

Maintenance Plan for Vegetated Portions of the MS4



**PROTECT
OUR WATER**

MĀLAMA I KA WAI

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION

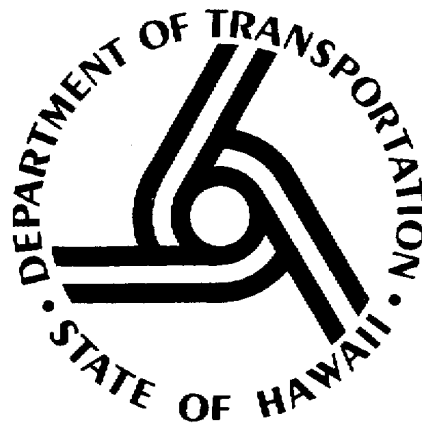
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Hawaii State Department of Transportation
Highways Division, Oahu District
Storm Water Management Program
NPDES Permit No. HI S000001
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State of Hawaii Department of Transportation
Highways Division, Oahu District



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TABLE OF CONTENTS

LIST OF TABLES	<i>iii</i>
ACRONYMS AND ABBREVIATIONS.....	<i>iv</i>
1. INTRODUCTION.....	1
2. IMPORTANCE OF VEGETATION	2
2.1. Reducing the Volume and Velocity of Storm Water Runoff with Vegetation	
2.2. A Natural Filtration System	
3. MAINTAINING VEGETATED PORTIONS OF THE MS4.....	3
3.1. Controlling Excessive Herbicide Application	
3.2. Controlling for Excessive Clearing, Cutting, and Removal of Vegetation	
4. TRAINING	5
5. SUMMARY	5

LIST OF TABLES

<u>Table</u>	<u>Title</u>	<u>Page</u>
Table 1.	Landscape Maintenance BMPs.....	6

ACRONYMS AND ABBREVIATIONS

BMP	Best Management Practice
DOT-HWYS	State of Hawaii Department of Transportation, Highways Division, Oahu District
HWY-OM	State of Hawaii Department of Transportation, Highways Division, Oahu District Maintenance Section
LID	Low Impact Development
MEP	Maximum Extent Practicable
MS4	DOT-HWYS' Municipal Separate Storm Sewer System
MS4 Permit	DOT-HWYS' NPDES Permit No. HI S000001
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
PBMP	Permanent Best Management Practice
SWMP	Storm Water Management Program
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids

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1. INTRODUCTION

The primary function of the State of Hawaii Department of Transportation, Highways Division, Oahu District's (DOT-HWYS') Municipal Separate Storm Sewer System (hereinafter referred to as "the MS4") is to convey storm water runoff away from critical infrastructure in order to ensure safe travel conditions. Additionally, vegetated portions of the MS4 provide erosion and sediment control. Proper landscape maintenance practices must be applied to preserve the multifunctional capacity of the MS4 as an effective measure in erosion and sediment control.

DOT-HWYS' National Pollutant Discharge Elimination System (NPDES) Permit No. HI S000001 (hereinafter referred to as "MS4 Permit") requires that DOT-HWYS develop a maintenance plan for vegetated portions of the drainage system used for erosion and sediment control, and low impact development (LID) features. The MS4 Permit requirement is shown below:

Pollution Prevention/Good Housekeeping, Erosion Control BMPs Program Plan

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."

The best management practices (BMPs) provided in this Maintenance Plan for Vegetated Portions of the MS4 (hereinafter referred to as "Plan") are designed to control any excessive clearing, removal, or cutting of vegetation, and application of herbicide, which may affect the usefulness of vegetated portions of the MS4. This Plan, in conjunction with the *Highway Manual for Sustainable Landscape Maintenance*¹ (*Landscape Manual*) and the *Maintenance Activities Best Management Practices Field Manual*² (*Maintenance Field Manual*), establishes the BMPs that DOT-HWYS' Maintenance Section (HWY-OM) staff and landscaping service contractors shall apply during maintenance of vegetated portions of the MS4.

While the concepts and practices outlined in this Plan can generally be applied to LID features and other vegetated permanent best management practices (PBMPs), site-specific operation and maintenance (O&M) manuals are used as the primary guide for LID and PBMP maintenance, in order to account for the unique nature and fundamental variance of such features.

¹SWCA Environmental Consultants. *Highway Manual for Sustainable Landscape Maintenance*, 2011. Print.

²State Department of Transportation. *Maintenance Activities Best Management Practices Field Manual*, 2006. Web. 25 June 2013. <<http://hidot.hawaii.gov/highways/landscape-architecture-program/>>.

2. IMPORTANCE OF VEGETATION

Controlling for the excessive removal of vegetation in and along MS4 infrastructure such as ditches, open channels, vegetated swales, bioretention basins, rain gardens, and other vegetated PBMPs allows established plants to provide valuable services. Vegetated portions of the MS4 play an important role in erosion and sediment control and can help treat storm water runoff. Cultivating a balanced presence of vegetation in the MS4 assists in filtering out pollutants and reducing the velocity and quantity of storm water runoff, thereby limiting erosion and the discharge of sediments and other pollutants into receiving water bodies.

2.1 REDUCING THE VOLUME AND VELOCITY OF STORM WATER RUNOFF WITH VEGETATION

Vegetation plays a critical role in regulating the amount and flow rate of storm water runoff. A direct relationship exists between the volume and velocity of storm water runoff and the erosional impact it can generate. Vegetated surfaces reduce the flow rate of storm water runoff as it encounters friction, obstruction, and absorption from plants, soil, and other organic matter. A lower velocity promotes infiltration and evaporation. Therefore, facilitating infiltration and evaporation by slowing the velocity of runoff with vegetation, reduces the total volume of storm water runoff and the erosional impact it can produce.

2.2 A NATURAL FILTRATION SYSTEM

DOT-HWYS' Storm Water Management Program (SWMP) is tasked with reducing the discharge of pollutants from the MS4 into waters of the State to the maximum extent practicable (MEP). Pollutants can accumulate on highways and other impervious surfaces. Many pollutants bind to soil particles, which is a property that amplifies the importance of erosion and sediment control. The vegetation in a properly maintained MS4 can filter out pollutants carried by storm water runoff. In fact, plants, soils, and microorganisms are extremely efficacious at naturally breaking down and neutralizing certain pollutants. For this reason, the composition and quality of storm water runoff is directly impacted by controlling for the excessive removal of vegetation in the MS4.

Soil particles themselves can be considered pollutants. Turbidity and total suspended solid (TSS) levels, two important measures of water quality, are both directly affected by soil erosion. As of June 2013, DOT-HWYS has been assigned required load reductions for TSS in three priority watersheds for which total maximum daily load (TMDL) studies have been completed. For these watersheds, DOT-HWYS must document how BMPs have reduced contributions of TSS from DOT-HWYS' right-of-way. Erosion and sediment control measures are expected to play a key role in demonstrating compliance with the load reductions stipulated in these TMDL watersheds. Vegetation within the MS4 can help prevent sediment from entering impaired waters, by capturing it before it is discharged from the MS4.

3. MAINTAINING VEGETATED PORTIONS OF THE MS4

Sections 1 and 2 examined the importance of maintaining vegetation for the purpose of erosion and sediment control. This section outlines the BMPs that should be employed while maintaining vegetated portions of the MS4.

The following guidelines were initially established in the *Landscape Manual* and the *Maintenance Field Manual*.

3.1 CONTROLLING EXCESSIVE HERBICIDE APPLICATION

While herbicide application can effectively eradicate weeds and remove unwanted vegetation, strict guidelines must be followed to prevent potential harm to personal safety and the environment. Refer to the *Landscape Manual*, Chapter 10, *Use of Pesticides in Vegetation Maintenance*, for safety instructions and specific procedures for herbicide application.

In certain situations, it is necessary for landscape maintenance crews to apply herbicides as the sole means of vegetative control. This section explains ways in which landscape maintenance crews can reduce the environmental impacts of herbicide use.

Always follow the instructions on herbicide labels. Never over-apply herbicides. Herbicides are soluble in water and readily bind to soil particles. Due to these properties, storm water runoff can become contaminated with herbicides, particularly when over-applied in erosive areas. Over-application of herbicides can kill useful vegetation, accumulate in waterways, harm stream life and coral reefs, and impair water quality.

Reducing the Impacts of Herbicide Application

- “Do not use herbicides in eroding areas.” (*Landscape Manual*, 193)
- “Do not spray herbicides in or around drainage structures, ditches, or swales with water in them.” (*Landscape Manual*, 132)
- Do not spray herbicides close to waterways. (*Landscape Manual*, 193)
- Check with the Engineer/Supervisor prior to the application of herbicides when spraying close to waterways.
- Check with the Engineer/Supervisor prior to the application of herbicides within PBMPs or LID features.
- “Do not spray when it is windy or when it is raining or about to rain.” (*Landscape Manual*, 194)

3.2 CONTROLLING FOR EXCESSIVE CLEARING, CUTTING AND REMOVAL OF VEGETATION

Whenever it is feasible to do so without compromising personal safety, weed control should be carried out using non-chemical alternatives. Many alternative biological and mechanical methods can be utilized, such as integrated pest management techniques, mowing and trimming, or simply weeding by hand. The following guidelines should be utilized while employing these techniques.

Maintaining Ditches and Swales

- “Maintain earth drainage ditches and swales with vegetative cover. Maintain the vegetation in ditches and swales similar to other landscape vegetation standards. If grassed, then mow according to the standards set in Chapter 5, *Mowing & Edging in Landscape Maintenance Zones*. If planted with other ground cover, shrubs, and trees, maintain them according to the vegetation management standards discussed in this manual.”(*Landscape Manual*,132)
- “Remove or kill only vegetation that will block water flow during storm events.” (*Landscape Manual*, 132)

Mowing & Edging Standards

- “Cutting too close using a weed eater or mower can create brown patches on grass. This is called scalping.”Do not scalp vegetated areas. Do not cut erosion control matting if any is present. (*Landscape Manual*,65)
- The recommended mowing standard for areas vegetated for erosion control is a height of 2-8 inches. (*Landscape Manual*, 67)
- The one third rule of mowing says, “Never cut more than one-third of the turfgrass blade during any one mowing. For example, if your mowing height is two inches, mow when the turfgrass blades have grown to a height of three inches.” (*Landscape Manual*,68)
- “It is best to mow on a regular schedule, often enough to maintain the one-third rule and at a mowing height that is near the middle of the recommended mowing height for the type of grass.” (*Landscape Manual*, 66)
- “Avoid loosening the soil and exposing dirt when conducting mechanical or manual weed control; this could lead to erosion.” (*Maintenance Field Manual*, 5)
- “Clean and remove all clippings from hard surfaces, roadways and drainage swales at the end of each workday.” (*Landscape Manual*,69)
- “Collect and dispose of clippings properly.” (*Maintenance Field Manual*, 5)

4. TRAINING

The concepts and guidelines outlined in this Plan will be incorporated into DOT-HWYS' annual Chemical Applications Training. All DOT-HWYS personnel responsible for landscape maintenance and/or chemical applications, and landscape maintenance service contractors, will be trained on the material covered in this Plan. Trainees will be presented with an easy-to-follow table of vegetative maintenance BMPs (Table 1).

5. SUMMARY

By employing sound vegetative management practices, landscape maintenance crews and service contractors play a central role in maximizing the functional utility of the MS4 as an effective measure in erosion and sediment control. Maintaining vegetation in the MS4 facilitates ecological services that effectively reduce the volume and velocity of storm water runoff, provide natural filtration, and mitigate erosion. For optimal results, DOT-HWYS' staff and service contractors shall follow the guidelines established by this Plan and covered in the Chemical Applications Training. DOT-HWYS is committed to reducing the discharge of pollutants from the MS4 to the MEP in order to comply with water quality standards and protect our valuable resources.

Table 1. Landscape maintenance BMPs for vegetated portions of the MS4 used for erosion and sediment control

Do	Don't
<ul style="list-style-type: none">• Use integrated pest management techniques for weed control.	<ul style="list-style-type: none">• Over-apply herbicides.
<ul style="list-style-type: none">• Use non-chemical alternatives to herbicides when possible.	<ul style="list-style-type: none">• Cut erosion control matting while maintaining areas with BMPs.
<ul style="list-style-type: none">• Follow the instructions on herbicide labels.	<ul style="list-style-type: none">• Spray herbicides close to waterways.
<ul style="list-style-type: none">• Follow the standards outlined in the <i>Highway Manual for Sustainable Landscape Maintenance, 2011</i>.	<ul style="list-style-type: none">• Use herbicides in eroding areas.
<ul style="list-style-type: none">• Maintain a one-third rule when cutting grass. Cut only the top one-third of grass blades.	<ul style="list-style-type: none">• Spray herbicides when it is raining, about to rain or windy.
<ul style="list-style-type: none">• Clean and remove all clippings from hard surfaces, roadways and drainage swales at the end of each workday.	<ul style="list-style-type: none">• Apply herbicides on PBMP or LID features without prior notification or approval from Engineer/Supervisor.
<ul style="list-style-type: none">• Collect and dispose of clippings properly.	<ul style="list-style-type: none">• Leave bare areas unattended.
<ul style="list-style-type: none">• Maintain earth drainage ditches and swales with vegetative cover.	<ul style="list-style-type: none">• Cut more than one-third of the turf grass blade.