Section 2
Stormwater Pollution Prevention Plan

2.1 Introduction

This section describes the preparation and implementation of a stormwater pollution prevention plan (SWPPP) for a construction project. A SWPPP must be prepared before construction begins, ideally during the project planning and design phases. This is because much of the information required by the SWPPP is already part of the project design documentation, and because the design may need to be modified to incorporate controls during construction and post-construction. It may be completed at the end of the design phase or at the initiation of the construction phase prior to any activity with the potential to cause water pollution.

Implementation of the SWPPP begins when construction begins, typically before the initial clearing, grubbing, and grading operations, since these activities can usually increase erosion potential on the site. During construction, the SWPPP should be referred to frequently, and amended by the owner and contractors as changes occur in construction operations, which could have significant effects on the potential for discharge of pollutants.

2.2 Minimum Requirements

2.2.1 Sites Subject to General Permit Coverage

A construction project is subject to the General Permit[1] if it disturbs one acre or more of soil, or the project results in the disturbance of less than one acre but is part of a larger common plan of development or sale of one or more acres. Construction sites that result in soil disturbance of one acre or greater will require the preparation and implementation of a SWPPP meeting the requirements of the General Permit.

2.2.2 Other Sites

Construction projects with a disturbed area of less than one acre are not covered under the General Permit at this time and therefore are not required by the SWRQCB to develop a SWPPP. However, the local municipality or Regional Water Quality Control Board (RWQCB) may require the development of a SWPPP for all projects that require a grading permit or if it is determined that the project poses a significant water quality risk threat. The owner should contact local authorities to determine local requirements.

2.3 Assess Construction Site and Planned Activities

The planning phase is the source of much of the information needed for the SWPPP. The basis for stormwater pollution control decisions is also made at this phase via the normal review process with the local municipality. Information to be collected includes contractor activities, disturbed areas and erosion potential, and site history.

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[1] State Water Resources Control Board (SWRCB) Order No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Stormwater Runoff Associated with Construction Activity (General Permit).

2.3.1 Contractor Activities

Information about contractor activities is required for the selection of proper BMPs. Details that should be recorded include:

- Equipment storage, cleaning and maintenance areas and activities
- Points of ingress and egress to the construction site
- Material loading, unloading, and storage practices and areas, including construction materials, building materials and waste materials.
- Materials, equipment, or vehicles that may come in contact with stormwater

2.3.2 Disturbed Areas and Erosion Potential

The physical condition of the site and adjacent areas should be reviewed. A project layout showing what is being constructed, limits of construction, project schedule, and existing features should be developed. Site characteristics including drainage patterns, soils, vegetation, surface water bodies, and steep or unstable slopes should be noted. A hydrology report, soils report, and a grading/drainage plan should be prepared. Physical conditions at the site will change as construction progresses. The SWPPP must be amended to address conditions as activities change at the site.

The hydrology reports should assess information such as drainage areas and patterns, rainfall information and expected run-on and runoff volumes and flow rates, etc. A soil report will identify soil constraints, design criteria, and soil stability. Both of these reports are used in the preparation of the preliminary grading and drainage plan. The grading and drainage plan should identify areas of cut and fill, slope during and after grading, protection of existing vegetation, and areas of soil disturbance. They also form the technical basis for selection of erosion and sediment control BMPs.

2.3.3 Site History

Existing site characteristics such as vegetation, environmental features, and areas of historic contamination (natural and/or industrial or agricultural) should also be recorded on the project layout. Soil laboratory analysis may be required should prior contamination be suspected. The selection and implementation of construction BMPs will be affected by what existing features need to be protected or mitigated during construction.

2.4 Identify and Select BMPs

The owner, the owner's design consultant, or the contractor, may select BMPs at the discretion of the owner. The contract between the owner and contractor should specify the responsibilities of the owner and contractor with regards to stormwater pollution control during construction. Owners must be aware that regardless of the contractual agreement between the owner and contractor with respect to BMP selection and SWPPP implementation, the owner is ultimately responsible for compliance with the General Permit.

A guide to selecting BMPs for construction activities is presented in the following sections. BMPs are generally selected in a three-step process:

- Define BMP Objectives
- Identify BMP category
- Select appropriate BMPs

2.4.1 Define BMPs Objectives

Selection and implementation of BMPs is based on the pollution risks associated with the construction activity. The pollution prevention objectives of BMPs are defined based on a review of information gathered during the assessment of the site and planned activities (Section 2.3). Once defined, BMP objectives are developed and BMPs selected. The BMP objectives for construction projects are as follows:

- Control of Erosion, and Discharge of Sediment:
  - Minimize Disturbed Areas: Only clear land which will be actively under construction in the near term (e.g., within the next 6-12 months), minimize new land disturbance during the rainy season, and avoid clearing and disturbing sensitive areas (e.g., steep slopes and natural watercourses) and other areas where site improvements will not be constructed.
  - Stabilize Disturbed Areas: Provide temporary stabilization of disturbed soils whenever active construction is not occurring on a portion of the site. Provide permanent stabilization during finish grade and landscape the site.
  - Protect Slopes and Channels: Safely convey runoff from the top of the slope and stabilize disturbed slopes as quickly as possible. Avoid disturbing natural channels. Stabilize temporary and permanent channel crossings as quickly as possible and ensure that increases in runoff velocity caused by the project do not erode the channel.
  - Control Site Perimeter: Delineate site perimeter to prevent disturbing areas outside the project limits. Divert upstream run-on safely around or through the construction project. Local codes usually state that such diversions must not cause downstream property damage, or be diverted into another watershed. Runoff from the project site should be free of excessive sediment and other constituents. Control tracking at points of ingress to and egress from the project site.
  - Retain Sediment: Retain sediment-laden waters from disturbed, active areas within the site.
- Manage Non-Stormwater Discharges and Materials:
  - Practice Good Housekeeping: Perform activities in a manner to keep potential pollutants from coming into contact with stormwater or being transported off site to eliminate or avoid exposure.

- Contain Materials and Wastes: Store construction, building, and waste materials in designated areas, protected from rainfall and contact with stormwater runoff. Dispose of all construction waste in designated areas, and keep stormwater from flowing onto or off of these areas. Prevent spills and clean up spilled materials.

2.4.2 Identify BMP Categories

Once the BMP objectives are defined, identify the category of BMP best suited to meet each objective. The particular BMP selected from each category depends on specific site conditions, construction activities, and cost considerations.

There are six BMP categories available for selection. They are:

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

BMPs for contractor activities are listed in the TR, NS, and WM categories. BMPs for erosion and sediment control are listed in the EC, SE, WE, and TR categories.

2.4.3 Select BMPs

BMPs for Erosion and Sediment Control

BMPs for erosion and sediment control are selected to meet the BMP objectives based on specific site conditions, construction activities, and cost. Various BMPs may be needed at different times during construction since activities are constantly changing site conditions.

Selection of erosion control BMPs should be based on minimizing disturbed areas, stabilizing disturbed areas, and protecting slopes and channels. Selection of sediment control BMPs should be based on retaining sediment on-site and controlling the site perimeter. Erosion and sediment control BMPs are listed in the EC, SE, WE, and TR categories, which are presented in Section 3.

BMPs for Contractor Activities

Certain contractor activities may cause pollution if not properly managed. BMPs should be selected based on the contractor activities information collected in the SWPPP. The materials and BMP objectives for contractor activities are practicing good housekeeping and containing materials and waste. BMPs for contractor activities are selected from the TR, NS and WM categories, which are presented in Sections 3 (TR) and 4 (NS, WM). Several considerations for selecting a BMP for contractor activities include:

- Is it expected to rain? Selection of a BMP is different for the rainy season versus the dry season. What activities can be postponed or re-scheduled until after the rains or performed during the dry season.

- How much water is being used? The more water used and wastewater generated, the more likely that pollutants transported by this water will reach the drainage system or be transported off site.

- What are the site conditions? BMPs may differ depending on whether the activity is conducted on a slope or flat ground near a drainage structure or watercourse. Conducting activities away from certain sensitive areas will reduce the cost and inconvenience of implementing BMPs.

- What about accidents? Controls for common activities should be established, and preparations should be made to allow for quick response to accidents or spills. In the event of a spill or exposure of construction compounds, what are the contingency plans for sampling the contaminated stormwater? Can the analysis be done in the field or should laboratory analysis be required? Are sample bottles available on-site, appropriate test strips, etc?

2.5 Stormwater Pollution Prevention Plans

2.5.1 SWPPP Preparation

The General Permit requires that the owner prepare a SWPPP for projects that will create one acre or more of soil disturbance. The General Permit also requires that the SWPPP applies to all areas that are directly related to the construction activity, including but not limited to staging areas, storage yards, material borrow areas, and access roads, etc. In some cases, the owner may enter into agreements with the contractor or stormwater quality professionals for preparation and implementation of the SWPPP. However, owners must be aware that regardless of the contractual agreement between the owner and contractor with respect to BMP selections and SWPPP implementation, the owner is ultimately responsible for compliance with the General Permit. It is highly recommended that the owner and contractor jointly review the SWPPP during its development or during a pre-construction conference.

The SWPPP is a document that addresses water pollution control during construction. The SWPPP must be prepared and available on the project site before the project owner, developer, or contractor begins any activity with the potential to cause water pollution. The SWPPP must be available on site at all times and must be implemented year-round throughout the duration of the construction project.

The SWPPP must be completed before any construction activity starts. No construction activity having the potential to cause water pollution shall be performed until the SWPPP has been completed, certified, and appropriate BMPs have been implemented. Construction activities that will not threaten water quality, such as traffic control, may proceed without a complete SWPPP if allowed by the local agency and the RWQCB.

The SWPPP should be directed at personnel on the construction project (e.g., supervisor, foreman, and inspectors). The SWPPP should provide specific guidance on actions to be taken by these personnel and should be presented in a format that accommodates day-to-day use (e.g., loose leaf, pullout sections, and checklists).

The SWPPP should provide a simple narrative and diagram that locates the construction site, identifies potential pollutant sources on site, and shows the location of the BMPs to be used to minimize erosion and sedimentation during construction. It should also describe measures which eliminate or reduce pollution of stormwater runoff by any chemicals and materials used during the construction process. The level of detail will vary with the intensity, size, and type of construction.

2.5.2 SWPPP Template

An electronic SWPPP template has been developed and is included in Appendix A of this handbook as an assistance tool. The template contains the elements required by the General Permit, but local agencies may develop their own SWPPP template or require an alternative format. It is important to note that a SWPPP does not need to match the template provided. The template SWPPP is provided as a guidance document that was developed to:

- Provide easy data entry during SWPPP preparation (instructions and examples can be viewed in the template while the SWPPP is being prepared)

- Provide consistency in SWPPP content and format, thus making the SWPPP review process more efficient

An electronic copy of the SWPPP template (Microsoft Word® 2000) can be downloaded from the California Stormwater BMP Handbook web site at "www.cabmphandbooks.com." Due to the SWPPP template objectives for consistency in SWPPP content and format, the SWPPP template's underlying structure cannot be modified by the user.

2.6 SWPPP Implementation

2.6.1 Staff Training

Training is imperative to the success of the BMPs identified in the SWPPP. Adequate training is required if these BMPs are to be installed and maintained properly. These BMPs will fail if not properly installed and maintained. Thus, only trained personnel should be assigned these responsibilities. A construction stormwater pollution prevention training program should be held for all construction personnel. A good program will include:

- SWPPP Preparation Training. This training is geared towards owners, engineers, contractors, and water quality professionals involved in preparation and certification of SWPPPs. The training must cover all aspects of construction site water pollution control, including, SWPPP documentation and BMP selection.

- SWPPP Implementation Training. This training is geared towards owners, contractors, superintendents, foremen, and key staff designated in the SWPPP as being responsible for

certifications, inspections, monitoring, and project oversight. The first training element must familiarize the individuals with the content and organization of the SWPPP, pollution control objectives, responsibilities for pollution control, BMPs, inspection procedures, and monitoring procedures. The second training element must focus on the SWPPP for the particular project site for which the individual is responsible, including site-specific responsibilities, BMPs, and other measures.

- BMP Implementation Training. This training is geared towards owners, contractors, superintendents, foremen, tradesmen, laborers, and for other staff that work on the construction site including subcontractors. The training should cover responsibilities for BMP implementation, how to implement BMPs, general good housekeeping, and protection of BMPs in place.

Construction water pollution control training typically includes off-site and on-site training. Off-site training is most appropriate for SWPPP Preparation training with instruction provided by trade associations, colleges, Regional Boards, County, or other water quality professionals. SWPPP Implementation training can be conducted through a combination of off-site training for the general subjects, and on-site training for a site specific SWPPP, with instruction provided by trade associations, colleges, Regional Boards, Counties, water quality professionals, and experienced owner and contractor superintendents. BMP implementation training is usually conducted on the project site with instruction provided by experienced owner and contractors' superintendents and foremen.

Subcontractor employees can impact water quality and potentially jeopardize compliance with the General Permit, thus subcontractor staff must also receive appropriate training. The owner may wish to contractually require that subcontractors employ trained staff.

2.6.2 Site Inspections

The General Permit requires inspections before and after a storm event, and once each 24-hour period during extended storm events, to identify BMP effectiveness and implement repairs or BMP changes as soon as feasible. At the onset of a construction project (e.g., clearing, grubbing, or earth movement) it may be more appropriate to perform inspection of the BMPs on a regular basis instead of just before and after a storm. This will allow sufficient time for any corrections or improvements to be made before the storm. An inspector should be identified in the SWPPP. Inspection can usually be performed as part of a regular oversight and inspection of the project site.

According to the General Permit, a tracking or follow-up procedure must follow an inspection that identifies deficiencies in the BMPs. The result of the inspection and assessment must be written. Include the date of the inspection, weather information, the person(s) who performed the inspection, observations, descriptions of inadequate BMPs, and the corrective actions that were taken, such as BMPs that were fixed or additional BMPs that were implemented. Inspection records must be retained for three years from the date they were generated. It is highly recommended that records be retained for at least three years following the date coverage is terminated under the General Permit; even longer retention of records is recommended where

sites have been subject to enforcement actions or are involved in litigation regarding issues covered by the permit.

2.6.3 BMP Monitoring

The type of BMP monitoring depends on which BMP is implemented. In the case of contractor activity BMPs, the monitoring consists of visual inspection to ensure that the BMP was implemented and maintained according to the SWPPP. Such inspection would include:

- Looking for evidence of spills and resulting clean-up procedures (e.g., supplies of spill cleanup materials)
- Verifying adequacy of trash receptacles
- Verifying waste disposal practices (e.g., recycle vs. hazardous waste bins)
- Examining integrity and use of containment structures
- Verifying use of employee education programs for the various activities
- Noting the location of activity (e.g., outdoor vs. indoor, concrete vs. grass)
- BMPs for any chemicals or fuels not addressed in the SWPPP must be developed

In the case of erosion and sediment control BMPs, the monitoring program should consist of regular inspection to determine the following:

- Are erosion and sediment control BMPs installed properly? The SWPPP BMPs should include details or references to allow for the proper construction of structural or vegetative erosion and sediment control devices. The inspector should ensure that these systems are installed according to the SWPPP in the proper locations
- Are the BMPs effective? The effectiveness of the BMP would be based on the presence of sediment behind or within control devices, the presence of sediment downstream of the site, and signs of erosion in stabilized areas after a storm event.
- Have drainage patterns changed? If the site has undergone significant grading operations, resulting in a change of drainage patterns, adjustment to the BMPs will likely be required to address this change. The inspector shall determine the extent of changes to the drainage pattern and the necessity for additional or reconfigured BMPs.
- Are areas stabilized as quickly as possible after completion of construction activities in an area? Disturbed active and inactive construction areas (inactive construction areas may be defined as areas in which no construction activity will occur for a period of 30 days or longer) should be stabilized as soon as practical. If construction, climatological, or other site conditions do not allow stabilization, the SWPPP should define alternative approaches.

- Are the BMPs properly maintained? Maintenance of erosion and sediment control BMPs is critical. Erosion controls should be installed as soon as practical after an area becomes inactive, and before the onset of rain. The capacity of sediment controls must be restored prior to the next rain event.

2.6.4 BMP Maintenance

The inspector should inspect the site on a regular basis, during and after any storm generating runoff to determine maintenance requirements and general condition of the installed system. The local agency may also inspect the site on a routine basis to assess the maintenance performed on the systems. All maintenance related to a storm event should be completed within 48 hours of the storm event. The following maintenance tasks should be performed on a regular basis:

- Removal of sediment from barriers and sedimentation devices
- Replacement or repair of worn or damaged silt fence fabrics
- Replacement or repair of damaged structural controls
- Repair of damaged soil stabilization measures.
- Other control maintenance as defined in each BMP fact sheet.

2.6.5 Stormwater Pollution Control Documentation

Records of inspections, compliance certifications, and non-compliance reporting are to be retained for at least three years by the owner. It is suggested that records of incidents such as spills or other releases be kept. Analyzing a history of this information can provide insight into modifying the BMPs. Photographs should also be kept.

Also, keep a record of maintenance activities or any other BMPs that are of an action nature. Activity based BMPs such as Good Housekeeping must be documented in each inspection; often, this documentation is the only evidence that the BMPs have been implemented.