

Construction Runoff Guidance Manual

for Contractors, Project Owners, and Developers

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Orange County Stormwater Program:

A Cooperative Project of the County of Orange,
Cities of Orange County and
Orange County Flood Control District



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1 Introduction and Overview

1.1 Introduction

This Construction Runoff Guidance Manual (Manual) is intended to enable applicants for building or grading permits to understand and comply with the regulatory requirements for creek, river, stream and coastal water protection during the construction phase of new development and significant redevelopment projects. Project owners and developers should be able to use this Manual as a guide to understand which permits and ordinances apply to their construction project. Contractors should be able to use this Manual as a guide to the Best Management Practices (BMPs) typically needed to be implemented at a construction site to ensure compliance with the Construction General Permit (CGP) and local ordinances.

1.2 Overview

The goal of this Manual is to provide useful, succinct information to enable contractors to control pollutant discharges from construction sites. Activities and materials used on a construction site may be a source of pollutants, including but not limited to sediment, concrete and grout; paints, lacquers, and primers; herbicides and pesticides; soaps and detergents; wood preservatives; equipment fuels, lubricants, coolants, and hydraulic fluids; and cleaning solvents. Water from construction sites can be a major transporter of these pollutants, which can leak from heavy equipment, be spilled, or can be eroded by rain from exposed soil or stockpiles. Once released, they can be transported into the receiving waters of the County of Orange (Orange County or “the County”), where they may enter aquatic food chains and cause fish toxicity problems, contribute to algal blooms, impair recreational uses, and degrade drinking water sources.

2 Regulatory Requirements

2.1 State and Regional Permit Requirements

Construction activity in Orange County is subject to regulation by both the Santa Ana and the San Diego Regional Water Quality Control Boards (Regional Boards or RWQCBs). The Regional Boards are responsible for implementing the Clean Water Act and the California Porter-Cologne Act. The boundary between the two Regional Board jurisdictions approximately follows El Toro Road in Lake Forest, separating the Santa Ana Region (Regional Board 8 or RB8) (north of El Toro Road) from the San Diego Region (Regional Board 9 or RB9) (south of El Toro Road). While some of the permits listed in Table 1 are issued statewide by the State Water Resources Control Board (State Board or SWRCB) and implemented throughout the state by the Regional Boards, other permits, like dewatering or de minimus permits, are issued and implemented on a Region-by-Region basis. Additionally, the Regional Boards issue Municipal Separate Storm Sewer System (MS4) Permits to the County and cities, which include additional requirements for managing construction sites.

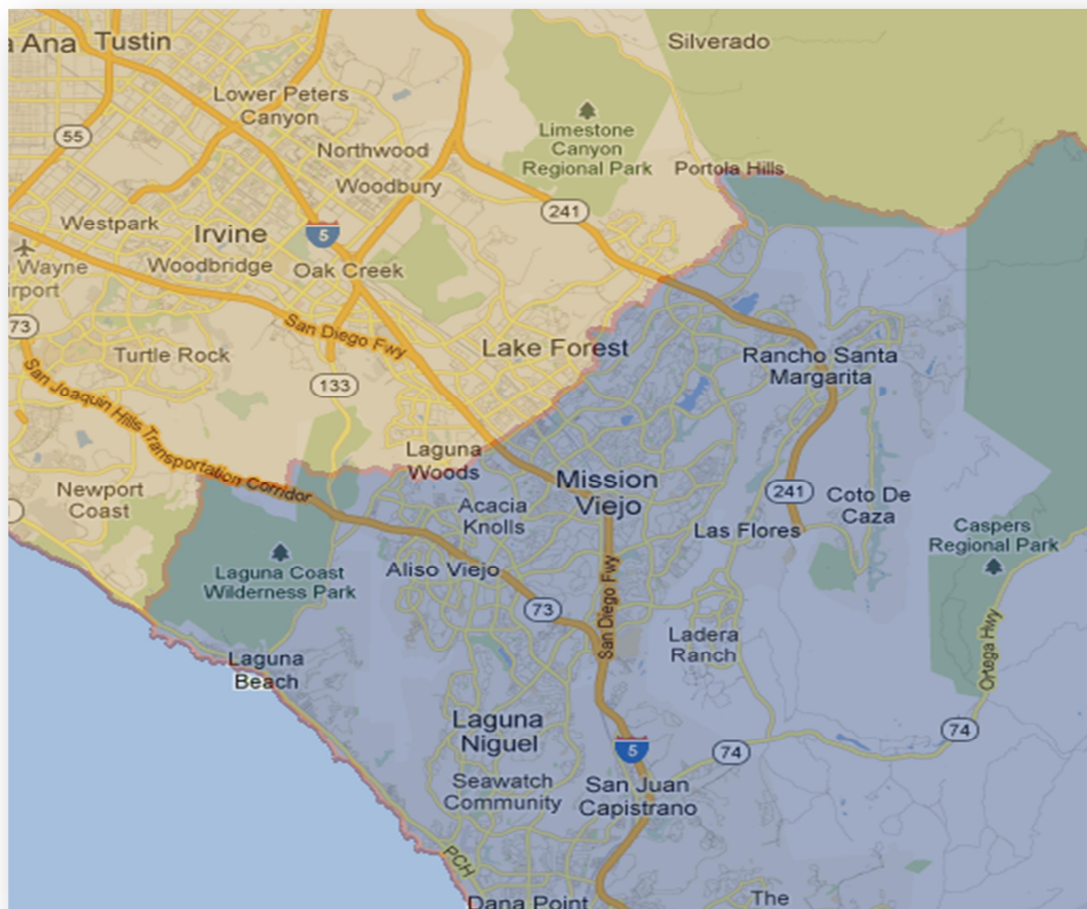


Figure 1: Map of Boundary between Santa Ana Regional Board (Yellow) and San Diego Regional Board (Blue)

Table 1 includes a list of all State or Regional permits related to runoff water quality that may apply to construction projects in Orange County. To determine which, if any, of these permits affect your construction project, go to Appendix A and follow the three flow charts. Appendix B includes a brief summary of each permit shown in Table 1. A list of web links for each permit is included in the Reference section at the end of this Manual.

Table 1: Summary of State and Regional Permits that May Affect Construction Projects in Orange County

	Order Number / NPDES Number	Permit Name	Affected Area
CGP	2009-0009-DWQ/ CAS000002	National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit)	Statewide
MS4	R8-2009-0030/ CAS618030	Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and The Incorporated Cities of Orange County within the Santa Ana Region (MS4 Permit for Santa Ana Region)	Santa Ana Region within Orange County
	R9-2009-0002/ CAS0108740	Waste Discharge Requirements for Discharges of Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watershed of the County of Orange, The Incorporated Cities of Orange County, and The Orange County Flood Control District Within the San Diego Region (MS4 Permit for San Diego Region)	San Diego Region within Orange County
Discharge To Land	2003-0003-DWQ	Statewide General Waste Discharge Requirements (WDRs) for Discharges to Land with a Low Threat to Water Quality (WDR for Discharge to Land)	Statewide
Groundwater Dewatering	R8-2007-0041/ CAG918002	General Discharge Permit for Discharges to Surface Waters of Groundwater Resulting from Groundwater Dewatering Operations and/or Groundwater Cleanup Activities at Sites within the San Diego Creek / Newport Bay Watershed Polluted by Petroleum Hydrocarbons, Solvents, Metals and/or Salts (Dewatering Permit for Santa Ana Region)	Santa Ana Region within Orange County
	R9-2008-0002/ CAG919002	Discharges of Extracted Groundwater to Surface Waters Except for San Diego Bay (Dewatering Permit outside of San Diego Bay for San Diego Region)	San Diego Region within Orange County
Potable Water	R8-2009-0003/ CAG998001	General Waste Discharge Requirements for Discharges to Surface Waters that Pose an Insignificant (De Minimus) Threat to Water Quality (De Minimus WDRs for Santa Ana Region)	Santa Ana Region within Orange County
	R9-2010-0003/ CAG679011	General NPDES Waste Discharge Requirements for Discharges of Hydrostatic Test Water and Potable Water to Surface Waters and Storm Drains or Other Conveyance Systems within the San Diego Region (Potable Water WDRs for San Diego Region)	San Diego Region within Orange County

In 2009, the SWRCB adopted Order No., 2009-0009-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, NPDES No. CAS000002 (Construction General Permit or CGP). The CGP requires that construction sites with one acre or greater of soil disturbance or less than one acre but part of a greater common plan of development apply for coverage for discharges under the CGP by submitting Permit Registration Documents (PRD) for coverage, developing a stormwater pollution prevention plan (SWPPP), implementing BMPs to address construction site pollutants and complying with the monitoring requirements of the CGP.

The County's and cities' construction site requirements are coordinated with, but separate from the CGP. The CGP applies regardless of whether a construction site discharges directly to receiving waters or to a municipal storm drain system. Inspections of construction sites by the County / cities (for MS4 permit compliance) or by Regional Board staff (for CGP compliance) are separate and carry different enforcement actions / mechanisms.

More details regarding the CGP and other State and Regional permits can be found in Appendix A.

2.2 Local Agency Requirements

Each city, as well as the County of Orange, has a Municipal Code that establishes requirements for erosion and sediment control on grading projects. All project owners must meet the requirements of the applicable code prior to, during, and after construction. Additionally, through the MS4 Permits listed in Table 1 and described in Appendix B, each city or the County is responsible for periodic inspections of construction sites within its boundaries. (All project owners must allow city or County inspectors onto the project site for these inspections.)

2.2.1 Local Grading Code

The Grading Code sets the rules and regulations for grading operations including operations preparatory to grading on private property. In addition to other requirements, the Grading Code requires that a project owner, developer or contractor prepare erosion control plans (ECPs), obtain a grading permit, and implement and maintain erosion and sediment control BMPs. Refer to the appropriate city or County website and/or Public Works Department for the full text of the municipal grading code.

2.2.2 Local Water Quality Ordinance

The County and cities in Orange County have adopted Water Quality Ordinances for the purpose of improving water quality and compliance with NPDES permit requirements and for the control of urban pollutants. The Water Quality Ordinances are part of their municipal codes and are, in effect, laws that contractors are required to comply with. Non stormwater discharges to the municipal storm drain system are prohibited unless covered by a discharge exception. Prohibited non-stormwater discharges include wastewater from concrete truck washing, paint equipment cleaning, spill cleanup, etc. (See Table 3). Please refer to the appropriate city or County website and/or Public Works Department for the full text of the municipal water quality ordinance.

Table 2: Allowed and Prohibited Discharges

Allowed	Prohibited (not allowed)
<ul style="list-style-type: none"> ▪ Discharges composed entirely of stormwater ▪ Projects permitted under the CGP may be authorized to discharge non-stormwater discharges including dechlorinated potable water sources such as: <ul style="list-style-type: none"> A. fire hydrant flushing, B. irrigation of vegetative erosion control measures (only in Region 8), C. pipe flushing and testing, D. water to control dust, and E. uncontaminated ground water from dewatering. Consult a construction stormwater professional to review the specific conditions. ▪ Discharges that are authorized by a De Minimus or Dewatering permit. 	<ul style="list-style-type: none"> ▪ Trash / debris / litter ▪ Concrete waste ▪ Sanitary waste ▪ Fuel or oil (Dumping, Spills, or Leaks) ▪ Non-stormwater discharges to the municipal storm drain system or receiving water (unless covered by an NPDES Permit, such as CGP or De Minimus) ▪ Projects in Region 9 permitted under the CGP are not authorized to discharge non-stormwater discharges including dechlorinated potable water sources such as: <ul style="list-style-type: none"> F. irrigation of vegetative erosion control measures

3 Best Management Practices (BMPs)

Best Management Practices (BMPs) collectively refer to a variety of pollution prevention controls implemented throughout the project site at various times of the project. BMPs discussed herein are specifically aimed to control pollution in stormwater runoff during the construction phase of the project. The major construction BMP categories can be broken down into

- Erosion Control (EC)
- Sediment Control (SE)
- Wind Erosion Control (WE)
- Tracking Control (TC)
- Non-Stormwater Management (NS)
- Waste Management and Materials Pollution Control (WM)

These BMPs will be discussed in detail throughout the remainder of this section. Permanent post-construction BMPs are not addressed in this document. Post construction BMP requirements are detailed in the Model Water Quality Management Plan (WQMP) as required by the MS4 Permits of either the Santa Ana Region or San Diego Region.

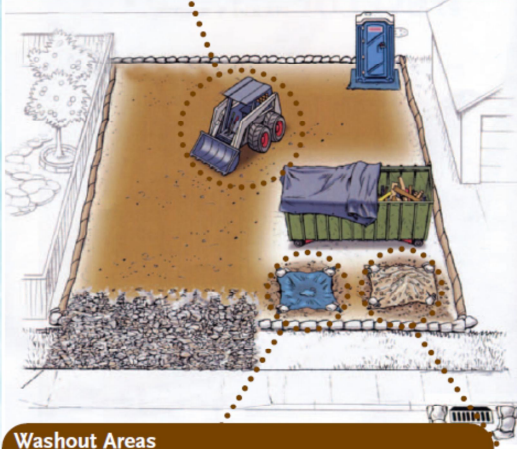
3.1 BMP Overview Diagram

The BMPs that are commonly used on construction sites are shown in Figure 2.

Best Management Practices for Construction Sites

Earthmoving Equipment

All earthmoving equipment must be stored onsite. Drip pans must be placed under equipment not in use, and maintenance must be conducted onsite instead of in the street. Any leaks should be cleaned up and repaired immediately.



Washout Areas

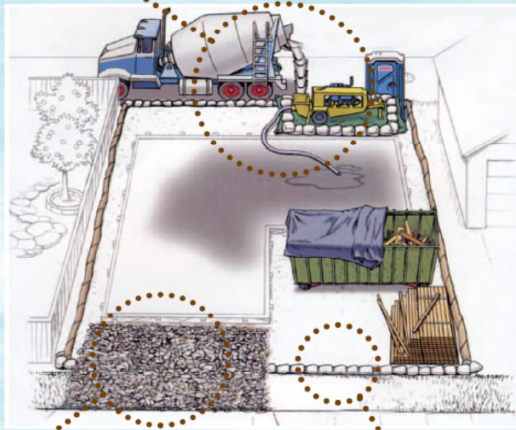
Disposal of "wet" construction materials should be handled in the washout area. This includes paint, stucco, and concrete. Use a plastic-lined pit to collect and contain liquids and prevent runoff into the street and gutter. The washout area must be checked and maintained daily to ensure compliance. Washout material must be disposed of properly.

Dirt and Grading

Stockpiled dirt and gravel must be stored onsite and covered. Dust control shall be maintained throughout all phases of construction. During the rainy season (October 1 – April 30) additional gravel, bags, tarps, and visqueen must be stored onsite for emergency repair.

Concrete Trucks/Pumpers

Pumpers must be surrounded by perimeter controls, such as gravel bags, sandbags, and straw wattles. Tarps also must be placed beneath concrete pumpers at all times to prevent spills into the street and sidewalk. Residual materials must be cleaned up as well. Trucks and pumpers are required to clean out in the washout area, not in the street, catch basin or a wheelbarrow.



Perimeter Controls

Gravel bags, silt fences and straw wattles are acceptable perimeter controls and must be used to control site run-on and runoff. Avoid running over perimeter controls with vehicles or heavy equipment, as they can damage the materials. Keep extra absorbent materials and/or a wet/dry vacuum onsite to quickly pick up spills. Sites must be checked and maintained daily.

Tracking Controls

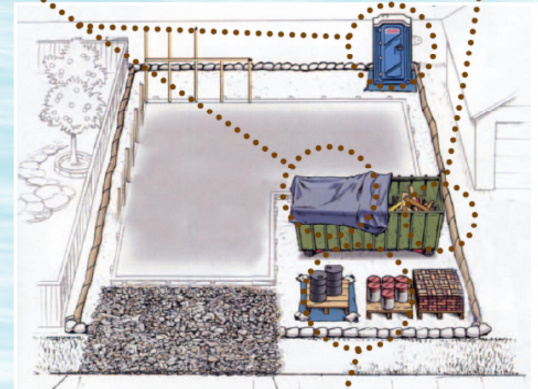
All entrances/exits on the site must have coarse gravel (1" to 3" angular material) and/or steel shaker plates to limit offsite sediment tracking. Hand or mechanical sweeping must also be used as needed to clean up any material that gets tracked offsite.

Dumpsters and Portable Toilets

Dumpsters must be covered with a tarp at the end of each work day and area around dumpster must be kept clean. Dumpsters must be located onsite unless an Encroachment Permit is obtained for placement in street. Portable toilets must have drip pans and be placed onsite so that any spills do not discharge offsite.

Building Materials/Staging Areas

Construction materials (including landscape materials) must be stored onsite. Building materials must be covered when not in use to prevent runoff caused by wind or rain.



Liquid Storage

Paints, solvents, fuel and other liquids stored onsite must be contained and covered. It is illegal for contractors to wash out or dump liquid waste or residue in the street, storm drain or sewer. Use washouts or hazardous material drums to contain liquid waste and residue and dispose of this material properly.

Figure 2: Typical Construction Site BMPs (Graphic provided by the City of San Clemente)

3.2 Minimum Site BMP Requirements

The following requirements are for deployment of selected construction BMPs and apply year-round (not just during the rainy season) to all projects.

- A. Pollution prevention where appropriate.
- B. Development and implementation of a site specific run-off management plan.
- C. Minimization of areas that are cleared and graded to only the portion of the site that is necessary for construction.
- D. Minimization of exposure time of disturbed soil areas.
- E. Minimization of grading during the wet season and correlation of grading with seasonal dry weather periods to the extent feasible.
- F. Limitation of grading to a maximum disturbed area as determined by the County / city before either temporary or permanent erosion controls are implemented to prevent stormwater pollution. The County / city has the option of temporarily increasing the size of disturbed soil areas by a set amount beyond the maximum, if the individual site is in compliance with applicable stormwater regulations and the site has adequate control practices implemented to prevent stormwater pollution.
- G. Temporary stabilization and reseeded of disturbed soil areas as rapidly as feasible.
- H. Non-stormwater management measures to prevent illicit discharges and control stormwater pollution sources.
- I. Erosion Control BMPs shall be implemented.
- J. Wind erosion control BMPs (dust control) shall be implemented.
- K. Sediment control BMPs shall be implemented at all appropriate locations along the site perimeter, at all operational storm drain inlets and at all non-active slopes.
- L. Tracking control BMPs to control off-site sediment tracking shall be implemented and maintained.
- M. Waste management and materials pollution control BMPs shall be implemented to prevent the contamination of stormwater by construction wastes and materials.
- N. Non-stormwater BMPs shall be implemented to reduce or prevent the contamination of stormwater from construction activities.
- O. Weather tracking: projects shall monitor the National Weather Service (www.weather.gov) probability of precipitation. When a rain event is predicted (forecast predicts a greater than 50% probability of precipitation), the project must be inspected and BMPs must be maintained or deployed as needed to protect the project from discharging pollutants. (CGP projects only)
- P. BMP failures must be repaired or replaced with an acceptable alternate as soon as it is safe to do so. Repairs or replacements must result in an adequate BMP, or additional BMPs should be installed to provide adequate protection.

- Q. Active exposed areas: Sufficient materials needed to install standby erosion and sediment control BMPs necessary to protect all active exposed areas from erosion and to reduce or prevent sediment discharges shall be stored on site. The total active exposed area shall not exceed that which can be adequately protected by deploying standby erosion control and sediment control BMPs prior to a predicted rain event.
- R. Inactive exposed areas: All exposed areas not being actively worked in shall be protected from erosion with temporary or permanent BMPs (erosion and sediment control). The ability to deploy standby BMP materials is not sufficient for these areas; erosion and sediment control BMPs must actually be deployed.
- S. Completed areas: Areas that have already been protected from erosion using permanent erosion control BMPs (physical or vegetation) are not considered “exposed”. Deployment of permanent erosion control BMPs should commence as soon as practical on completed areas.
- T. Preservation of natural hydrologic features where feasible.
- U. Preservation of riparian buffers and corridors where feasible.
- V. Evaluation and maintenance of all BMPs, until removed.
- W. Retention, reduction, and proper management of all stormwater pollutant discharges on site to the Maximum Extent Practicable (MEP) standard.

3.3 CASQA BMP Handbook

The California Stormwater Quality Association (CASQA) has prepared a handbook providing details about all of the recommended BMPs. The current version of this handbook is the CASQA Best Management Practice Handbook, Construction, 2009 Edition. A membership to CASQA can be obtained at www.casqa.org. Access to the BMP Fact Sheets referenced in this section is included with the CASQA membership. The Handbook contains six major categories of BMP fact sheets with guidelines on how to select each BMP. The six categories include: Erosion Control (EC), Sediment Control (SE), Wind Erosion Control (WE), Tracking Control (TC), Non-Stormwater Management (NS), and Waste Management and Materials Pollution Control (WM).

These categories of BMPs and their applicability are discussed in the following sections.

3.4 BMP Directory

In order to meet the requirements of the Permits and Ordinances mentioned in Section 2, BMPs must be selected, installed, and maintained properly throughout the duration of construction projects. BMPs must be discussed with all project contractors, subcontractors, and any party involved, because education is the most important BMP.

3.4.1 Erosion Control (EC)

Erosion control BMPs focus on preventing soil from being eroded by stormwater and potentially discharged from the construction site. Erosion control is more effective than sediment control for reducing sediment discharge. However, a combination of both erosion control and sediment control is required to effectively reduce sediment discharge. This section highlights the most common erosion control BMPs for construction projects.

Erosion prevention is to be used as the most important measure for keeping sediment on site during construction. Permanent revegetation or landscaping shall be done as early as feasible at a minimum.

Table 3: Physical / Vegetative Stabilization BMPs

Physical / Vegetative Stabilization: Covering the soil with a protective layer that can help to hold soil in place and/or reduce the erosive impact of rain drops or runoff.	
Type	Description
Scheduling	Sequencing construction activities to reduce the amount of exposed soil during seasons of higher precipitation probability. All projects should consider scheduling activities to minimize the amount of disturbed area during seasons of higher precipitation probability. Phasing can be used to maintain stabilized areas (vegetation or impervious cover) as much as possible during construction. Disturbed areas should be stabilized as soon as practical. Attempt to schedule grading outside of seasons of higher precipitation probability. <u>Reference:</u> CASQA EC-1, EC-2
Seeding	Applying seed to a surface with the intention of achieving vegetation which can effectively protect soils from erosion while reducing runoff by encouraging infiltration / transpiration. Seeding is effective for temporary and permanent stabilization of slopes, stock piles, and other disturbed soils. Seeds can be combined with mulch and water then sprayed onto surfaces (also referred to as hydro seeding) for immediate erosion protection. Without combining or covering seeds with mulch seeds will be susceptible to erosion until vegetation has sufficiently established. Supplemental irrigation may be required to establish vegetation. Scarifying surfaces prior to seed application can increase its effectiveness. <u>Reference:</u> CASQA EC-4
Soil Binders	Spraying a liquid compound to disturbed soils to bind and stabilize the soil surface (forming a crust). This process reduces the potential for wind and water erosion. Examples include: guar, psyllium, starch, gypsum, pitch and rosin emulsion, polymers, and acrylates. Soil binders are effective for temporary stabilization of slopes, stockpiles, and other disturbed areas. Soil binders need time to cure and should not be applied less than 24 hours before predicted precipitation. The specific soil binder selected depends on the type of soil. Soil binders must be non-toxic and environmentally benign. Soil binders will need to be reapplied as needed based on the specific soil binder and visual inspection. Soil binders are much less effective in areas that receive traffic. <u>Reference:</u> CASQA EC-5
Mulching	Covering disturbed soils with a fibrous wood, straw, or similar material to protect the bare soil from rainfall impact erosion while reducing runoff by encouraging infiltration / evaporation. Mulching is effective for temporary stabilization of slopes, stock piles, and other disturbed soils. Mulch materials can be combined with water then sprayed onto surfaces (also referred to as hydraulic mulch) for increased wind erosion protection. Typically, mulch must be reapplied every 6 to 12 months. Soil roughening prior to mulch application can increase its effectiveness. <u>Reference:</u> CASQA EC-3, EC-6, EC-8
Geotextiles and Mats	Covering disturbed soils with a natural or synthetic blanket or mat. This process greatly reduces the potential for wind and water erosion. Some rolls and mats physically hold the soil in place. Example include: geotextiles, plastic covers, rolled erosion control blankets / mats, straw / mulch blanket, coconut fiber blanket, and plastic netting. Geotextiles and mats are effective for temporary stabilization of steep slopes with high erosion potential, stockpiles, and channels that will be vegetated. Geotextiles and mats are more expensive than other erosion control BMPs. Materials may need to be removed prior to final stabilization. Mats / blankets are most effective when in direct contact with the soil; do not roughen soil or leave significant rocks / roots. Mats / blankets typically require an anchoring mechanism to hold them in place. Mats / blankets should be laid parallel to the



<p>Physical / Vegetative Stabilization: Covering the soil with a protective layer that can help to hold soil in place and/or reduce the erosive impact of rain drops or runoff.</p>	
Type	Description
	<p>direction of flow. Mats / blankets should allow water to flow on top of them and not below which would cause the soil to wash out. <u>Reference:</u> CASQA EC-7</p> 
<p>Non-Vegetative Stabilization</p>	<p>Covering disturbed soils with a non-vegetative material to protect the bare soil from rainfall impact erosion while reducing runoff by encouraging infiltration / evaporation. Examples include: decomposed granite, gravel, and rock slope protection. Other non-vegetative stabilization is effective for temporary and permanent stabilization of areas with heavy vehicular or pedestrian traffic or areas where a vegetative cover is infeasible. Other non-vegetative stabilization is intended to be used in combination with additional erosion control and sediment control BMPs. If used for permanent stabilization, periodic inspection and maintenance may be required. Material should be selected based on the slope and use of the area. <u>Reference:</u> CASQA EC-16 and Caltrans Standard Specifications May 2006 Section 72-2.</p>

Table 4: Concentrated Flow Erosion Control BMPs

Concentrated Flow Erosion Control: Reducing concentrated flow velocity or protecting concentrated flow paths to prevent erosion.	
Type	Description
Dikes, Swales, and Slope Drains	<p>Grading and compacting soil or installing pipe to control / divert / direct runoff. Dikes, swales, and slope drains can be combined to safely convey runoff down a slope, direct runoff to a stabilized channel, reduce potential for flooding, direct runoff to sediment traps / basins. Dikes, swales, and pipes that are used to direct runoff must be properly sized based on the specific application. Typically, slope drains require energy dissipation. Monitor swales and dikes for erosion or accumulation of sediment or debris. Swale and dike slopes should be 2:1 or less. Use vegetation, geotextiles, or mats to stabilize swales. Temporary devices must be removed. <u>Reference:</u> CASQA EC-9, EC-11</p> 
Energy Dissipation	<p>Placing rock, riprap, or similar material to reduce erosion from concentrated, high velocity flows. Energy dissipation is effective at pipe outlets, channel linings, and transitions from stabilized to un-stabilized conveyances. Line the area with filter fabric prior to placing rock or riprap. Accumulated sediment may be difficult to remove from energy dissipation area. For pipe outfalls the size of the energy dissipation area will increase with flow rate and/or pipe size. Temporary devices must be removed. <u>Reference:</u> CASQA EC-10, EC-12</p>
Soil Roughening	<p>Mechanically roughening soil (track walking or imprinting) to prepare soil for additional BMPs or create small terraces to break up sheet flow. Soil roughening can be applied to slopes, stockpiles, basins, and other disturbed soil areas. Soil roughening is intended to be used in combination with additional erosion control and sediment control BMPs. A common implementation method is to drive heavy equipment with its treads parallel to the contours of the slope. For long slopes additional terracing may be required. <u>Reference:</u> CASQA EC-15</p>

3.4.2 Sediment Control (SE)

Sediment control BMPs focus on preventing eroded soil from being discharged from the construction site. The demand placed on sediment control BMPs is dependent upon the effectiveness of the erosion control BMPs. More robust erosion controls will reduce the need for sediment controls and vice versa. However, a combination of both erosion control and sediment control is required to effectively reduce sediment discharge. This section highlights the most common sediment control BMPs for construction projects.

At a minimum, sediment controls are to be used as a supplement to erosion prevention for keeping sediment on-site during construction, and slope stabilization must be used on all active slopes during rain events regardless of the season and on all inactive slopes during the rainy season and during rain events in the dry season.

Table 5: Perimeter / Linear Control BMPs

Perimeter / Linear Controls: Establishing linear BMPs to reduce the potential for sediment discharge across a slope, at the project's perimeter, or to Environmentally Sensitive Areas (ESAs)	
Type	Description
Linear Sediment Controls	Installing sediment control BMPs along contours to reduce runoff velocity, remove sediment, and discourage rill erosion. Examples include: fiber rolls, sand / gravel bags, and straw bales. Linear sediment controls are effective parallel to contours on the face of slopes and at the top and toe of slopes. Linear sediment controls are typically implemented temporarily until slope is stabilized. Straw bales must be anchored and should not be used on the face of slopes. Fiber rolls must be trenched and staked during installation. For Risk Level / LUP Type 2 and 3 projects, the CGP specifies minimum uninterrupted sheet flow lengths for slopes to be 20 feet for slopes under 25%, 15 feet for slopes 25-50%, and 10 feet for slopes over 50%. <u>Reference:</u> CASQA SE-5, SE-6, SE-8, SE-9, SE-14
Perimeter Controls	Installing a barrier to prevent sediment discharges by controlling run-on and run-off around the perimeter of the construction site or limits of grading. Examples include: silt fence, fiber rolls, sand / gravel bags, and straw bales. Perimeter controls are effective when implemented around the perimeter of the construction site or limits of grading. Perimeter controls are not effective when used in a concentrated flow path. Silt fence and fiber rolls require proper installation which includes trenching and staking. Typically, perimeter controls should be installed prior to grading and remain functional until final stabilization is achieved. Maintenance of perimeter controls must be performed as needed. Perimeter controls are a minimum BMP requirement of the CGP. <u>Reference:</u> CASQA SE-1, SE-5, SE-6, SE-8, SE-14


<p>Perimeter / Linear Controls: Establishing linear BMPs to reduce the potential for sediment discharge across a slope, at the project's perimeter, or to Environmentally Sensitive Areas (ESAs)</p>	
Type	Description
	

Table 6: Storm Drain Inlet Protection BMPs


<p>Storm Drain Inlet Protection: Ponding and/or filtering stormwater to remove pollutants (primarily sediment) from entering the storm drain system.</p>	
Type	Description
Storm Drain Inlet Protection	<p>Filtering or ponding of stormwater before it enters a storm drain inlet to reduce the amount of sediment that discharges. Storm drain inlet protection should be implemented at every storm drain inlet that receives runoff from active construction areas. Ponding of sediment laden stormwater can provide the best results if the ponding capacity is appropriate for the tributary drainage area. Ponding may be limited by street traffic constraints. Other sediment controls such as check dams should be used upstream to reduce the amount of sediment that reaches the storm drain inlet protection. After a storm sediment that has settled must be cleaned up. <u>Reference:</u> CASQA SE-10, SE-14.</p> 

Table 7: Sediment Capture BMPs



Sediment Capture: Capturing sediment in channelized stormwater to reduce sediment discharge.	
Type	Description
Sediment Trap / Basin	<p>Constructing a temporary containment area to detain runoff to allow for deposition of sediment prior to stormwater discharge. Sediments traps / basins are effective when implemented within the downstream section of a construction site or at discharge points. Sediment traps can be effectively implemented throughout a large construction site. Sediment basins can efficiently be developed at locations where future post-construction basins will be utilized. Sediment traps should only be used for tributary drainage areas below 5 acres. Sediment basins should be used for tributary drainage areas between 5 and 75 acres. Sediment traps / basins can be large and may not be suitable for small construction projects. Sediment traps / basins should be sized by a Registered Civil Engineer to ensure they have sufficient capacity. Sediment traps / basins should not hold water for longer than 72 hours. Local agencies may have stricter vector control and child safety fence requirements. Typically dikes, swales, or piping are required to direct runoff to traps / basins. <u>Reference:</u> CASQA SE-2, SE-3</p> 
Check Dams	<p>Constructing small barriers along a swale or channel to reduce channel erosion and allow for deposition of sediment. Check dams are effective for sediment control within un-stabilized concentrated flow paths on the construction site such as swales, ditches, or channels. Typically, check dams are constructed of rock, sand / gravel bags or fiber rolls. Effective check dams will collect sediment behind each check dam which must be removed regularly to maintain the performance of the check dam. Check dams should not be constructed with straw bales or silt fence. <u>Reference:</u> CASQA SE-4, SE-5, SE-6, SE-8</p>

Table 8: Street Cleaning BMPs

<p>Street Cleaning: Cleaning streets and other paved areas that have collected sediment and/or debris to prevent it from entering the storm drain system.</p>	
Type	Description
Street Sweeping and Vacuuming	<p>Cleaning sediment from streets and roadways to reduce the potential discharge to storm drain inlets or receiving waters. Sweeping and vacuuming should be implemented on all paved areas within and adjacent to construction sites. Inspect and maintain areas subject to sediment tracking on a daily basis. Utilize methods that collect and remove sediment instead of methods that simply spread the sediment around. <u>Reference:</u> CASQA SE-7</p> 

3.4.3 Wind Erosion Control (WE)

Wind Erosion Control is any practice that protects the soil surface and prevents the soil particles from being detached by wind. Wind Erosion Control is also referred to as dust control.

Table 9: Wind Erosion Control BMPs

<p>Wind Erosion Control: Covering or wetting exposed soil to prevent erosion by-way-of wind.</p>	
Type	Description
Wind Erosion Control	<p>Preventing wind from causing erosion or dust. Examples include: wet suppression, chemical dust suppression, covering exposed sediment, and minimizing disturbed area though scheduling. Wind erosion control should be implemented at every construction project throughout all disturbed areas. Wet suppression is sufficient for most projects if implemented regularly. Other requirements (Clean Air Act, Air Quality Management Districts, etc.) typically address wind erosion control. Chemical dust suppression should only be implemented when it will have no negative environmental impacts. <u>Reference:</u> CASQA WE-1</p>

Wind Erosion Control: Covering or wetting exposed soil to prevent erosion by-way-of wind.	
Type	Description
	

3.4.4 Tracking Control (TC)

Tracking Control is any practice that prevents or reduces the amount of sediment that is tracked to paved areas from unpaved areas by vehicles or construction equipment.


Table 10: Tracking Control BMPs


Tracking Control: Reducing the amount of sediment that leaves the site from vehicles and construction equipment.	
Type	Description
Stabilized Construction Entrance / Exit	Constructing a stabilized surface where sediment can be dislodged from vehicle and equipment tires before being tracked onto off-site paved roads. Stabilized construction entrance / exits should be implemented at every construction project to prevent sediment tracking from the site. Stabilized construction entrances / exits should be 50 feet or more in length. The most common method is to place 3-6 inch rock at least 1 foot high over filter fabric. Additional rock may need to be added as sediment accumulates. Rumble plates can be added for additional sediment removal. Tracking controls are a minimum BMP requirement of the CGP. <u>Reference:</u> CASQA TC-1
	

3.4.5 Non-Stormwater Management (NS)

Non-stormwater management is any practice that limits or reduces potential pollutants at their source before they are exposed to stormwater. Non-stormwater management typically involves day-to-day operations of the construction site and is usually under the control of the contractor. Non-stormwater management is often referred to as good housekeeping practices.

Table 11: Non-Stormwater Management BMPs


Non-Stormwater Management: Preventing construction related pollutants from contacting stormwater.	
Type	Description
Vehicle and Equipment Pollution Prevention	<p>Preventing, containing, and disposing of pollutants from cleaning, fueling, and maintaining vehicles and equipment. Vehicle and equipment pollution prevention should occur at every construction project that cleans, fuels, or maintains vehicles or equipment. All cleaning, fueling, and maintenance performed on the site should occur in an area designated for the activity and at least 50 feet away from downstream storm drain facilities. Avoid “topping-off” of fuel tanks. Keep absorbent spill cleanup materials available; dispose of used materials properly. Train employees and subcontractors proper spill prevention, control, and cleanup procedures. Use drip pans or a secondary containment area for fueling and maintenance. Inspect for equipment leaks daily. Prevent wash water from entering storm drain system. <u>Reference:</u> CASQA NS-8, NS-9, NS-10</p> 
Dewatering Operations	<p>Managing and/or treating the discharge of accumulated stormwater or non-stormwater (groundwater or water used during construction activities) to prevent unauthorized discharge. Dewatering operations should be implemented for any discharge of accumulated stormwater or non-stormwater. Primary concern with accumulated stormwater is sediment. Common methods for reducing sediment from a discharge are sediment traps / basins, weir tanks, dewatering tanks, filter bags / socks, media / cartridge filters. Risk Level and LUP Type 2 and 3 projects must sample accumulated stormwater discharge. As an alternative, accumulated stormwater can be pumped to another area on the site for infiltration to eliminate the need to discharge. Non-stormwater discharges typically require a separate discharge permit. An example of a dewatering filter bag for stormwater dewatering discharges is provided below. <u>Reference:</u></p>

Non-Stormwater Management: Preventing construction related pollutants from contacting stormwater.	
Type	Description
	CASQA NS-2 
Paving and Grinding Operations	Managing paving and grinding operations to reduce the potential for pollutant discharge. Paving and grinding operations should be implemented at every construction project that involves paving, resurfacing, or saw cutting. Avoid paving operations when rain is forecasted. Grindings, saw-cutting slurry, and waste / debris must be collected and recycled or properly disposed of; none of this should be allowed to enter the storm drain system. Do not apply seal coat, tack coat, slurry seal, or fog seal if rain is forecasted within the curing period. <u>Reference:</u> CASQA NS-3

3.4.6 Waste Management and Materials Pollution Control (WM)

Waste management and materials pollution control are practices that limit or reduce or prevent the contamination of stormwater by construction wastes and materials. Potential wastes include solid, sanitary, concrete, hazardous, and equipment-related. Waste management and materials pollution control is also often referred to as good housekeeping practices.

Table 12: Materials Pollution Management BMPs

Materials Pollution Management: Handling, storing, and using construction materials with adequate precautions and control measures to reduce or prevent the contamination of stormwater.	
Type	Description
Stockpile Management	<p>Covering or stabilizing stockpiles and providing sediment controls around the perimeter of stockpiles. Stockpile management should occur at every required stockpile within a construction project. Required stockpiles include those of soil, sand, PCC or AC rubble, cold mix asphalt, aggregate base or sub base, and treated wood. Stockpile management is effective against stormwater and wind erosion. All stockpiles can be covered with plastic or similar material. Alternatively, soil stockpiles may be protected with an erosion control (stabilization) practice. Raw materials such as cold mix treated wood should also be placed on top of plastic. Typical sediment controls placed around the perimeter of stockpiles are fiber rolls, silt fence, and sand / gravel bags. All stockpiles should be placed at least 50 feet away from downstream storm drain facilities. Reference: CASQA WM-3, SE-1, SE-5, SE-6, SE-8</p> 


Materials Pollution Management: Handling, storing, and using construction materials with adequate precautions and control measures to reduce or prevent the contamination of stormwater.	
Type	Description
Material Delivery, Storage, and Use	<p>Preventing and containing pollutant discharges from materials that are delivered, stored, and used on-site. Materials of concern include: petroleum products, asphalt, concrete, paints, solvents, soil stabilizers and binders, pesticides, herbicides, fertilizers, detergents, and other hazardous chemicals. Material delivery, storage, and use management should occur at every location of a construction project where materials of concern are delivered, stored, or used. All material delivery and storage should occur in an area designated for the activity and at least 50 feet away from downstream storm drain facilities. Minimize the quantities of materials of concern. Store materials in an enclosed area with secondary containment. Keep absorbent spill cleanup materials available; dispose of used materials properly. Train employees and subcontractors on proper spill prevention, control, and cleanup procedures. Avoid over-application of soil binders, pesticides, herbicides, and fertilizers. <u>Reference:</u> CASQA WM-1, WM-2, WM-4</p> 

Table 13: Waste Management BMPs


Waste Management: Handling, storing, and disposing of construction wastes with adequate precautions and control measures to reduce or prevent the contamination of stormwater.	
Type	Description
Spill Prevention and Control	<p>Preventing, controlling, and cleaning up spills to reduce pollutant discharges from construction activities. Spill prevention and control should occur at every construction project that uses petroleum products, asphalt, concrete, paints, solvents, soil stabilizers and binders, pesticides, herbicides, fertilizers, detergents, or other hazardous chemicals. Train employees and subcontractors proper spill prevention, control, and cleanup procedures. Do not bury or wash spills away with water. Keep absorbent spill cleanup materials available; dispose of used materials properly. Report significant spills (those that cannot be contained by personnel in the immediate vicinity) to a local agency, such as the Fire Department, for cleanup assistance. Additional agencies may need to be contacted in the event of a significant spill. <u>Reference:</u> CASQA WM-4</p>
Solid Waste Management	<p>Containing and disposing of debris and non-hazardous waste to prevent it from being discharged to the storm drain system. Solid waste management and materials pollution control should occur throughout every construction project for non-hazardous</p>

Waste Management: Handling, storing, and disposing of construction wastes with adequate precautions and control measures to reduce or prevent the contamination of stormwater.	
Type	Description
	construction waste and scraps, trash from employees or subcontractors, and waste generated from demolition. Waste should be collected and contained in designated areas. Avoid using waste containers that do not have lids or are not watertight. Collect and dispose of loose trash and waste weekly. <u>Reference:</u> CASQA WM-5
Hazardous Waste Management	Containing and disposing of hazardous waste to prevent it from being discharged to the storm drain system. Hazardous waste management and materials pollution control should occur at every construction project that uses petroleum products, asphalt, concrete, paints, solvents, pesticides, herbicides, fertilizers, wood preservatives, or other hazardous chemicals. Train employees and subcontractors proper hazardous waste management and materials pollution control procedures. Store hazardous wastes in an enclosed area with secondary containment. Do not allow hazardous wastes to infiltrate at the site. Avoid overfilling hazardous waste containers. Hazardous wastes should be handled as required by Title 22. For projects that require demolition, lead-, cadmium-, or chromium-based paints, asbestos, and PCBs may exist and will require special treatment. All hazardous waste storage should occur in a designated area at least 50 feet away from downstream storm drain facilities. Hazardous wastes should be disposed of by a licensed hazardous waste transporter. <u>Reference:</u> CASQA WM-6
Concrete Waste Management	Containing and disposing of concrete waste to prevent it from being discharged to the storm drain system. Concrete Waste Management should occur at every construction project where concrete is poured, saw cut, grinded, or demolished. Inform all employees and subcontractors that washout from concrete trucks and concrete waste should be collected in concrete washout. Concrete washouts should be watertight and prevent any concrete waste from being able to discharge to the storm drain system. Avoid allowing concrete washout to become greater than 75% full. Concrete demolition debris may be stored by following the stockpile management BMP. <u>Reference:</u> CASQA WM-8, WM-3



Waste Management:

Handling, storing, and disposing of construction wastes with adequate precautions and control measures to reduce or prevent the contamination of stormwater.

Type	Description
	
Sanitary Waste Management	<p>Containing and disposing of sanitary waste to prevent it from being discharged to the storm drain system. Sanitary Waste Management should occur at every construction project that contains portable or permanent sanitary facilities. Avoid placing portable sanitary facilities in a concentrated flow path, such as a gutter. Use secondary containment under portable sanitary facilities. Contract a licensed sanitary and septic waste hauler to maintain portable sanitary facilities. All portable sanitary facilities should be located at least 50 feet away from downstream storm drain facilities. If a spill occurs, follow federal, state, and local regulations for containment and cleanup. <u>Reference:</u> CASQA WM-9</p>

3.4.7 Inspection and Maintenance Frequency Summary

	Santa Ana Region Criteria (only one need apply)			Inspection Frequency	
				Wet Season (Oct. – Apr.)	Dry Season (May – Sep.)
High	All sites 20 acres and larger	Sites over 1 acre tributary to Clean Water Act Section 303(d) waters listed for sediment or turbidity impairment.	Sites tributary to and within 500 feet of an Area of Special Biological Significance (ASBS).	Monthly	Conduct at a frequency to ensure that sediment and other pollutants are properly controlled and that unauthorized, non-stormwater discharges are prevented.
Medium	All sites between 5 to 20 acres where none of the other above criteria apply.			Twice during wet season	
Low	All sites less than 5 acres where none of the other above criteria applies.			Once during wet season	

When BMPs or BMP maintenance is deemed inadequate or out of compliance, an inspection frequency of once every week will be maintained until BMPs and BMP maintenance are brought into compliance (regardless of site prioritization).

	San Diego Region Criteria (only one need apply)			Inspection Frequency	
				Wet Season (Oct. – Apr.)	Dry Season (May – Sep.)
All sites 30 acres or more in size with rough grading or active slopes occurring during wet season.	All sites one acre or more, and tributary to a CWA section 303(d) water body segment impaired for sediment or within or directly adjacent to, or discharging directly to, the ocean or a receiving water within an ESA.	Other sites determined by the Copermittees or the Regional Board as a significant threat to water quality.		Biweekly (Once every two weeks)	As needed during the dry season. Sites that meet any of the criteria for biweekly inspections during the wet season must be inspected at least once in August or September each year.
All sites one acre or larger where none of the above criteria apply.				Monthly	
All sites less than one acre where none of the above criteria apply.				As needed to ensure compliance with ordinances and MS4 Permit.	

Reinspection frequencies must be determined by each Copermittee based upon the severity of deficiencies, the nature of the construction activity, and the characteristics of soils and receiving water quality.

4 References

Web links to permits listed in Table 1.

- National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities. Order number 2009-0009-DWQ. NPDES number CAS000002.
www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml
- Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and The Incorporated cities of Orange County within the Santa Ana Region. Order number R8-2009-0030. NPDES number CAS618030.
www.waterboards.ca.gov/rwqcb8/water_issues/programs/stormwater/oc_permit.shtml
- Waste Discharge Requirements for Discharges of Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watershed of the County of Orange, The Incorporated cities of Orange County, and The Orange County Flood Control District Within the San Diego Region. Order number R9-2009-0002 NPDES number CAS0108740.
www.waterboards.ca.gov/rwqcb9/water_issues/programs/stormwater/oc_stormwater.shtml
- Statewide General Waste Discharge Requirements (WDRs) for Discharges to Land with a Low Threat to Water Quality. Order number 2003-0003-DWQ.
www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0003.pdf
- General Discharge Permit for Discharges to Surface Waters of Groundwater Resulting from Groundwater Dewatering Operations and/or Groundwater Cleanup Activities at Sites within the San Diego Creek / Newport Bay Watershed Polluted by Petroleum Hydrocarbons, Solvents, Metals and/or Salts. Order number R8-2007-0041. NPDES number CAG918002.
www.waterboards.ca.gov/santaana/board_decisions/adopted_orders/orders/2007/07_041_gen_wdr_san_diego_erk_11302007.pdf
- Discharges of Extracted Groundwater to Surface Waters Except for San Diego Bay. Order number R9-2008-0002. NPDES number CAG919002.
www.waterboards.ca.gov/sandiego/board_decisions/adopted_orders/2008/r9-2008-0002.pdf
- General Waste Discharge Requirements for Discharges to Surface Waters that Pose an Insignificant (De Minimus) Threat to Water Quality. Order number R8-2009-0003. NPDES number CAG998001.
www.waterboards.ca.gov/santaana/board_decisions/adopted_orders/orders/2009/09_003_deminimus_permit_wdr.pdf
- General NPDES Waste Discharge Requirements for Discharges of Hydrostatic Test Water and Potable Water to Surface Waters and Storm Drains or Other Conveyance Systems within the San Diego Region. Order number R9-2010-0003. NPDES number CAG679011.
www.waterboards.ca.gov/sandiego/board_decisions/adopted_orders/2010/r9-2010-0003.pdf

5 Glossary

ASBS – Area of Special Biological Significance. The Water Quality Control Plan for Ocean Waters of California (California Ocean Plan) designates 35 Areas of Special Biological Significance, two of which lie within the Santa Ana Regional Board jurisdiction:

- Newport Beach Marine Life Refuge (HU801.110)
- Irvine Coast Marine Life Refuge (HU801.110)

BMP – Best Management Practices (BMPs) are activities, practices, procedures, or facilities implemented to avoid, prevent, or reduce pollution of the stormwater system and receiving waters.

Common Plan of Development – Generally a contiguous area where multiple, distinct construction activities may be taking place at different times under one plan. A plan is generally defined as any piece of documentation or physical demarcation that indicates that construction activities may occur on a common plot. Such documentation could consist of a tract map, parcel map, demolition plans, grading plans or contract documents. Any of these documents could delineate the boundaries of a common plan area. However, broad planning documents, such as land use master plans, conceptual master plans, or broad-based CEQA or NEPA documents that identify potential projects for an agency or facility are not considered common plans of development.

Construction General Permit (CGP) – A National Pollution Discharge Elimination System (NPDES) permit (No. CAS000002) issued by the State Water Resources Control Board for the discharge of stormwater associated with construction and land disturbance activities of one acre or more (Order No. 2009-0009-DWQ).

Construction Project – any site for which building or grading permits are issued and where an activity results in the disturbance of soil such as soil movement, grading, excavation, clearing, road construction, structure construction, or structure demolition; and sites where uncovered storage of materials and wastes such as dirt, sand, or fertilizer occurs; or exterior mixing of cementaceous products such as concrete, mortar, or stucco will occur.

Demolition – an activity involving the demolishing or the destruction of a structure, facilities, or associated appurtenances.

Discharge – the release spill, leak, pump, flow, escape, leaching, dumping or disposal of any liquid, semi-solid, or solid substance.

Environmentally Sensitive Area (ESA) – includes but is not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated in the Ocean Plan as Areas of Special Biological Significance (ASBS) or by the State Water Resources Control Board (Water Quality Control Plan and amendments); water bodies designated with the RARE beneficial use by the State Water Resources Control Board (Water Quality Control Plan and amendments); areas designated as preserves or equivalent under the Natural Community Conservation Planning Program; and any areas designated as Critical Aquatic Resources (CARS) or other equivalent environmentally sensitive areas which have been identified by the County or city.

Erosion – the wearing away of the ground surface as a result of the movement of wind, water, and/or ice

Erosion Control – the activity of reducing or eliminating erosion by using a combination of Best Management Practices to protect adjacent private property, watercourses, public facilities, and receiving waters from an abnormal deposition of sediment or dust.

Erosion Control Plan – A plan (including drawings, specifications, or other requirements) detailing the methods of implementing an erosion control system.

Municipal Separate Storm Sewer System (MS4) – the street gutter, channel, storm drain, catch basin, constructed drain, lined diversion structure, wash area, inlet, outlet, or other facility, which is part of or tributary to the County-wide stormwater runoff system and owned, operated, maintained, or controlled by the County / city, and used for the purpose of collecting, storing, transporting, or disposing of stormwater.

NPDES Permit – NPDES is an acronym for National Pollution Discharge Elimination System. NPDES is the national program for administering and regulating Sections 307, 318, 402 and 405 of the Clean Water Act (CWA).

Non-stormwater – any runoff or discharge not entirely composed of stormwater.

Notice of Intent (NOI) – an application submitted by the owner / operator of a project that constitutes his intent to be authorized by an NPDES permit issued for stormwater discharges associated with the construction activity indicated.

Notice of Termination – a form to discontinue coverage under an NPDES general permit for stormwater discharges associated with industrial activity and stormwater discharges associated with construction activity.

Pollutant – any liquid, solid or semi-solid substances that will interfere with or adversely affect the beneficial uses of the receiving waters, flora, or fauna of the state. A more detailed definition is included in the Water Quality Ordinance. Generally, pollutants can include such items as:

- Artificial materials
- Household wastes
- Metals and Non-metals
- Petroleum and related hydrocarbons
- Animal wastes
- Substances having a pH less than 6.5 or greater than 8.6, or unusual coloration, turbidity or odor
- Waste materials, sediment, and wastewater generated by construction sites and construction activities
- Pollutants defined by the Federal Clean Water Act
- Other constituents or materials, including but not limited to pesticides, herbicides, fertilizers, fecal coliform, fecal streptococcus or enterococcus, or eroded soils, sediment and particulate materials.

Post-Construction BMPs – Structural and non-structural controls which detain, retain, or filter the release of pollutants to receiving waters after construction is complete and final stabilization is attained.

Qualified SWPPP Developer (QSD) – Individual who is authorized per the requirements of Order No. 2009-0009-DWQ to develop and revise SWPPP's.

Qualified SWPPP Practitioner (QSP) – Individual assigned responsibility by the owner for non-stormwater and stormwater visual observations, sampling and analysis, and responsibility to ensure full compliance with the Construction General Permit and implementation of all elements of the SWPPP, including the preparation of the annual compliance evaluation and the elimination of all unauthorized discharges.

RARE – Rare, Threatened, or Endangered Species (RARE) Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened or endangered.

Receiving Water – A river, lake, ocean, stream, or other watercourse identified in the Basin Plan into which waters may be discharged.

Regional Board – Regional Water Quality Control Boards administer water quality requirements within a watershed region. There are nine Regional Boards under the SWRCB. The SWRCB is one of five branches of the California Environmental Protection Agency The San Diego Regional Board and the Santa Ana Regional Board have jurisdiction in Orange County.

Runoff – Water originating from rainfall, melted snow, and other sources (e.g., sprinkler irrigation) that flows over the land surface to receiving waters.

Run-on – Off site stormwater surface flow which enters your site.

Scour – The erosive and digging action in a watercourse caused by flowing water.

Secondary Containment – Structures, usually dikes, berms, or large containers, surrounding tanks or other storage containers, designed to catch spilled material to prevent it from being discharged.

Sediment – Solid particulate matter, both mineral and organic that comes from the weathering of rock.

Sedimentation – The process of depositing soil particles, clays, sands, or other sediments that were picked up by runoff.

Sheet Flow – Flow of water that occurs overland in areas where there are no defined channels where the water spreads out over a large area at a uniform depth.

Storm Drains – Above- and below-ground structures for transporting stormwater to streams or outfall for flood control purposes.

Stormwater – Urban runoff and snowmelt runoff consisting only of those discharges, which originate from precipitation events.

Stormwater Pollution Prevention Plan (SWPPP) – Document required by the General Construction Permit to be developed and implemented by construction sites with 1 acre or greater of soil disturbance, or less than 1 acre but part of a greater common plan of development. The SWPPP emphasizes the use of appropriately selected, correctly installed, and maintained

pollution reduction BMPs. This approach provides the flexibility necessary to establish BMPs that can effectively address source control of pollutants during changing construction activities.

State Water Resources Control Board (SWRCB) – California agency that implements and enforces water quality and NPDES permit requirements and oversees the Regional Boards.

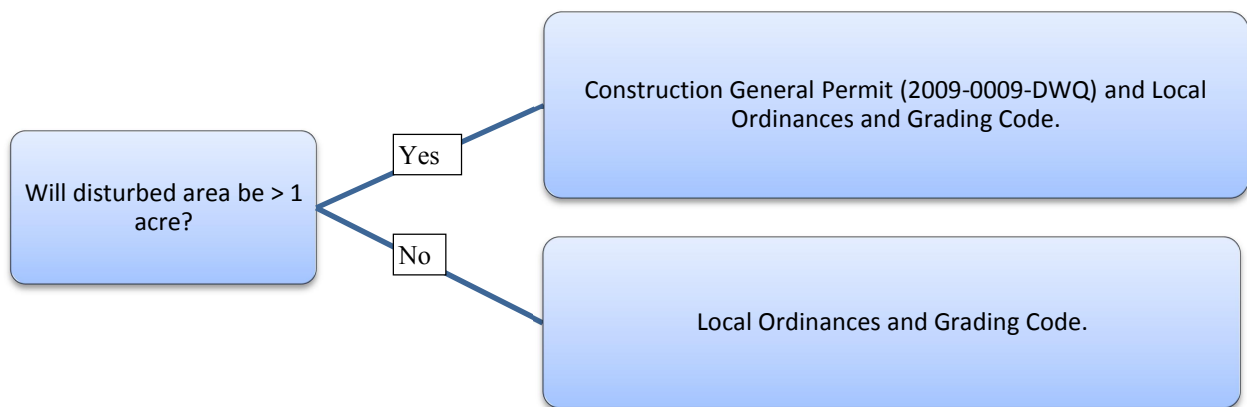
Waste Discharge Identification (WDID) Number – an identification number assigned by the State Water Resources Control Board upon receipt of a complete NOI.

Appendix A: Permit Determination Flowcharts

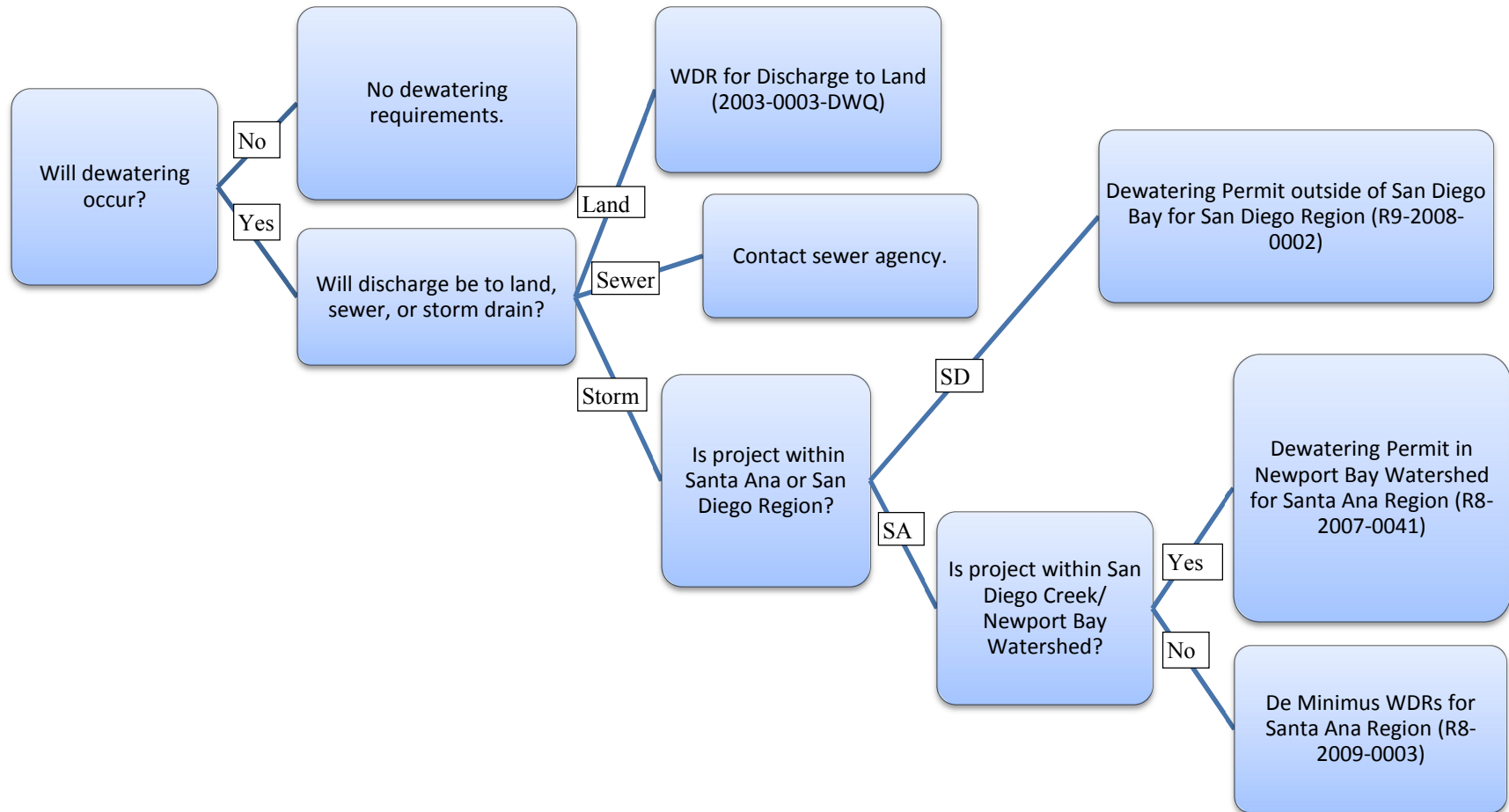
This appendix includes flowcharts for project owners or developers to quickly determine which permits are required for a particular project and a short description of each permit. For each project, follow the questions in each of the three flow charts to determine construction permitting and site management requirements. For example if a project is less than an acre, but requires dewatering, the reader should quickly understand that the CGP does not apply to them, but that they need to read more about dewatering permits.

To use this appendix, follow Steps 1-3 for each project. After following the steps, refer to Sections 2.1 and 2.2 for details on the specific permits and ordinances that may affect your project.

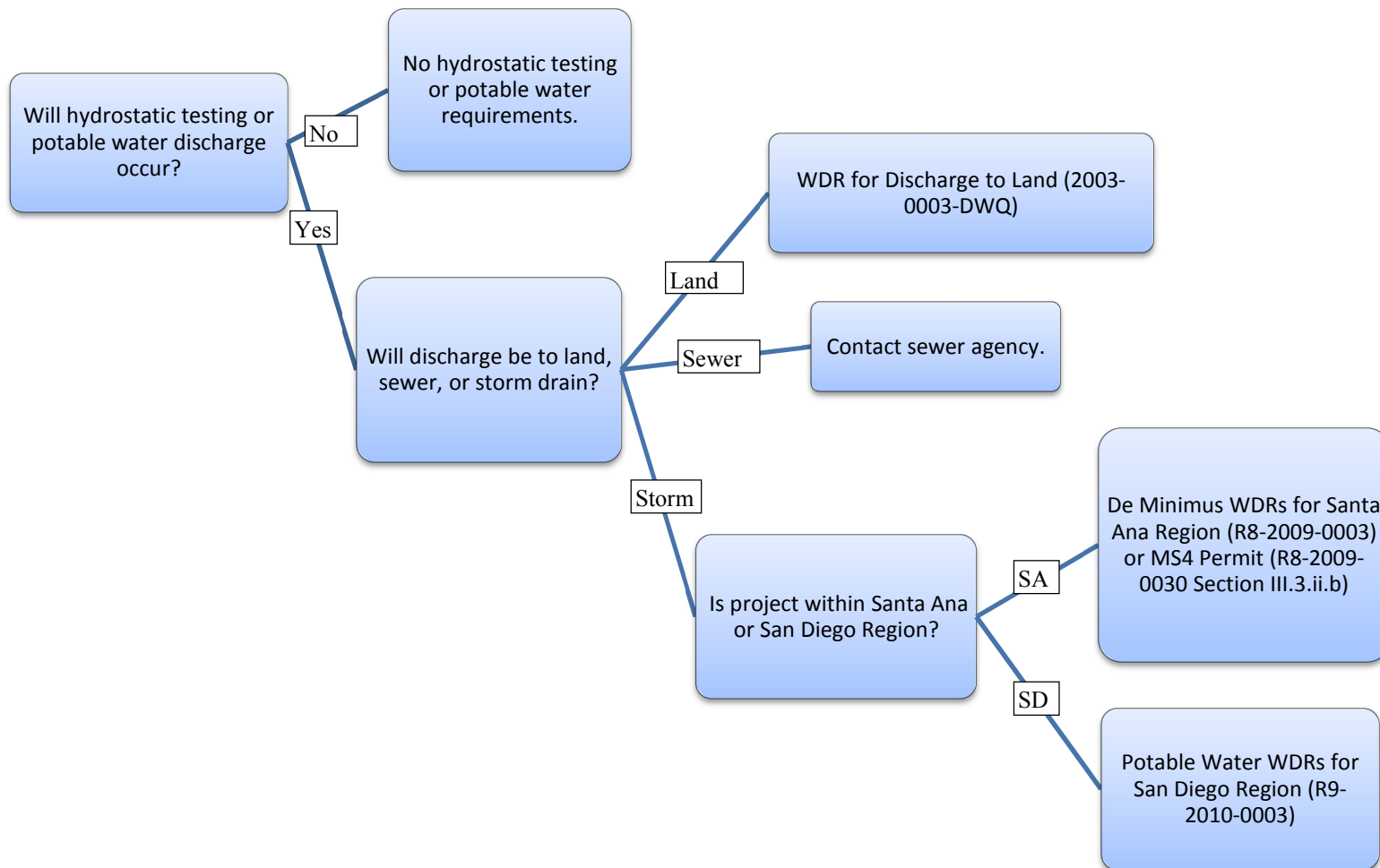
Step 1: Project Size



Step 2: Dewatering



Step 3: Hydrostatic Testing or Potable Discharge



Appendix B: Permit Descriptions

1. Construction General Permit (2009-0009-DWQ / CAS000002)

Note: This Section applies only to projects with greater than or equal to one acre of disturbed area.

In 2009, the State Water Resources Control Board (SWRCB) adopted Order No., 2009-0009-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, NPDES No. CAS000002 (Construction General Permit or CGP).

The CGP requires that construction sites with one acre or greater of soil disturbance or less than one acre but part of a greater common plan of development apply for coverage for discharges under the CGP by submitting Permit Registration Documents (PRD) for coverage, developing a stormwater pollution prevention plan (SWPPP), implementing BMPs to address construction site pollutants and complying with the monitoring requirements of the CGP.

The County's and cities' construction site requirements are coordinated with, but separate from the CGP. The CGP applies regardless of whether a construction site discharges directly to receiving waters or to a municipal storm drain system. Inspections of construction sites by County / cities (for MS4 permit compliance) or by Regional Board staff (for CGP compliance) are separate and carry different enforcement actions / mechanisms.

The following briefly summarizes the process for a construction project that is subject to the CGP:

- The project owner, Legally Responsible Person (LRP), is responsible for obtaining CGP coverage. Permit coverage is obtained by preparing and certifying the Permit Registration Documents (PRDs). PRDs must be uploaded and certified by the LRP in the SWRCB Storm Water Multi Application Report Tracking System (SMARTS, <https://smarts.waterboards.ca.gov/>).
- Each project subject to the CGP requires the services of a Qualified SWPPP Developer (QSD) and a Qualified SWPPP Practitioner (QSP). These titles are defined in the CGP, Section VII.
- Each year an Annual Report must be submitted and certified in SMARTS. The reporting period is from August 1 to June 30 and Annual Reports are due on September 1.
- After construction is completed and the site fully complies with the final stabilization requirements of the CGP, the owner must terminate permit coverage through SMARTS.

2. MS4 Permit for Santa Ana Region (R8-2009-0030 / CAS618030)

In 2009, the Santa Ana Regional Board issued its fourth term MS4 permit, Order No. R8-2009-0030. This permit regulates stormwater discharge from municipal storm drain systems. The permit is issued to the County of Orange and the cities within the Santa Ana Region boundary. The goal of the MS4 permit is to protect water quality by requiring the County and cities (collectively, the Co-Permittees) to implement a program to eliminate significant pollutant discharges from construction activities by requiring the implementation of appropriate Best

Management Practices (BMPs) on all construction sites. BMPs are activities, practices, procedures, or devices implemented to avoid, prevent or reduce pollution of the municipal storm drain system and receiving waters.

3. MS4 Permit for San Diego Region (R9-2009-0002 / CAS0108740)

In 2009, the San Diego Regional Board issued its fourth term NPDES permit, Order No. R9-2009-0002. This permit regulates stormwater discharge from municipal storm drain systems. The permits issued to the County of Orange and the cities within the San Diego Region Boundary. The goal of the MS4 permit is to protect water quality by requiring the County and cities (collectively, the Co-Permittees) to implement a program to eliminate significant pollutant discharges from construction activities by requiring the implementation of appropriate Best Management Practices (BMPs) on all construction sites. BMPs are activities, practices, procedures, or devices implemented to avoid, prevent or reduce pollution of the municipal storm drain system and receiving waters.

4. WDRs for Discharge to Land (2003-0003-DWQ)

This permit, Order No. 2003-0003-DWQ, applies to projects that discharge to land where the discharge has a low threat to water quality. These are typically low volume discharges with minimal pollutant concentrations. The primary difference between this permit and the permits described in herein is the destination of the water. This permit regulates discharges to land, while the following two sections discuss discharges to storm drains or receiving waters. For instance, if a dewatering discharge will be piped to an infiltration basin during construction, this permit should be used.

5. De Minimis WDRs for Santa Ana Region (R8-2007-0041 / CAG918002 and R8-2009-0003 / CAG998001)

There are two permits within the Santa Ana Region that regulate dewatering discharges to a storm drain or receiving water. Order No. R8-2007-0041, NPDES No. CAG918002, regulates dewatering discharges in the San Diego Creek / Newport Bay watershed. And, Order No. R8-2009-0003, NPDES No. CAG998001, amended by R8-2012-0062, regulates dewatering discharges for the Santa Ana Region. Refer to the permit text for specific circumstances allowing projects to be covered under the region-wide permit even though it is located within the San Diego Creek / Newport Bay watershed.

Dischargers subject to the San Diego Creek / Newport Bay Permit (Order No. R8-2007-0041) formed a Working Group and funded the development of a Work Plan to develop a management plan for nitrate and selenium discharges to surface waters that result from groundwater-related inflows. If those entities that participate in the Working Group (refer to Order for enrollees list), can demonstrate that compliance with the numeric selenium effluent limitations identified in the Order is infeasible, the groundwater-related discharge is allowed provided that the Working Group implements the Work Plan in a timely manner and that the discharger fulfills its financial and participatory requirements established by the Group. For dischargers who are not participating in the Working Group and cannot comply with the numeric effluent limitations, the discharger must either not proceed with the planned discharge or must identify and participate in a program that assures that selenium discharges in excess of those allowed by the Order are offset on at least a one-to-one basis.

To obtain coverage under either of these permits, the general guidelines below should be followed:

Existing Dischargers

1. Submit an updated Notice of Intent (NOI) to continue discharging; and
2. A copy of the current Monitoring and Reporting Program along with any proposed treatment modifications.

Additionally, Order No. R8-2007-0041 should be reviewed by all parties as there are different and/or additional stipulations that need to be met based on enrollment status in the Nitrogen and Selenium Management Program (NSMP).

New Dischargers

At least 45 days (180 days if applying under Order No. R8-2007-0041) before the start of a new discharge, the Discharger needs to submit an application for coverage and obtain a letter of authorization from the Executive Officer for the dewatering discharge. The application needs to include:

1. A Notice of Intent (NOI) to be covered under the Order.
2. A site characterization study that identifies the presence of contaminated groundwater onsite (constituents of concern listed with the Orders), its properties, and a three-dimensional assessment of the extent of concentration of contaminants in the subsurface; which includes a description of the geologic and hydrologic factors that control the migration of the contaminants; and, if adjacent to a contaminated site, the Discharger has to evaluate the depth and flow rate of the extraction as well as the possibility of extracting the contaminated groundwater from the adjacent site.
3. A report including the following:
 - a. A list of constituents and the discharge concentration of each constituent from each source (See the Order for constituent of concern); and for coverage under Order No. R8-2007-0041 only, a chemical analysis of the untreated groundwater for organic pollutants using EPA method 8260B (See the Order for specific constituent testing and reporting requirements);
 - b. Estimated average and maximum daily flow rates in million gallons per day (mgd), the frequency and the expected start date and duration of the discharges;
 - c. Proposed discharge location(s) and the latitude and longitude of each discharge point;
 - d. A description of the proposed treatment system (if applicable);
 - e. The affected receiving water and a map showing the path from the point of initial discharge to the ultimate receiving water; and
4. Any other information deemed necessary by the Regional Board Executive Officer.

It should be noted that coverage under Order No. R8-2007-0041 requires several extra steps and it is highly recommended to review those requirements within the Order. Some of those additional items are:

1. An evaluation of selenium and nitrogen concentrations and the feasibility of meeting the numeric effluent limitations specified in the Order. The conclusion of which has varying impacts on coverage as specified in the Order;
2. A fixed hardness value for sites polluted with metals needs to be submitted for approval by the Regional Executive Officer as outlined in the Order; and
3. A description of run-on, interception and diversion of runoff.

Additionally, Order No. R8-2007-0041 should be reviewed by all parties as there are different and/or additional stipulations that need to be met based on enrollment status in the NSMP.

6. Dewatering Permit Outside of San Diego Bay for San Diego Region (R9-2008-0002 / CAG919002)

This permit, Order No. R9-2008-0002, applies to discharges of extracted groundwater to receiving waters or storm drains within the San Diego Regional Board jurisdiction (South of El Toro Road). To qualify for this permit, a laboratory analysis of the groundwater must show that the water quality is within the limits set by the permit. The permit requires sampling and analysis of dewatering discharges, and reporting to the Regional Board on a periodic basis.

7. Potable Water Discharges in Santa Ana Region (R8-2009-0003 / CAG998001)

The permit identified in Section 2. 1 for de minimus discharges, Order No. 2009-0003, is also the permit that applies to discharges of potable water during construction. This may include discharges of hydrostatic test water for pipes or tanks.

8. Potable Water Discharges in San Diego Region (R9-2010-0003 / CAG679011)

This permit, Order No. R9-2010-0003, regulates discharges of hydrostatic test water and/or potable water to storm drains or receiving waters in the San Diego Region, to all receiving waters except for San Diego Bay and its tributaries. Activities covered may include discharge from testing, repair and maintenance of pipelines, tanks and vessels dedicated to drinking water purveyance.

Appendix C: Erosion Control Best Management Practices Field Evaluation – Summary

Background

The County of Orange conducted a field evaluation of five erosion control BMPs to evaluate their effectiveness in the field. A full copy of the Erosion Control Best Management Practices Field Evaluation (Study) may be found on the OC Watersheds website (http://www.ocwatersheds.com/documents/OCerosionControl_FINALReportJan07II.pdf), and a brief summary of the Study is provided here. The Study included development of a study plan, selection of an appropriate test site with soils and slopes commonly found in Orange County, selection of erosion controls for evaluation, study implementation, monitoring and maintenance of the test plots.

BMPs Selected

Four erosion control BMPs were selected for the Study:

- UltraTack- UltraTack is a low molecular weight polyacrylamide product. UltraTack is a spray on binder or tackifier, and is nontoxic to plant and animal life. UltraTack must be applied 24 hours prior to a storm event, and must be reapplied as needed, but generally every three months at a minimum.
- EarthGuard – EarthGuard is a high molecular weight polyacrylamide product. Earth Guard is a spray on binder and is nontoxic to plant and animal life. It is effective immediately, even when applied during a rain event, and may provide erosion control for up to three months.
- EarthGuard Fiber Matrix (recycled paper mulch and wood fiber mulch) – This BMP combines Earth Guard and fiber to form a matrix that provides erosion control for a full rainy season. The binder plus fiber harden after application to form a crust that protects soil from raindrop impact. Two types of EarthGuard fiber mulch were used; one consisting of 100% recycled paper mulch, and the other wood fiber mulch.
- Landscaping Mulch – The wood mulch tested for this study was a typical landscaping mulch made of shredded wood mulch and bark. Wood mulch helps reduce soil erosion by protecting bare soil from rainfall impact, increasing infiltration and reducing runoff.

Test Plots

A total of fifteen test plots were used in the Study, three for each of the BMPs selected. Each BMP was tested on a slope of 2% (flat slope), 5% (mild slope) and 50%. Each test plot was approximately 25 feet by 100 feet, with flow in the long direction.

Test Period

Each of the test plots was observed over the course of the 2004-2005 wet season. Observations of the performance of each type of control were made before and after forecast events, as well as once per month. The condition of each test plot and the location and mechanism of any failures were documented, along with evidence of erosion and unraveling of erosion control materials.

Findings

The 2004-2005 water year was one of the wettest on record, with the Study site receiving over twice the normal amount of precipitation for the area. The relative performance of the selected erosion controls was evaluated qualitatively using the results of the visual monitoring. BMPs were considered to have “failed” when rilling or similar evidence of erosion became visually apparent. In general, the hydro mulches outperformed the binders; whereas landscape mulch performed best on all slopes. The binders and hydro mulches did not hinder growth of volunteer vegetation. Although seed mix was not added to the controls, new vegetation was observed on all test plots except for the landscape mulch.

Recommendations

The Study provides erosion control recommendations based on the findings of the Study (see **Table C-1**). These recommendations are based on appropriate slope, application rate, duration of effectiveness, application methods, inspection requirements and costs

Table C-1: Recommendations from the Erosion Control Best Management Practices Field Evaluation

EC Control	Amount Rain / Duration ¹		Appropriate Site Applications	Application Methods	Inspection Requirements	Costs
	Flat Area (< 5%)	Slope Area (> 5%)				
PAM (low weight)	1"; 1 storm	Not recommended	Temporary, single storm event; cohesive soils; slope length<500 feet	Dissolve in water, 20 lbs. per 2000 gallons, per acre	After each rain event	\$1.30 – \$5.50 / lb (material cost only)
PAM (high weight)	< 2"; 2+storm	1"; 2+ storm	Temporary, two storm events; cohesive soils; slope length<500 feet	Dissolve in water, 20 lbs. per 2000 gallons, per acre	After each rain event	\$1.30 – \$5.50 / lb (material cost only)
Wood Hydro-mulch ²	<12"; 1 season	<12"; 1 season	Steep slopes, steeper than 3:1; high erosion potential slopes; slopes where anchored mulch is needed; disturbed areas where plants slow to develop; stockpiles; slopes adjacent to ESAs	3,000 lb / acre to 4,000 lb / acre based on the manufacturer's recommendation, 12-24 hours to dry and become effective	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 (nrs)	\$6,000 per acre
Landscape Mulch ³	< 12"; 1 season	< 12"; 1 season	Flat areas, steep slopes, cohesive soils	Distribute by hand or use pneumatic methods, 2-3- inch depth (thickness) per CASQA guidance	Prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the nrs	\$4,000 per acre

¹ When used per manufacturer recommendations.

² When used with a high-weight binder. Hydro mulch consisting only of paper fiber is not recommended. Wood hydro mulch may not contain more than 25% paper fiber.

³ Tested at about 5-inch depth (thickness).