

## **CHAPTER 8**

# **POST-CONSTRUCTION STORM WATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT**

The Post-Construction Storm Water Management in New Development and Redevelopment Program (Post-Construction SWM Program) will institute procedures to incorporate the installation of appropriate permanent BMPs for certain new development and significant redevelopment projects that HDOT Highways undertakes (e.g., contract projects), as well as certain types of encroachment projects. Permanent BMPs are designed to be installed and remain in place as part of a project to provide for long-term storm water quality or quantity control. New development and significant redevelopment projects include but are not necessarily limited to new roadways and roadway and intersection improvements or modifications, such as widening.

The Post-Construction SWM Program is complementary to the Construction Program in that permanent BMPs could sometimes be incorporated in a site-specific construction BMP plan, and therefore, be used to prevent the discharge of pollutants during construction and after the project is completed.

Specific elements of the Post-Construction SWM Program include:

- Criteria (“unified criteria”) to determine when permanent BMPs must be included in a project;
- Permanent BMP Manual and specifications;
- Instituting permanent BMP considerations throughout the life-cycles of both HDOT Highways and encroachment projects, which include:
  - Using the unified criteria during both the planning and design phases of projects, and having the criteria available to sponsors of encroachment projects,
  - Using a checklist and a manual to assist applicable projects (contract and encroachment) in selecting appropriate permanent BMPs,
  - Design review and approval process for contract and encroachment projects to ensure that permanent BMPs are included in the design, if required, and
  - Permanent BMP database incorporated into the AMS to track the location, type, and frequencies of inspections and maintenance activities;
- Retrofit feasibility study to determine the locations for retrofitting and improving sections of the Oahu MS4 that are discharging to waters listed pursuant to CWA Section 303(d) for sediment, siltation, turbidity and/or trash; and
- Supporting a training program and outreach materials so that people involved in HDOT Highways-related new developments or significant redevelopments (e.g., HDOT and utility company personnel, design consultants, contractors, etc.) are familiar with permanent BMP criteria, methods, specifications, and permitting requirements.

## **8.1 Permanent BMP Criteria and Design References**

### **8.1.1 Unified Criteria**

The permanent BMP criteria or “unified criteria” are meant to assist project managers, design engineers, construction engineers, plan reviewers, construction contractors and others involved with new development or significant redevelopment projects in determining when permanent BMPs should be included in a project’s planning or design to address storm water impacts and pollutants of concern.

The permanent BMP criteria, which are provided in Appendix F.1, consider the water quality impacts from the post-construction condition of the project, among other factors. The criteria specify that projects that generate at least one acre of new permanent impervious surface include permanent BMPs. Special conditions may apply, as determined by HDOT Highways, regardless of whether a project introduces at least one acre of new impervious surface. For instance, if a project’s storm water runoff drains into sensitive receiving waters, Class I inland waters, Class AA marine waters, and/or selected 303(d) list water bodies, permanent BMPs would likely be required. Also, HDOT Highways may grant an exemption and or variance to certain types of projects, such as underground utilities or projects that return an area to pre-development runoff conditions.

### **8.1.2 Permanent BMP Manual**

HDOT Highways completed a *Storm Water Permanent Best Management Practices Manual* (February 2007) (Permanent BMP Manual) (see Appendix F.2). Permanent BMPs are designed to manage and treat storm water runoff prior to discharge from Oahu MS4 outfalls. The permanent BMP options include the following categories:

- Vegetated swales: dry swales and wet swales;
- Infiltration facilities: infiltration trenches; infiltration basins and bio-retentions;
- Storm water wetlands: shallow wetlands, extended detention wetlands and pocket/pond wetlands;
- Storm water ponds: wet ponds, extended detention ponds and multi-pond system;
- Filtering systems: sand filters, and organic filters; and
- Proprietary hydrodynamic type devices

Selection of the appropriate BMPs for a particular project should be site specific and applicable to site conditions. No single BMP would be able to achieve pollutant reduction for every given situation. Each BMP described in the manual has its advantages and disadvantages. Therefore, the designer or project/design manager should consider the benefits, costs, pollutant removal efficiency, aesthetical acceptability, and other pertinent factors when selecting BMPs for individual projects.

Copies of the Permanent BMP Manual will be provided to all HDOT Highways staff involved in new development or significant redevelopment projects, such as project managers, design engineers, construction engineers, and plan reviewers. It would also be available on-line in the public website (see Section 4.2.1.5), which will also make it available to private consultants and contractors.

### **8.1.3 Permanent BMP Checklist**

Completion of the Permanent BMP Checklist, which is provided in Appendix F.3, ensures that HDOT Highways project/design managers (or design consultants) and encroachment project applicants consider permanent BMPs as part of their projects. As noted in Section 8.2, the checklist shall be completed for all contract and encroachment projects regardless of whether the project requires permanent BMPs.

## **8.2 Permanent BMP Consideration in Project Life Cycle**

The Post-Construction SWM Program will provide support to new development and significant redevelopment projects conducted by HDOT Highways during each of the following four major stages, which represent the entire life cycle of a project: planning; design; construction; and operations and maintenance. The elements of the program support are described below.

### **8.2.1 Planning**

The planning (or project development) phase typically starts by HDOT Highways preparing a project definition report, which includes identifying the project site, a general statement of the purpose and need, and a brief description of the proposal. If HDOT Highways chooses to proceed with the project following completion of the report, conceptual engineering is prepared, and the project would likely undergo environmental review in accordance with HRS Chapter 343. If federal funds are planned for construction of the project, the environmental review process must also be in compliance with the National Environmental Policy Act.

During the environmental review process, project sponsors are required to assess the potential environmental impacts of the project. Because one of the potential impacts of highway projects is pollutant runoff affecting nearby water bodies, especially if the project proposes to introduce a substantial amount of new impervious surfaces, an evaluation of whether permanent BMPs should be included as part of the project to avoid or minimize adverse impacts is appropriate. Using the support provided under the Post-Construction SWM Program, HDOT Highways personnel (and by extension, planning and engineering consultants, if any) shall determine if their projects require permanent BMPs. If so, they shall include permanent BMPs in their conceptual plans, including its impact on preliminary cost estimates, right-of-way requirements and other environmental resources. The Permanent BMP Manual (see Section 8.1.2) provides additional information about program support during the planning phase of a project, and can also be used as a resource to identify conceptual BMP plans or solutions.

### **8.2.2 Design**

For contract projects, construction documents (i.e., plans, specifications and estimates or PS&E) are prepared during the design stage, typically by design consultants (see Chapter Seven). The design stage also involves HDOT Highways obtaining right-of-way through fee simple acquisition, and acquiring construction and environmental permits (e.g., NPDES).

Using the unified criteria (see Section 8.1.1), project/design managers (and by extension, design consultants) shall determine if permanent BMPs are required for contract projects, if not already determined during the planning stage. If permanent BMPs are required, the Permanent BMP Manual can be used for guidance on selecting the appropriate BMP. All relevant information in the bid documents, including PS&E for the BMPs, shall be submitted to HDOT Highways Division Design Branch, Hydraulic Design Section (HWY-DH) for review of the permanent BMPs, as part of HDOT Highways' normal plan review process. Regardless of whether the contract project requires permanent BMPs, the project/design manager or design consultant shall complete the permanent BMP checklist along with the other documents and forward them to HWY-DH (see Section 8.1.3). The contract project shall not proceed to the bidding process without first receiving the appropriate permanent BMP approval and documentation from HWY-DH. The Permanent BMP Manual (see Section 8.1.2) provides additional information about program support during the design phase of a project.

Encroachment projects, such as those projects that require a connection or discharge permit or other HDOT Highways permit, shall be reviewed by HWY-DH during the permit review process to check whether or not the project requires permanent BMPs. Applicants will be able to obtain the unified criteria, permanent BMP checklist and Permanent BMP Manual by request or through the public website (see Section 4.2.1.5). If an encroachment project requires permanent BMPs, HWY-DH will also review the BMPs construction documents for appropriateness to the project. The encroachment project will not receive an HDOT Highways' approval or permit without first receiving the appropriate permanent BMP approval and documentation from HWY-DH.

In addition to checking whether or not the permanent BMPs are appropriate for a contract or encroachment project, the HWY-OM reviews shall also check the documents for appropriate future maintenance requirements.

### **8.2.3 Construction**

Construction of contract and encroachment projects is overseen by HWY-OC and HWY-OM, respectively. They shall be responsible for checking and inspecting that permanent BMPs, if any, are constructed in accordance with approved PS&E, the same as other elements of a project.

### **8.2.4 Operations and Maintenance**

Maintenance of permanent BMPs will depend on their types and sizes. Depending on the BMP constructed, regular inspections, monitoring, repairs, and/or retrofits may be required. The Post-Construction SWM Program includes a management system as part of the AMS to ensure that permanent BMPs are subject to consistent inspections and maintenance (see Section 3.3.4). The system will include a database of all permanent BMPs. For each permanent BMP, the database will include information about its type and location, as well as its inspection and maintenance requirements (permanent BMPs in HDOT Highways rights-of-way only).

All permanent BMPs installed as part of a new development or significant redevelopment by either HDOT Highways or non-HDOT Highways entity will be maintained by HWY-OM

personnel, unless the permanent BMP is not in the HDOT Highways rights-of-way. Conducting inspections and performing maintenance of the permanent BMPs installed as part of this program will be under the pollution prevention/good housekeeping program, but will be coordinated through the management system described in this section.

### **8.3 Retrofit Feasibility Study**

As part of the Oahu MS4 NPDES Permit requirements, HDOT Highways will complete a feasibility study for retrofitting the existing Oahu MS4 discharges to receiving waters listed pursuant to CWA Section 303(d) for sediment, siltation, turbidity, and/or trash. The retrofits may include water quality BMPs to meet State Water Quality Standards.

A detailed scope has been developed for the feasibility study (see Appendix F.4). A final feasibility study will be completed within three (3) years of the effective date of the Oahu MS4 NPDES Permit, which became effective on March 31, 2006.

The AMS will provide essential tools that will be used to analyze the following types of data layers:

- 303(d) listed watersheds, stream, beaches and bays;
- Topography;
- Storm drain network;
- Outfalls;
- Permanent BMPs;
- State highway routes and right of way;
- Land use;
- Soils data;
- Zoning information;
- Water quality monitoring data; and
- Aerial photography.

The goal of the AMS analysis will be to identify potential locations for maximum water quality enhancement.

### **8.4 Training**

The training element of the Post-Construction Storm Water Management Program will cover the Permanent BMP Manual. Instruction will include application of the BMP criteria as well as providing instruction about selecting appropriate permanent BMPs. The training was started in January 2006 and will expand in 2007 to include training that will cover the Permanent BMP Manual.

### Training Recipients

Training will be made available to the following personnel:

- Contractors who perform design work for the State DOT; and
- HDOT Highways personnel with project design and construction storm water responsibilities, including design engineers, construction engineers, and plan review staff.

### Training Method

The method of training will involve both PowerPoint presentations and handout materials, which include the following documents:

- Presentation's PowerPoint slides that allow for the taking of notes;
- Permanent BMP Manual; and
- Descriptions of sample permanent BMPs.

### Trainer Qualifications

The trainer must meet the following qualifications:

- Professional experience in designing, installing, and/or inspecting permanent BMPs; and
- Knowledge of the effectiveness of various permanent BMPs in local climate and geological conditions.

### Topics

Topics will include the following:

- Environmental background and regulatory requirements, particularly the Clean Water Act and the NPDES permit program;
- Information and awareness of the Oahu MS4 NPDES, and the overall Oahu SWMP;
- Informing staff that they serve an important role in protecting the water quality in the State;
- Responsibilities of HDOT Highways regarding storm water management and erosion and sediment control at construction sites;
- Permanent BMP Criteria;
- Instructions on how to fill out the Permanent BMP Checklist; and
- All types of permanent BMPs covered in the Permanent BMP Manual.

### Training Schedule and Reporting

Training will be held annually. The Mid-Year and End-of-Year Reports (See Chapter Thirteen) will contain information on the number and dates of training sessions, types of training, and recipients of the training.

### Additional Training Activities

The training regimen includes the provision of education and outreach material to those parties who apply for HDOT Highways encroachment or Oahu MS4 discharge or connection permit. This group includes developers, engineers, architects, consultants, construction contractors, excavators, and property owners, on the selection, design, installation, operation and maintenance of storm water treatment controls. The outreach materials include:

- Simplified flowcharts for thresholds triggering permits and requirements;
- List of required permits, implementing agencies, fees, overviews, timelines; and
- Brief discussion of potential environmental impacts associated with storm water runoff.

## **8.5 Organizational Structure**

As shown on Figure 8-1, the Post-Construction SWM Program is overseen by HWY-DH. Within the Hydraulic Section, an Engineer V assists in the review of projects that require permanent BMPs, including encroachment projects. In addition, the HDOT Highways Design Branch, Design Section (HWY-DD) provides design services for contract projects prepared by in-house staff and incorporates permanent BMPs in their designs.

Contract projects that are prepared by consultants during project development or planning are overseen by HDOT Highways Planning Branch (HWY-P), the Design Branch Technical Design Section (HWY-DS), or the Design Branch Design Section (HWY-DD). HWY-P, HWY-DS, and HWY-DD, inform their consultants that the permanent BMP criteria need to be considered during the environmental evaluation and design processes. These HDOT Highways design sections also have the responsibility to ensure that the in-house staff and consultants are aware of the other permanent BMP materials, and are familiar with appropriate permanent BMP designs. During construction, HWY-OC is responsible for checking that permanent BMPs are constructed in accordance with approved plans. HWY-OM is responsible for maintaining the permanent BMPs, ensuring that they are working as intended.

As described in Section 7.6, HWY-OM oversees encroachment projects, and is therefore, responsible for notifying applicants about the permanent BMP criteria, and making sure that the criteria are applied to the encroachment projects. If necessary, HWY-OM will check if permanent BMPs are included in the project. The permanent BMP plans will be reviewed by HWY-DH, as noted above. HWY-OM is also responsible for checking that permanent BMPs of encroachment projects are constructed in accordance with approved plans.

The master consultant staff has assisted or will assist HWY-DH in developing the permanent BMP criteria, the Permanent BMP Manual, the retrofit feasibility study, other related materials, and the training program.

THIS PAGE INTENTIONALLY LEFT BLANK.

