Program Evaluation Report

Hawaii Department of Transportation Storm Water Management Program (Permit No. HI 0021245)

1.0 Introduction

1.1 Program Evaluation Purpose

Tetra Tech, Inc., with assistance from the Hawaii Department of Health (DOH), conducted a program evaluation of the Municipal Storm Water Management Program (SWMP) of the Hawaii Department of Transportation (HDOT), Highways Division, in September 2004. HDOT is required to implement the SWMP and to meet other requirements described in the National Pollutant Discharge Elimination System (NPDES) permit issued to HDOT (permit no. HI 0021245).

The primary purpose of the evaluation was to assess HDOT's progress in implementing its SWMP and addressing deficiencies and potential permit violations identified in an evaluation conducted in August 2003. Secondary goals included reviewing the overall effectiveness of the program and collecting data to assist DOH in reissuing the NPDES permit.

1.2 NPDES Permit History and Status

HDOT was issued an NPDES permit to discharge storm water runoff and certain non-storm water discharges identified in the permit from HDOT's municipal separate storm sewer system (MS4) outfalls into state waters and waters of the U.S. on the Island of Oahu. The NPDES storm water permit was issued on June 20, 2000. It became effective on July 20, 2000, and was scheduled to expire on September 8, 2004. DOH has administratively extended this NPDES permit until a new NPDES permit is issued to HDOT. The current permit, the second MS4 storm water permit issued to HDOT, requires HDOT to develop and implement a SWMP.

1.3 Logistics and Program Evaluation Preparation

In addition to the documents reviewed prior to the evaluation in August 2003, Tetra Tech, Inc., reviewed the following program materials to prepare for this evaluation:

- HDOT Permit Reapplication and End-of-Year Report (December 2003)
- HDOT Storm Water Management Program Plan, Oahu District (December 2003)
- HDOT Mid-Year Report (February 2004)

On September 22–24, 2004, Tetra Tech, Inc., with assistance from DOH, conducted the program evaluation. The evaluation schedule was as follows:

Day	Time	Permit Element	
		Team 1	Team 2
Wednesday Sept. 22	1:30–4:30	Kickoff Meeting Discussion of Overall SWMP Organizational Structure; Data Management	
Thursday Sept. 23	8:30	Flood Control Erosion Control New Development Construction Plan Review (office)	Construction Site Visits (field)
	1:00	Illicit Discharges Industrial Discharges (office)	Maintenance Facilities Chemical Application Debris Control (field)
Friday Sept. 24	8:30	Monitoring (office)	Training (office)
	1:30–4:00	Discussion of Permit Requirements and Out-brief	

Upon completion of the evaluation, the two evaluation teams held an exit interview to discuss their preliminary findings. During the exit interview, the attendees were informed that the findings were to be considered preliminary pending further review by DOH and EPA.

1.4 Program Evaluation Topics

The evaluation team reviewed HDOT storm water activities in the following program areas:

- Program Management
- Program Effectiveness and Reporting
- Construction Activities BMP Program
- New Development and Significant Redevelopment BMP Program
- Erosion Control BMP Program
- Debris Control and Maintenance Facilities BMP Programs
- Chemical Applications BMP Program
- Inventory of Industrial Discharges; Illicit Discharges/Illegal Connections
- Monitoring Program

The following areas were not evaluated in detail as part of this program evaluation:

- HDOT activities associated with the Airports and Harbors Divisions. This evaluation focused on HDOT's Highways Division.

- HDOT activities on islands other than Oahu.

- Wet-weather monitoring data and sampling procedures, although a general discussion of monitoring plans and results was included in the evaluation.

- Other NPDES permits issued to the permittee (e.g., industrial or construction NPDES storm water permits).

- Legal authority.

- Inspection reports, plan review reports, and other relevant files. The program evaluation team did not conduct a detailed file review to verify that all elements of the program were being implemented as described. Instead, the team relied on its observations and on statements from HDOT representatives to assess overall compliance with permit requirements. A detailed file review of specific program areas could be included in a subsequent evaluation.

1.5 Program Areas Recommended for Further Evaluation

The evaluation team recommends the following additional assessments:

- A review of the SWMP program and priorities after the master consultant is hired and has had sufficient time to actively engage in program implementation. Specific areas of focus could include response to the findings presented in this report, progress on a technical design manual and specifications for post-development storm water controls, identification of erosion control sites and potential remedies, geographic information system (GIS) and database integration, and identification of a process or methods to measure program effectiveness.

- A review of the monitoring plan developed for the Ala Wai Canal watershed to determine whether it meets the requirements of the MS4 permit and TMDL.

- A review of the debris removal program and its overall progress approximately 3 to 6 months after the service contractor has initiated work.

- An on-site review and interview of herbicide applicators to view the application process and discuss training.

2.0 Program Evaluation Results

The following findings summarize results of the program evaluation and are grouped by storm water program area. The findings address only the most significant issues identified during the program evaluation. Because of the limited time available to conduct the evaluation, HDOT should not consider the list of findings in this report a comprehensive evaluation of individual program elements or the overall SWMP.

2.1 Program Management

- *HDOT has added two new members to the storm water staff in the past year and plans to add several more.*

Within the past year, the Drainage Discharge Unit (DDU) in the Oahu District Maintenance Section has added two additional staff members, including another Engineer V to manage the storm water program. This is a significant increase from the single staff person assigned to the DDU and storm water program in August 2003. However, several positions still remain vacant, including two for engineers and two for inspectors. At the time of the evaluation, HDOT was developing plans to fill these positions with transfers from other HDOT programs.

- *HDOT is seeking to hire a master consultant and two service consultants to help implement the storm water program.*
  At the time of the evaluation, HDOT was advertising for a master consultant to assist in all aspects of the storm water program, including inspections, development of a design manual for post-construction BMPs, and revision of the SWMP. In addition to the master consultant, HDOT plans to hire two service contractors to conduct additional street sweeping and storm drain cleaning.

  These additional resources should greatly assist HDOT in implementing its SWMP.

- *A SWMP was developed in December 2003.*
  HDOT developed a revised SWMP and submitted it to DOH in December 2003. This plan was based on the BMP Program Plans developed to comply with the NPDES permit and EPA's Orders for Compliance, but it also includes updates to activities and detailed organization charts for HDOT's management of the storm water program.

- *HDOT had established a statewide environmental training program and assigned two staff for implementation purposes.*
  The training program had been established within the preceding 12 months and was to be expanded with one additional staff member and the hiring of a contractor. The current plan was to develop a training matrix that associated individual job responsibilities with an assortment of required training courses. The training courses were to cover storm water, hazardous materials, chemical applications, and more. HDOT was finalizing the scope of services for the contractor bid and expected to announce the opportunity to bid in the October–November timeframe.

- *The storm water management plan should include specific measurable goals for activities.*
  The SWMP describes activities HDOT will undertake to implement the storm water program, but it generally does not specify measurable goals, or quantifiable activities, for each BMP. Measurable goals are used not only to track program implementation but also to plan for future activities and to notify DOH in advance how much of an activity HDOT plans to complete. HDOT should specify these measurable goals in the SWMP for each specific activity and BMP. For example,

a measurable goal for the industrial discharge program might be "to conduct surveys of at least 100 properties adjacent to HDOT rights-of-way each year."

- *HDOT needs to continue mapping its storm drain system in a GIS and identify areas of the MS4 that discharge to impaired waters.*
  HDOT has only the outfalls of its system mapped in GIS. During the evaluation HDOT representatives stated that the master consultant will be tasked with updating the GIS coverage to include storm drain pipes, storm drain inlets, and structural controls. HDOT will also need to identify areas of the MS4 that discharge to impaired waters (section 303(d) listed waters). DOH is developing a map of these waters, and HDOT should link this map into its GIS when complete.

- *HDOT will need to develop specific plans to address TMDLs, including the Ala Wai Canal TMDL.*
  The Ala Wai Canal is an impaired waterbody in a highly urbanized area. DOH has adopted a Total Maximum Daily Load (TMDL) for total nitrogen and total phosphorus that includes a specific wasteload allocation for HDOT. HDOT and the City and County of Honolulu (CCH) were combined into an "urban source wasteload allocation." This combined wasteload allocation sets a limit of 6 kg/day (a 65 percent reduction) in total nitrogen and a limit of 5 kg/day (a 50 percent reduction) in total phosphorus to meet the state's water quality standards.

  The implementation expectations in the TMDL state that HDOT "should identify actions necessary to implement its WLA, with the intent that these actions will be incorporated in the NPDES permit when it is reissued in 2004. The DOT plan should specifically identify both implementation and monitoring actions that will be carried out to reduce nutrient loading and measure the effectiveness of these actions in meeting the WLAs and the associated water quality standards."

  Because of the combined wasteload allocation, HDOT will need to work closely with CCH to implement BMPs and develop a monitoring program to demonstrate that both entities are meeting the WLAs. In addition to the Ala Wai Canal TMDL, HDOT will also need to address TMDLs for other waterbodies that have been developed or will be developed in the near future.

2.2 Program Effectiveness and Reporting

- *HDOT needs to develop measures to assess the effectiveness of the storm water program.*
  Storm water programs cannot rely solely on water quality sampling data to demonstrate effectiveness. Additional measures, such as number of catch basins cleaned, pounds of debris removed from the highways, and increases in training and knowledge of staff, are indicators that can be used to assess the effectiveness of the storm water program. HDOT should develop a formal program effectiveness strategy that describes which indicators and information will be tracked to demonstrate program effectiveness.

Additional information and suggestions on tracking program effectiveness can be found in materials from the November 14, 2003, meeting of the California Storm Water Quality Association. This meeting focused on MS4 program effectiveness and how it can be documented. The presentation materials are available at http://www.casqa.org/meetings/presentations.htm. An additional resource is *A Framework for Assessing the Effectiveness of Jurisdictional Urban Runoff Management Programs*, developed by the San Diego Municipal Storm Water Copermittees. A copy of this report is available at http://www.projectcleanwater.org/pdf/copermittees/assessment_framework_final.pdf

- *HDOT needs to develop procedures to assess BMP performance/effectiveness.* For HDOT to implement an effective storm water program, it must have data on which BMPs are effective and how effective they are in reducing targeted pollutants. These data will also help HDOT to comply with the wasteload allocations identified in TMDLs. Some examples of other programs and guidance that could be useful in this effort are listed below:

    - Washington Chapter of APWA, *Protocol for the Acceptance of Unapproved Stormwater Treatment Technologies for Use in the Puget Sound Watershed* (November 1999) http://mrsc.org/Subjects/Environment/water/apwa/protocol.aspx

    - City of Sacramento, *Investigation of Structural Control Measures for New Development* (November 1999) http://www.sacstormwater.org/const/manuals/dl-scm99.html

    - International Stormwater BMP Database http://www.bmpdatabase.org/ The document *Urban Stormwater BMP Performance Monitoring: A Guidance Manual for Meeting the National Stormwater BMP Database Requirements* is available on this site.

    - EPA's Environmental Technology Verification (ETV) Program. http://www.epa.gov/etv/index.html

- *HDOT should develop a streamlined reporting format for DOH and EPA.* HDOT currently submits a mid-year report and an end-of-year report to DOH but has requested in its permit reapplication that the requirement for a mid-year report be dropped from the next MS4 permit. HDOT should propose a streamlined reporting format to DOH and EPA that identifies the key information necessary for all parties to assess compliance. The end-of-year report could be more comprehensive and provide more narrative than the mid-year report and other interim reports.

For an example of a well-written end-of-year report that describes what the permittee was required to do, what the permittee did, and why, HDOT should refer to the latest end-of-year report from CCH.

2.3 BMP Program

- *HDOT has made improvements in its oversight of erosion and sediment controls at construction projects.*
  The evaluation team did not conduct on-site inspections of HDOT construction projects but did meet with Area, Resident, and Project Engineers to discuss the process of ensuring that projects implement effective erosion and sediment controls. In a change from the previous year, the two Area Engineers are cooperating to conduct additional inspections of construction projects to ensure consistent application of BMPs. Both the Project and Resident Engineers interviewed displayed a high level of BMP awareness, and BMPs were deployed at a variety of construction sites throughout the Honolulu area. The criteria for when to conduct inspections were well known, and inspection procedures appeared adequate.

- *HDOT should develop a more effective enforcement tool for engineers and inspectors and evaluate its current process for including erosion and sediment controls in big packages.*
  HDOT has developed standard BMP specifications and inspection requirements for erosion control in the SWMP that largely place the burden on the contractor. Staff indicated, however, that ensuring contractors adequately deploy and maintain the BMPs can be a problem and that current remedies (e.g., stop work, withheld payments, verbal warnings) are not necessarily effective or efficient. To help ensure that erosion and sediment controls are implemented on all projects, HDOT should develop an effective enforcement tool that inspectors can use when contractors do not voluntarily implement BMPs in a timely manner. For maximum effectiveness, this enforcement tool likely needs to be developed for use on a statewide basis rather than solely within the District.

  Also, HDOT should develop specific criteria for how erosion and sediment controls will be included in bid packages. This would help to ensure that contractors accurately estimate storm water costs and plan for the installation of controls. Some DOTs and MS4s have required all contractors to allocate a specific dollar amount in bids to storm water costs or have required contractors to allocate a specific percentage of total project costs (roughly 1 to 2 percent) to storm water management. Another alternative is for HDOT to specify the approximate amount of the particular erosion and sediment control needed (e.g., X feet of silt fence, Y construction entrances) and then allow contractors to bid on those items.

2.4 New Development and Significant Redevelopment BMP Program

- *HDOT needs to address post-construction runoff during project design.*
  HDOT does not require new projects to treat post-construction storm water runoff. An exception is a retention basin planned for the new North-South Road; however, the evaluation team was not able to assess whether this retention basin was designed only for flood control or also included a water quality control design component. Incorporating storm water quality practices into development projects during the design stage is more effective and less costly than addressing post-construction runoff after a project has been retrofitted. In addition, HDOT is encouraged to engage the construction and maintenance sections in the decision-making process and design for post-construction controls. Ultimately, these organizations share responsibility for the successfulness of any project, and therefore they should work together so that future post-construction controls can be designed, built, and maintained for enhanced water quality. The process should be iterative and ever-improving, which can happen only with an integrated feedback loop between the organizations.

  HDOT should develop standards and require new developments that increase impervious surfaces to install controls to address post-construction runoff. As an example, HDOT can review the standards developed by CCH in its *Rules Relating to Storm Drainage Standards* (January 2000).

  HDOT will also need to develop a system to track the location and maintenance of structural controls after they are installed. The SWMP already includes a permanent BMP inspection form that inspectors could use to verify that the BMPs are being properly operated and maintained.

  Two examples of BMP manuals developed by state DOTs for storm water are listed below. HDOT should review these and other examples before giving specific direction to the master consultant, who will likely be tasked with developing a design standards manual for HDOT.
  - *Washington State Department of Transportation (WSDOT) 2004 Highway Runoff Manual*
    http://www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/HighwayRunoff2004.pdf

  - *Colorado Department of Transportation (CDOT) New Development and Redevelopment Stormwater Management Program*
    http://www.dot.state.co.us/environmental/envWaterQual/docs/Stormwater.pdf

- *HDOT should begin to address post-construction runoff from existing highway segments.*
  Because the development of new or expanded highways is infrequent, HDOT should also develop a system to assess runoff from existing highways to determine whether post-construction controls are needed to protect water quality. This will be especially critical in section 303(d)-listed watersheds, where little new construction is occurring but waterbodies are still impaired. HDOT will need

to assess water quality impacts from existing highways and then select appropriate controls, potentially including structural treatment controls, to remove pollutants from highway runoff before discharging it to state waters.

2.5 Erosion Control BMP Program (for sites not related to construction activity)

- *HDOT should include water quality parameters when prioritizing rockfall areas.* The HDOT Materials Lab was recently brought in to coordinate activities associated with the erosion control program and rockfall study. However, the 10 highest-ranked rockfall hazard sites listed in Table V-1 of the SWMP had an average cost estimate for correction of almost $9 million each. The rockfall study was primarily focused on safety and addressing hazardous conditions along highways. HDOT should not rely solely on the Rockfall Protection Management Program to identify erosion problems along existing highway rights-of-way.

  HDOT should use the erosion control inspection form in the SWMP to catalog areas of erosion along HDOT rights-of-way and then identify methods to correct those problems. The Materials Lab could assist by helping to conduct research and identifying preferred vegetative and nonvegetative cover for highway slopes.

2.6 Debris Control and Maintenance Facilities BMP Programs

- *HDOT has made improvements at the baseyards and plans to increase maintenance within the District.*
  The evaluation team visited only the Keehi and Kakoi baseyards. The overall condition of the baseyards had improved significantly and only a select number of concerns were noted. Findings included the following:

Baseyard	Improvements	Concerns
Keehi	• Removal of junk pile(s) • BMPs under downspouts • Perimeter BMPs • Segregation of waste materials and signage • Secondary containment for batteries and hazardous materials • Improved housekeeping	• No operator for the spray washer, resulting in overflow • Lack of sweeping • Lack of impervious location or dewatering pad for vactor trucks
Kakoi	• Improved housekeeping and material storage • Drip pans • Storm drain placards	• Poorly maintained (torn) storm drain filter • Lack of sweeping

HDOT should also identify a person responsible for overseeing all activities at each baseyard. This would eliminate problems that arise from multiple-tenant use and ensure consistent inspections and application of BMPs. In addition, the Kakoi

baseyard pavement is scheduled to be replaced, and this will provide HDOT a unique opportunity to "start new" with this facility.

HDOT is still lacking in adequate maintenance of the MS4, including storm drain inspection, cleaning, and street sweeping. HDOT has requested $20 million in additional funding for maintenance activities, which if allocated by the legislature should significantly help with maintenance of the MS4. HDOT will need to construct a dewatering facility for vactor truck waste and will need to establish a maintenance schedule for MS4 facilities. HDOT plans to issue a service contract for additional street sweeping services, which should help to increase the area and frequency of street sweeping activities.

2.7 Chemical Applications BMP Program

- *HDOT's Special Services unit needs additional training and equipment regarding its chemical application process.*
  To clarify herbicide application procedures, the evaluation team met with the Oahu District's Maintenance Section. The HDOT representatives indicated that HDOT had temporarily discontinued the practice of herbicide spraying. They also stated that herbicide is applied immediately adjacent to guardrails as a substitute for manual trimming and occasionally as spot applications to vegetation growing in cracks in roadside concrete ditches. Herbicides are applied to guardrail areas to reduce manual maintenance costs associated with weed whacking. General application to roadside ditches (concrete or vegetative) is not practiced.

  It was acknowledged that field crews need additional on-the-job training to ensure proper and consistent application of herbicides. Furthermore, additional equipment is necessary to ensure more precise application. The Maintenance Section plans to provide this training to all Special Services employees.

2.8 Inventory of Industrial Discharges; Illicit Discharges/Illegal Connections

- *HDOT is beginning to step up efforts to conduct industrial and illicit discharge investigations.*
  Within the past year, HDOT has hired an inspector to assist the storm water program with conducting investigations of illicit discharges and an inventory of industrial properties adjacent to the Highway Division's rights-of-way. HDOT has conducted about 60 surveys of industrial discharges out of a total of about 208 dischargers that were included in a survey of property owners conducted in 2000, and the Department plans to have the master consultant assist in additional investigations.

  As mentioned, the survey of properties adjacent to HDOT rights-of-way was conducted in 2000. HDOT should periodically update, at least annually, the survey and inventory of industrial discharges to reflect changes in ownership and

new construction. HDOT should also include this information in the GIS to help facilitate program implementation.

- *HDOT should integrate related storm water databases.*
  HDOT has developed a series of spreadsheets and databases to track activities, including both industrial facilities adjacent to highway rights-of-way and illicit connections/discharges to the MS4. HDOT should work to develop a single, integrated database that allows it to assess multiple activities at a single property. For example, both industrial and discharge log databases are based on the property's tax map key. HDOT could integrate these databases so it could quickly assess whether a specific property is on its industrial list and view that property's history of illicit discharges.

- *HDOT should work to resolve active illicit connections or discharges identified in its log.*
  The active connection discharge log included in the SWMP (Appendix X-B) includes 12 pages of connections or discharges to HDOT's MS4, some of which date back to 1995. Almost all of these discharges are marked as active or unknown under the "active or closed" heading. HDOT should work to resolve these active illicit discharges by investigating older incidents marked "active" to determine whether the discharge is still occurring. Many of the discharges in the log appear to be from construction activity over a year ago, so these discharges might no longer exist.

  HDOT should also ensure that it documents the resolution of all illicit discharge investigations and continue to follow up on each discharge until it has been resolved.

2.9 Monitoring Program

- *HDOT is planning to conduct additional monitoring in the Ala Wai watershed to assess HDOT's contribution to the TMDL.*
  Since 2001 HDOT has conducted storm water monitoring in the North Halawa watershed as part of the H-3 freeway project. Five stations have been monitored, including one station that consists almost exclusively of runoff from the highway. (The other stations include in-stream sampling and runoff from other land uses.)

  As noted in the latest monitoring plan, HDOT plans to conduct monitoring in the Ala Wai watershed, which is listed by DOH as an impaired waterbody. As described in section 2.1, HDOT is subject to specific wasteload allocations in a TMDL for the Ala Wai Canal watershed, and the Department will need to demonstrate that its actions are complying with these limits and meeting water quality standards. HDOT should work closely with both DOH and CCH to develop a monitoring plan that both characterizes HDOT's contribution to the wasteload allocation and measures the effectiveness of actions taken to implement the TMDL.