatering discharge (e.g., check dams, sediment traps, riprap, and grouted riprap at outlets);

b. Cleaning and maintenance plan for all dewatering devices and filter media when the pressure equals or exceeds the manufacturer's specifications (if applicable);

c. Site-specific dewatering sampling protocols used to comply with requirements in Section B.1; and

d. A site map depicting the dewatering activity discharge area location(s).

D.5. The discharger shall enter results of all numeric action level (e.g., turbidity and pH) exceedances through SMARTS within 10 days of the field measurements demonstrating the exceedance.

D.6. The QSD shall revise the SWPPP to incorporate immediate corrective actions to prevent further exceedances of the numeric action levels for pH and turbidity, within 10 days of the exceedance.

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