CHAPTER 8
POLLUTION PREVENTION/GOOD HOUSEKEEPING EROSION CONTROL BMPS PROGRAM

The purpose of the Erosion Control BMPs Program (Erosion Control Program) is to prioritize permanent erosion control improvements at erosional areas with the potential for significant water quality impacts, in addition to erosional areas that pose public safety concerns.

The Erosion Control Program is responsible for implementing the following BMPs:

1. Identify erosional areas with the potential for significant water quality impact for the purpose of implementing erosion control improvements.
2. Submit to DOH a list of projects with an implementation schedule for constructing permanent erosion control improvements.
3. Implement temporary erosion control measures on erosional areas (i.e., highway-adjacent eroded slopes) within DOT-HWYS' ROW with the potential for significant water quality impact, if a permanent solution is not immediately possible.
4. Provide DOH with an action plan to address erosion at DOT-HWYS' storm drain system outlets with significant potential for water quality impacts.
5. Develop a maintenance plan for vegetated portions of the drainage system used for erosion and sediment control.

The Erosion Control Program is administered in accordance with the MS4 Permit and Consent Decree requirements outlined in Table 8-1 and Table 8-2, respectively.

Table 8-1. MS4 Permit Requirements for the Erosion Control Program

MS4 Permit Reference	SWMPP Section
Part D.1.f.(3).(i) *Implement permanent erosion control improvements, ensuring that erosional areas with the potential for significant water quality impact, but with limited public safety concerns, are also considered a high priority for remediation. Identification of erosional areas with the potential for significant water quality impact shall include areas where there is evidence of rilling, gullying, and/or other evidence of significant sediment transport, and areas in close proximity to receiving waters listed as impaired by either sediment, siltation and/or turbidity. The Permittee shall include procedures to identify and implement erosion control projects based on water quality concerns while continuing to address high profile public safety projects.*	Section 8.1 Section 8.2
Part D.1.f.(3).(ii) *Require the implementation of temporary erosion control measures (e.g., erosion control blankets and/or fabrics, gravel bag placement and silt fencing/fiber rolls) on erosional areas within DOT-HWYS right-of-ways with the potential for significant water quality impact if a permanent solution is not immediately possible. Notwithstanding any other implementation provisions, the SWMP shall require the implementation of such temporary erosion control measures on all applicable areas within 18 months of the effective date of this*	Section 8.1 Section 8.3

MS4 Permit Reference	SWMPP Section
permit. For projects which require a CWA Section 401 Water Quality Certification (WQC), the WQC application shall be submitted to DOH within one (1) year of the effective date of this permit and be implemented with six (6) months of the WQC or other regulatory permit(s) issuance date.	
Part D.1.f.(3).(iii) *Develop a maintenance plan for vegetated portions of the drainage system used for erosion and sediment control, and LID features; including controlling any excessive clearing/removal, cutting of vegetation, and application of herbicide which affects its usefulness.*	Section 8.5
Part D.1.f.(3).(iv) *Provide the DOH with an Action Plan to address erosion at its storm drain system outlets with significant potential for water quality impacts to be completed within one (1) year of the effective date of this permit, which shall identify outfalls to be addressed, explanation on the basis for their selection and an implementation schedule. The implementation schedule shall cover a five (5) year period. A status report on implementation of the plan shall be included in the Annual Report. The Permittee shall install velocity dissipators or other BMPs to reduce erosion at locations identified by the Islandwide Retrofit Study or through its periodic required inspections. The Action Plan may include, but not be limited to projects in compliance with any TMDL I&M Plan.*	Section 8.4
Part D.1.f.(3).(v) *Submit a list of projects and an implementation schedule for permanent erosion control improvements as described in Part D.1.f.(3)(i) of this permit shall be submitted to DOH within one (1) year from the effective date of this permit.*	Section 8.2

Table 8-2. Consent Decree Requirements for the Erosion Control Program

Consent Decree Reference	SWMPP Section
Pg 24, Section V.10.h.(1) *HDOT shall include water quality impacts as a priority in selecting projects for erosion control improvements, ensuring that erosional areas with the potential for significant water quality impact, but with limited public safety concerns, are also considered a high priority for remediation. Erosional areas with the potential for significant water quality impact shall include areas where there is evidence of rilling or gullying or other evidence of significant sediment transport and that are located within High Priority Watersheds. HDOT shall identify and implement erosion control projects based on water quality concerns while continuing to address high profile public safety projects.*	Section 8.1
Pg 25, Section V.10.h.(2) *HDOT shall require the prompt implementation of temporary erosion control measures (e.g., erosion control blankets or fabrics, gravel bags, and silt fence/fiber rolls) on the erosional areas with the potential for significant water quality impact identified in the preceding Subparagraph if a permanent solution is not immediately possible.*	Section 8.3
Pg 25, Section V.10.h.(3) *HDOT shall modify the list of approved erosion and sediment control BMPs to include, at least all of those contained in the CCH manual. The revised SWMPP shall also provide for the implementation of alternative erosion and sediment control BMPs where appropriate.*	Section 8.3
Pg 25, Section V.10.h.(4) *HDOT shall undertake a program to evaluate the erosional potential of storm drain system outlets that discharge downslope of the roadbed. Where discharge points are observed to be creating erosional conditions, HDOTs program shall require installation of velocity dissipaters or other BMPs to reduce the risk of continued erosion at these locations.*	Section 8.4

8.0 Program Organization

To fulfill the requirements of the MS4 Permit and the Consent Decree, the following organizational structure has been established for the Erosion Control Program.

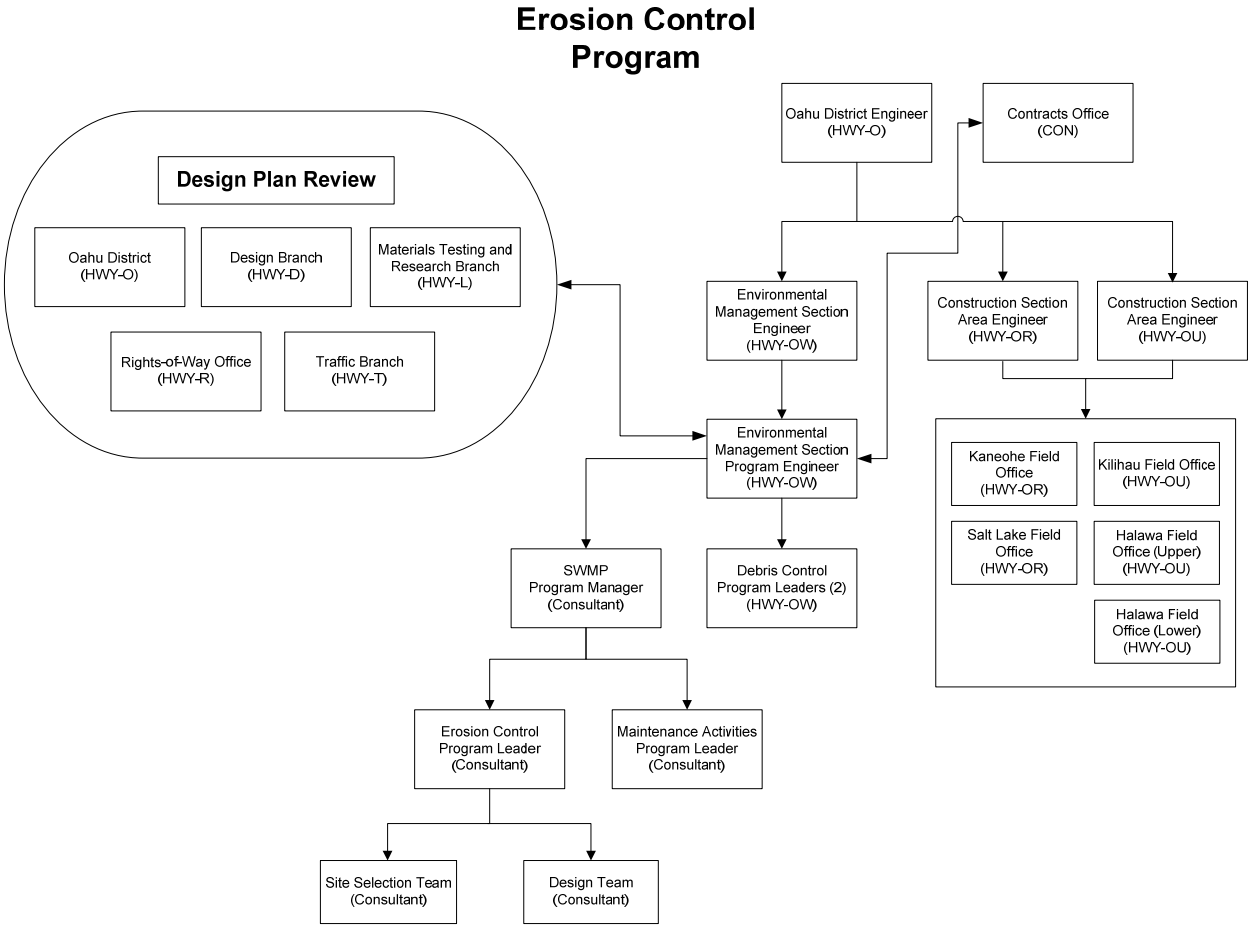

Figure 8-1. Erosion Control Program Organizational Chart
(Note: The number in parenthesis indicates the number of individuals involved.)

8.1 Identifying Erosional Areas

Erosion control projects are implemented for the purpose of protecting receiving water bodies, in addition to addressing public safety concerns. This section provides an explanation of the criteria and methodology used to identify erosional areas with the potential for significant water quality impact.

Parts D.1.f.(3).(i) and D.1.f.(3).(ii) of the MS4 Permit require DOT-HWYS to implement erosion control improvements on erosional areas with the potential for significant water quality impact, which includes erosional areas where there is evidence of rilling, gullying, and/or other evidence of significant sediment transport, as well as erosional areas in close proximity to receiving waters listed as impaired by sediment, siltation, and/or turbidity. Both the CWA Section 303(d) list and TMDL water bodies with WLA reductions assigned to DOT-HWYS were used to determine the inventory of watersheds listed as impaired for TSS and/or turbidity.

Erosional areas that met these criteria were further evaluated to determine if they had an effective vegetated buffer to mitigate potential sediment transport to the nearest water body. Vegetated buffers slow the velocity of storm water runoff, allowing sediment and other pollutants to settle out. A natural vegetated buffer of 50 feet or more located between the final discharge point of the MS4 and the nearest receiving water body was generally classified as effective at mitigating potential sediment runoff.

Articulated Concrete Block Mat Systems are an effective, economic method of erosion control in areas where establishing new vegetation is difficult.

Figure 8.2 represents the criteria used to define erosional areas with the potential for significant water quality impact.

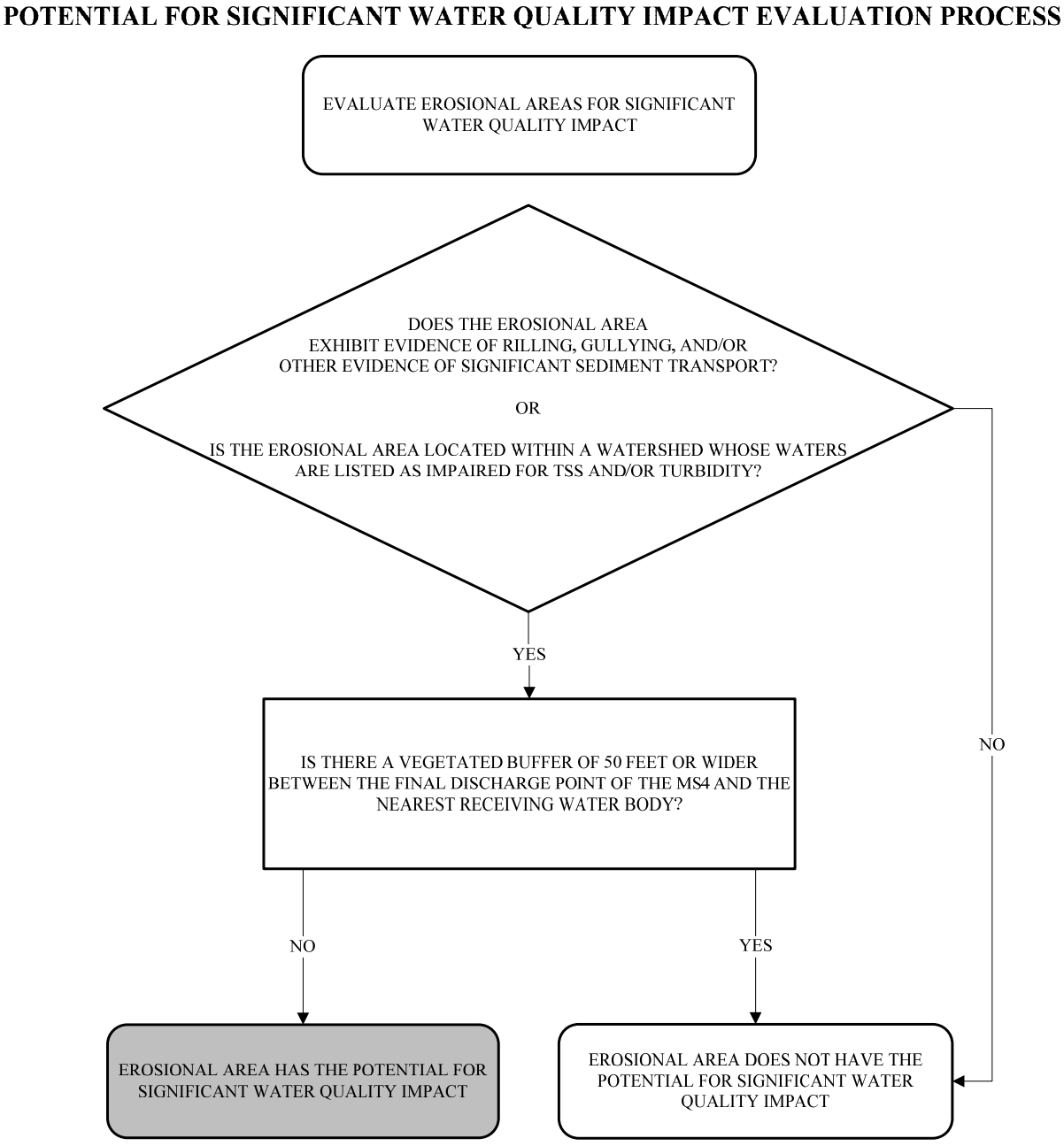

Figure 8-2. Criteria Used to Designate Sites with the Potential for Significant Water Quality Impact

In 2007, 957 erosional areas were identified within DOT-HWYS' ROW on Oahu and ranked using quantitative criteria. The findings were published in the *Islandwide Assessment of Erosional Areas on the Island of Oahu, 2007* (*Islandwide Assessment*), which was submitted as an appendix to DOT-HWYS' 2007 SWMPP.

The erosional areas identified in the *Islandwide Assessment* were evaluated for the potential for significant water quality impact, based on the criteria discussed in Section 8.1. From the original inventory of 957 sites, it was determined that 59 sites met the criteria for having the potential for significant water quality impact. All 59 sites exhibited evidence of rilling, gullying, and/or other evidence of significant sediment transport, and 54 were in close proximity to receiving waters listed as impaired for TSS and/or turbidity.

A Site Selection Team was tasked with identifying erosional areas with the potential for significant water quality impact, as shown in Figure 8-3.

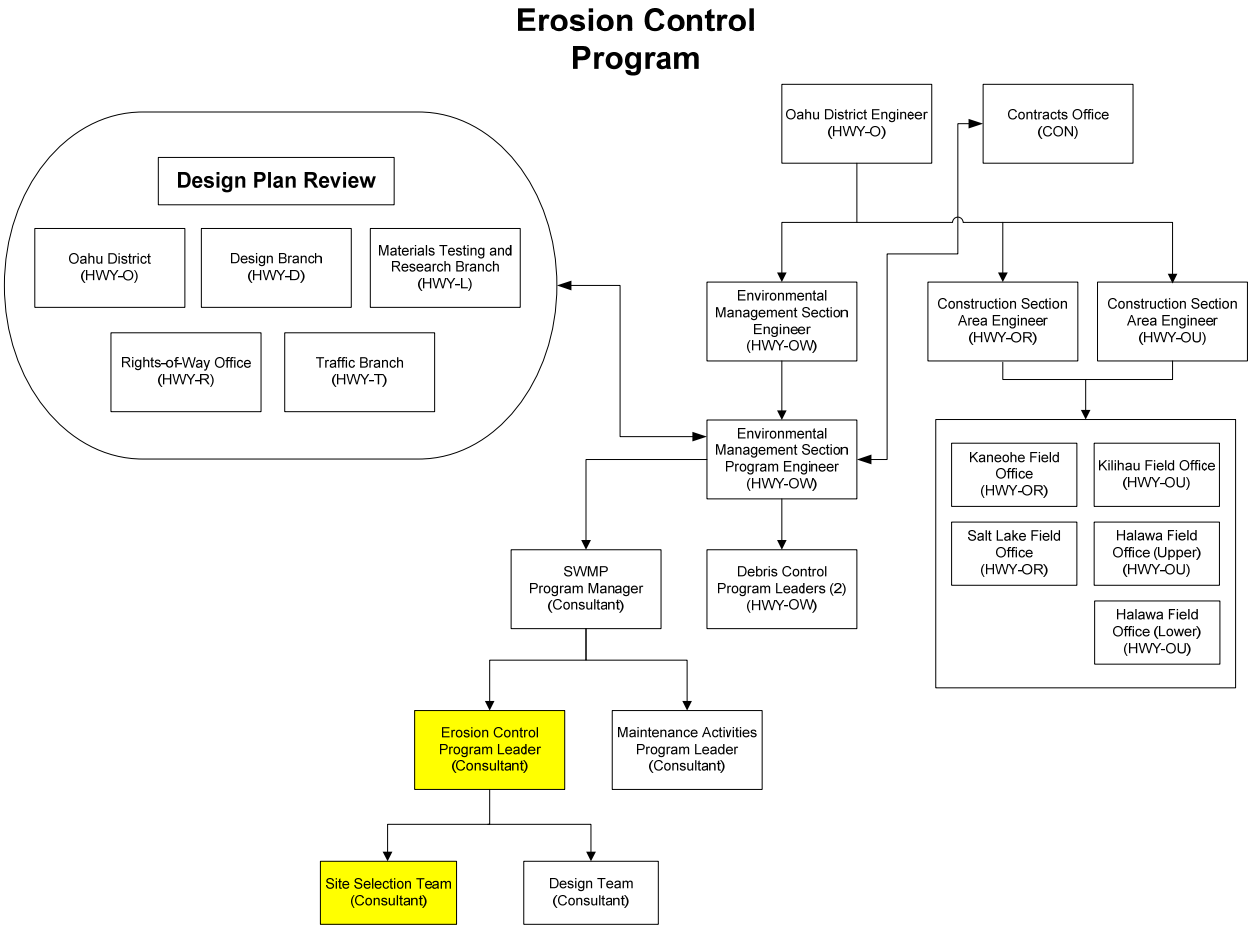

Figure 8-3. Erosion Control Program Organizational Chart for Roles and Responsibilities Related to Site Selection for Erosion Control Improvements

8.2 Permanent Erosion Control BMPs

The 59 erosional areas with the potential for significant water quality impact are considered a high priority for remediation.

Part D.1.f.(3).(v) of the MS4 Permit requires DOT-HWYS to submit a list of projects and an implementation schedule for permanent erosion control improvements to DOH within one year of the effective date of the MS4 Permit.

The list of erosional areas selected for permanent erosion control projects, along with a corresponding five-year implementation schedule, are provided in Table 8.3. The "implementation year" is the year in which the erosional area repair is scheduled to be completed; however, this schedule is subject to change due to funding availability, permitting delays, or other unforeseen circumstances. Eroded areas with an implementation year listed as "To be determined" are generally sites with restricted construction access, limited rights-of-way, significant environmental permitting requirements and/or prohibitive design and construction costs. DOT-HWYS will continue to work toward resolving these issues and will provide updates to the implementation schedule in the Annual Report. The list of projects and implementation schedule were submitted to DOH on October 27, 2014.

Table 8-3. Permanent Erosion Control Projects

Site ID	Route ID	Route	Watershed	Implementation Year
62	H-1	Interstate Route H-1	Kaloi	2014
81	99	Kamehameha Hwy	Waiawa	2014
221	61	Kalanianaole Hwy	Kawainui	2014
222	61	Kalanianaole Hwy	Kawainui	2014
505	80	Kamehameha Hwy	Kaukonahua	2014
534	99	Kamananui Road	Kaukonahua	2014
1009	H-1	Interstate Route H-1	Kaloi	2014
84	99	Kamehameha Hwy	Waiawa	2014
219	61	Kalanianaole Hwy	Kawainui	2014
440	H-1	Interstate Route H-1	Waiawa	2014
528	99	Kamananui Road	Kaukonahua	2014
125	72	Kalanianaole Hwy	Kapakahi-Waipio	2016
214	H-3	Interstate Route H-3	Kawainui	2016
215	H-3	Interstate Route H-3	Kawainui	2016
473	61	Pali Highway	Kawainui-Kaneohe	2016
474	61	Pali Highway	Kawainui-Kaneohe	2016
9003	H-3	Interstate Route H-3	Kawainui	2016
207	H-3	Interstate Route H-3	Kaneohe	2017
208	H-3	Interstate Route H-3	Kaneohe	2017
209	H-3	Interstate Route H-3	Kaneohe	2017
210	H-3	Interstate Route H-3	Kaneohe	2017

Site ID	Route ID	Route	Watershed	Implementation Year
1008	83	Kamehameha Hwy	Kaneohe	2017
47	H-1	Interstate Route H-1	Waikele-Kapakahi	2017
48	H-1	Interstate Route H-1	Waikele	2017
56	H-1	Interstate Route H-1	Kapakahi	2017
109	H-1	Interstate Route H-1	Waikele	2017
445	H-2	Interstate Route H-2	Waiawa	2018
230	H-2	Interstate Route H-2	Waiawa	2018
241	H-2	Interstate Route H-2	Waiawa	2018
907	750	Kunia Road	Kaukonahua	2018
57	H-1	Interstate Route H-1	Waikele	2018
110	H-1	Interstate Route H-1	Kapakahi	2018
446	H-2	Interstate Route H-2	Waiawa	2018
450	H-1	Interstate Route H-1	Waimalu	2018
89	99	Kamehameha Hwy	Halawa	2018
92	99	Kamehameha Hwy	Halawa	2018
510	99	Kamehameha Hwy	Waikele	2018
518	H-2	Interstate Route H-2	Waiawa	2018
519	H-2	Interstate Route H-2	Waiawa	2018
224	61	Kalanianaole Hwy	Kawainui	2019
239	H-2	Interstate Route H-2	Waiawa	2019
502	99	Kamehameha Hwy	Poamoho	2019
987	H-1	Interstate Route H-1	Waikele	2019
988	H-1	Interstate Route H-1	Waikele	2019
150	99	Kamehameha Hwy	Waikele	2019
21	750	Kunia Road	Waikele	To be determined
149	99	Kamehameha Hwy	Waikele	To be determined
246	H-2	Interstate Route H-2	Waiawa	To be determined
408	99	Kamehameha Hwy	Poamoho	To be determined
417	61	Kalanianaole Hwy	Kawainui	To be determined
418	61	Kalanianaole Hwy	Kawainui	To be determined
467	64	Sand Island Access	Kalihi	To be determined
496	99	Kamehameha Hwy	Poamoho	To be determined
507	80	Kamehameha Hwy	Kaukonahua	To be determined
521	99	Wilikina Drive	Kaukonahua	To be determined
913	H-3	Halawa Access Road	Halawa	To be determined
973	99	Kamehameha Hwy	Waiawa	To be determined
2010	750	Kunia Road	Waikele	To be determined
223	61	Pali Highway	Kawainui	To be determined

The personnel shown in Figure 8-4 are involved in the implementation of permanent erosion control improvements.

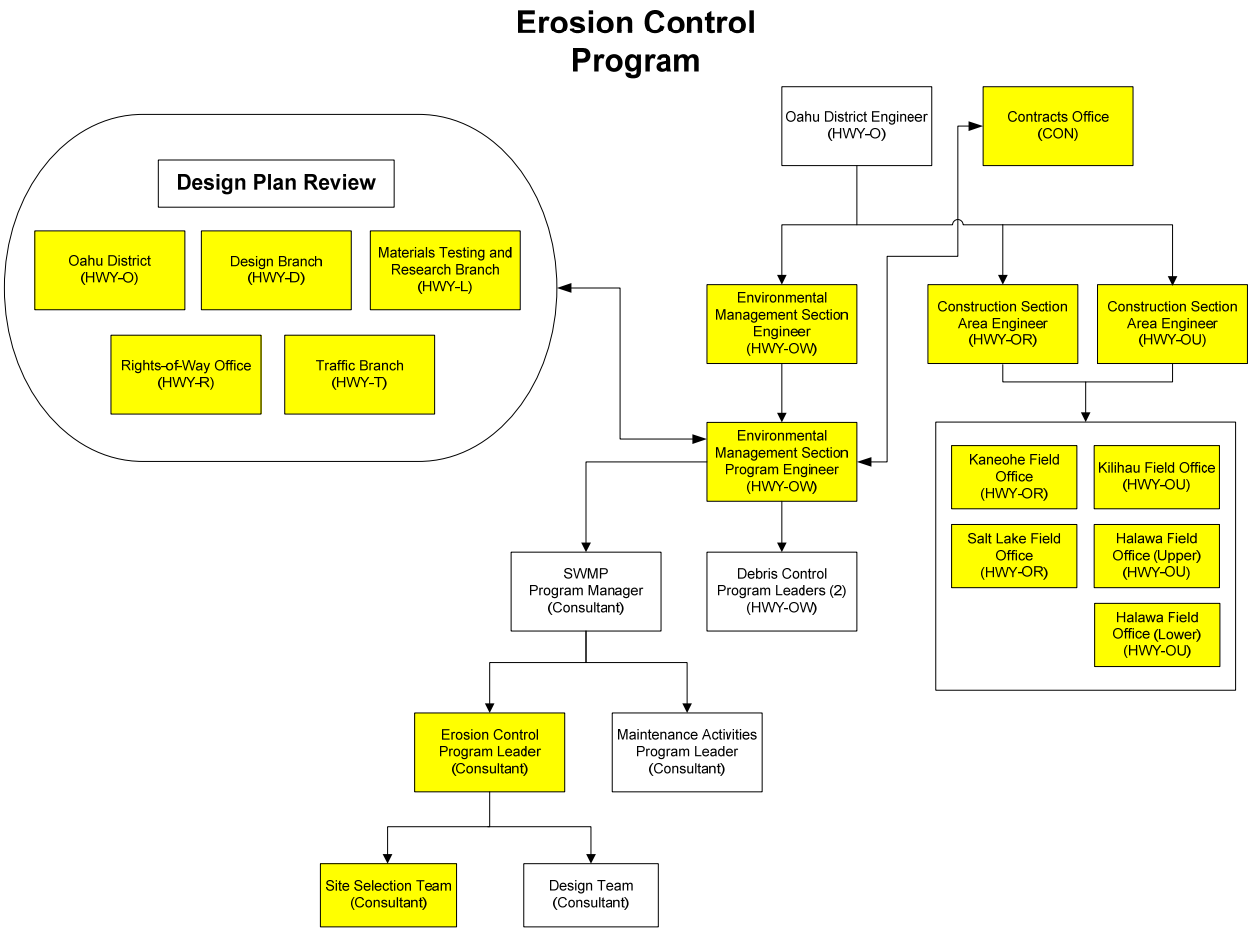

Figure 8-4. Erosion Control Program Organizational Chart for Roles and Responsibilities Related to Permanent Erosion Control Improvements

8.3 Temporary Erosion Control BMPs

Part D.1.f.(3).(ii) of the MS4 Permit requires DOT-HWYS to implement temporary erosion control improvements within 18 months of the effective date of the MS4 Permit, on any erosional area with the potential for significant water quality impact for which a permanent solution is not immediately possible. Of the 59 sites identified, 36 had existing temporary BMPs in place. Temporary BMPs were installed on the remaining 23 erosional areas within 18 months of the effective date of the MS4 Permit.

During the temporary BMP selection process, the Debris Control Program Leaders and Site Selection Team assessed the conditions of each erosional area requiring temporary BMPs to determine the most appropriate BMP type for each site. Erosion and sediment control BMPs were selected from the DOT-HWYS' *Construction BMPs Field Manual* (Appendix D.1), which includes the BMPs contained in the City and County of Honolulu's *BMP Manual for Construction Sites in Honolulu*, as required by the Consent Decree. Information about each erosional area requiring temporary BMPs is provided in Table 8.4.

Table 8-4. Temporary Erosion Control Sites

Site ID	Route ID	Route	Watershed
2010	750	Kunia Road	Waikele
467	64	Sand Island Access	Kalihi
507	80	Kamehameha Hwy	Kaukonahua
502	99	Kamehameha Hwy	Poamoho
89	99	Kamehameha Hwy	Halawa
973	99	Kamehameha Hwy	Waiawa
149	99	Kamehameha Hwy	Waikele
150	99	Kamehameha Hwy	Waikele
408	99	Kamehameha Hwy	Poamoho
496	99	Kamehameha Hwy	Poamoho
57	H-1	Interstate Route H-1	Waikele
56	H-1	Interstate Route H-1	Kapakahi
110	H-1	Interstate Route H-1	Kapakahi
47	H-1	Interstate Route H-1	Waikele-Kapakahi
48	H-1	Interstate Route H-1	Waikele
109	H-1	Interstate Route H-1	Waikele
987	H-1	Interstate Route H-1	Waikele
988	H-1	Interstate Route H-1	Waikele
246	H-2	Interstate Route H-2	Waiawa
230	H-2	Interstate Route H-2	Waiawa
241	H-2	Interstate Route H-2	Waiawa
445	H-2	Interstate Route H-2	Waiawa
913	H-3	Halawa Access Road	Halawa

Temporary erosion control improvements are administered by the personnel depicted in Figure 8-5.

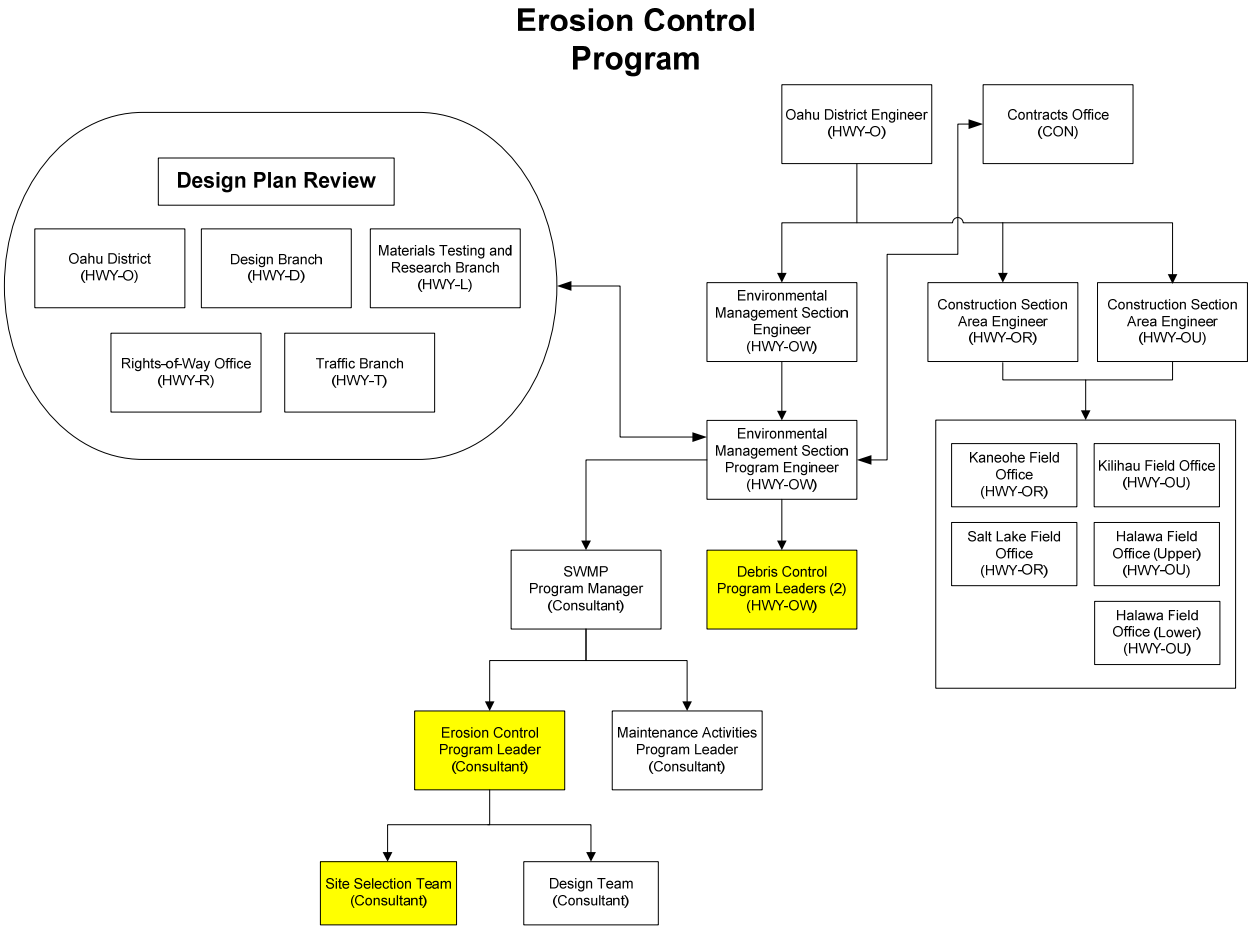

Figure 8-5. Erosion Control Program Organizational Chart for Roles and Responsibilities Related to Temporary Erosion Control Improvements

8.4 Action Plan to Address Erosional Outfalls

Part D.1.f.(3).(iv) of the MS4 Permit requires DOT-HWYS to provide DOH with an action plan to address erosion at its storm drain system outlets (i.e., erosional outfalls) that have the significant potential for water quality impacts, along with a five-year implementation schedule. The purpose of the *Action Plan to Address Erosional Outfalls* (Appendix H.1) is to reduce erosion at DOT-HWYS' MS4 outfalls on the island of Oahu that have the significant potential for water quality impacts, by implementing appropriate and cost-effective outfall repairs. Potential erosional outfall repair sites were selected through the review of previous MS4 studies and from data collected during routine MS4 monitoring and maintenance activities.

The following criteria were used to determine final site selections for the five-year implementation schedule:

1. Confirmed as an outfall from the MS4;
2. Classified as having significant potential for water quality impacts:
   - Erosion issues caused by discharge at outfall
   - Evidence of sediment transport to downstream receiving waters
   - Inadequate natural or man-made storm water treatment in flow path to receiving waters
3. Located within DOT-HWYS' ROW, or known to have an access easement, and have readily available construction and maintenance access;

Sites that are located in a TMDL, Consent Decree, or CWA Section 303(d) listed watershed were given a higher priority for remediation.

This previously eroded outfall was completely repaired and reconstructed. A rip rap apron provides protection from future erosion.

Figure 8-6 depicts the personnel involved in the development and implementation of the Action Plan to Address Erosional Outfalls.

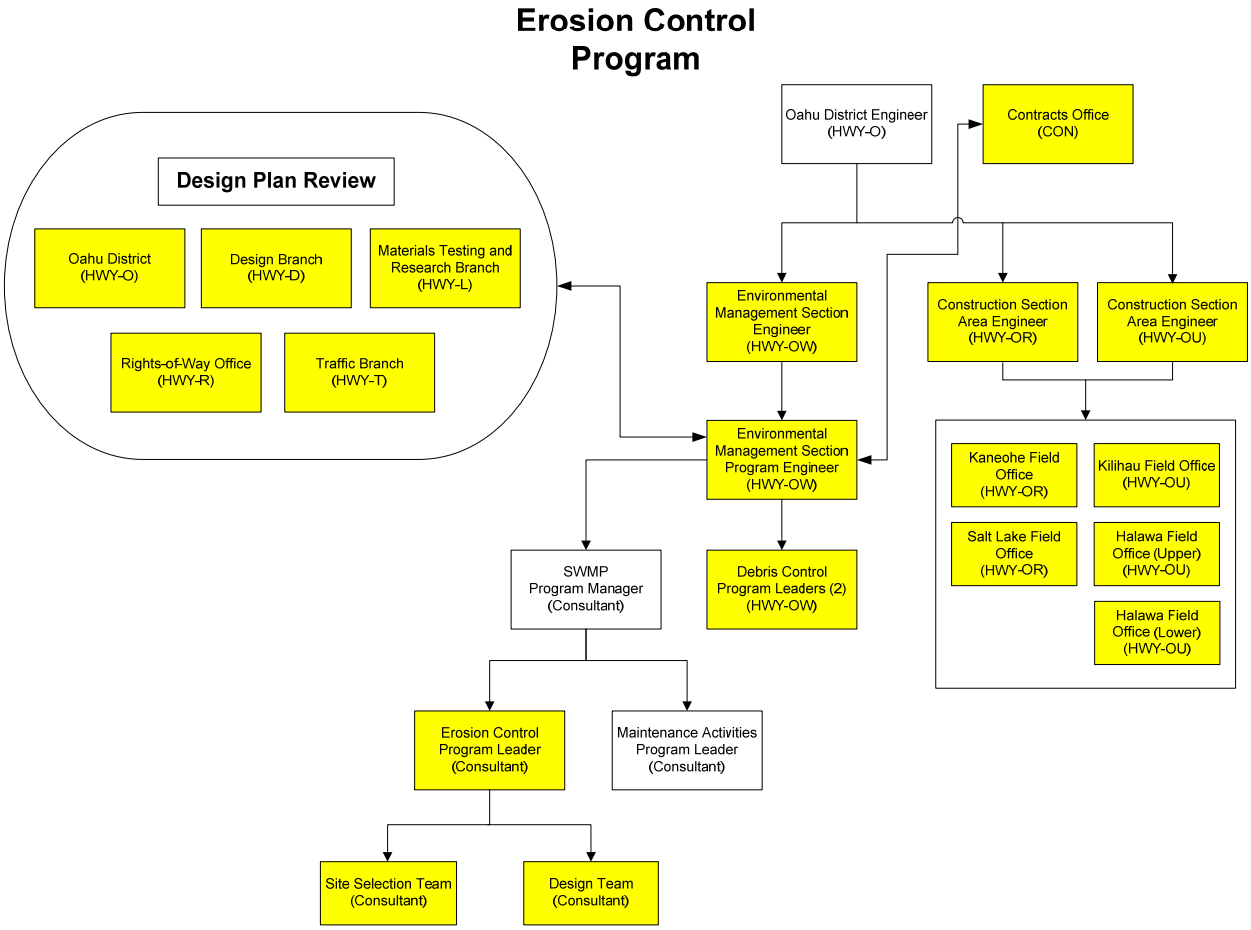

Figure 8-6. Erosion Control Program Organizational Chart for Roles and Responsibilities Related to the Action Plan to Address Erosional Outfalls

8.5 Maintenance Plan for Vegetation

Vegetated portions of the MS4 can effectively filter out sediment collected by storm water runoff, before it is discharged into receiving water bodies.

Part D.1.f.(3).(iii) of the MS4 Permit requires DOT-HWYS to develop a maintenance plan for vegetated portions of the drainage system used for erosion and sediment control. The *Maintenance Plan for Vegetated Portion of the MS4* (*Maintenance Plan*) (Appendix H.2) is intended for use by HWY-OM staff responsible for landscape maintenance activities, including herbicide applications. The purpose of the *Maintenance Plan* is to prevent the excessive removal of vegetation and over-application of herbicides in and around vegetated portions of the drainage system used for sediment and erosion control, in order to maintain the presence and usefulness of a vegetated buffer.

The *Maintenance Plan* instructs staff on proper landscape maintenance practices and explains the importance of maintaining vegetation in and along the MS4, including ditches, open channels, vegetated swales, bioretention basins, rain gardens, and other vegetated PBMPs. Content from the *Maintenance Plan* has been incorporated into the Chemical Application Training's instructional material (Section 7.1).

This eroded slope was repaired by applying a mixture of grass seed, fertilizer, and mulch, which was then secured in place using erosion control fabric. The newly planted grass is just beginning to sprout through the fabric.

The Maintenance Activities Program Leader is responsible for training HWY-OM staff on the content of the *Maintenance Plan*, as depicted in Figure 8-7.

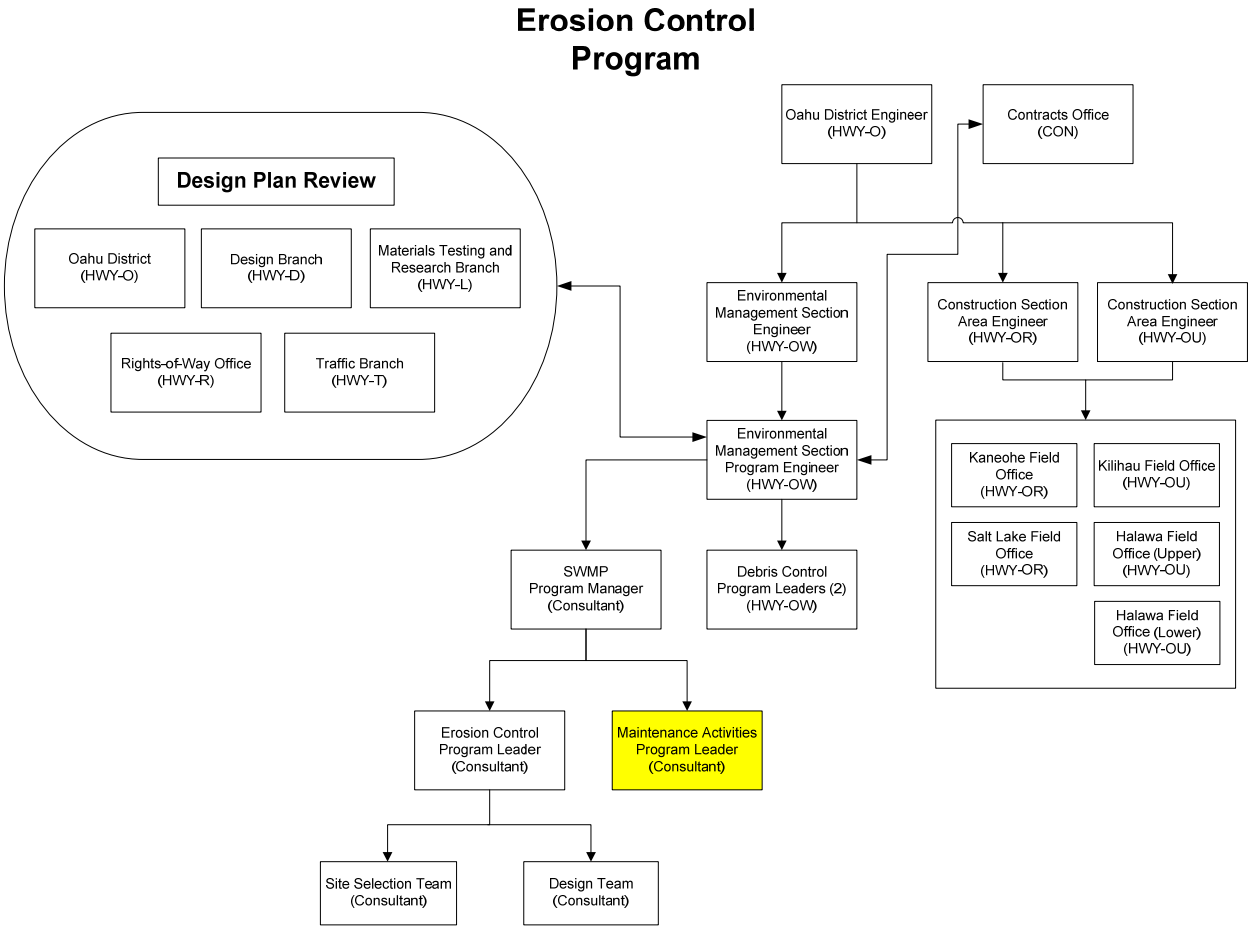

Figure 8-7. Erosion Control Program Organizational Chart for Roles and Responsibilities Related to the Maintenance Plan

8.6 Monitoring Program Effectiveness

Table 8-5 provides measurable standards/milestones for the BMPs discussed in this chapter and DOT-HWYS' strategy for monitoring the effectiveness of their implementation.

Table 8-5. Standards/Milestones for the Erosion Control Program

Section	BMP	Standard/Milestone	Monitoring Effectiveness
8.1	Identifying Erosional Areas	• Identify and maintain a database of erosional areas with the potential for significant water quality impacts.	• Milestone completed on 10/27/2014. • Utilize database to implement and track permanent erosion control projects at erosional areas with the potential for significant water quality impacts.
8.2	Permanent Erosion Control BMPs	• Submit a list of areas selected for permanent erosion control projects, along with an implementation schedule, to DOH within one year of the EDOP. • Construct permanent erosional control improvements in accordance with the submitted list of projects and implementation schedule.	• Milestone completed on 10/27/2014. • Create and maintain a database to track the status and schedule of permanent erosion control projects.
8.3	Temporary Erosion Control BMPs	• Implement temporary erosion control BMPs on areas with the potential for significant water quality impact, within 18 months of the EDOP when a permanent control is not immediately possible.	• Milestone completed on 4/27/2015.

Section	BMP	Standard/Milestone	Monitoring Effectiveness
8.4	Action Plan to Address Erosional Outfalls	• Provide action plan to address erosion at storm drain system outfalls with significant potential for water quality impact within one year from the EDOP. • Construction projects in accordance with implementation schedule.	• *Action Plan to Address Erosional Outfalls* submitted to DOH on 10/27/2014. • Create and maintain a database to track the status and schedule of erosional outfall projects.
8.5	Maintenance Plan	• Develop a maintenance plan for vegetated portions of the drainage system used for erosion and sediment control.	• *Maintenance Plan* completed on 10/27/2014.

Repair of this eroded slope involved applying a mixture of grass seed, fertilizer, and mulch, which was then secured in place using erosion control fabric. The newly planted grass has grown significantly, and completely obscures the erosion control fabric from view.

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