# Storm Water Annual Monitoring Plan 2020 — 2021

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Statewide Storm Water Management Program
NPDES Permit No. HI S000001
**May 2020**

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STATE OF HAWAII DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION, OAHU DISTRICT

# STORM WATER ANNUAL MONITORING PLAN 2020 – 2021

MS4 NPDES Permit No. HI S000001



State of Hawaii Department of Transportation
Highways Division, Oahu District
727 Kakoi Street, Honolulu, Hawaii 96819

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| | |
|---|---|
| BMP | Best Management Practice |
| COC | Chain of Custody |
| DOH | State of Hawaii Department of Health |
| DOT-HWYS | State of Hawaii Department of Transportation, Highways Division, Oahu District |
| EPA | United States Environmental Protection Agency |
| IDDE | Illegal Discharge Detection and Elimination |
| I&M | Implementation and Monitoring |
| JPEG | Joint Photographic Experts Group |
| LCS | Laboratory Control Samples |
| LCSD | Laboratory Control Sample Duplicate |
| MS4 | Municipal Separate Storm Sewer System |
| MS | Matrix Spikes |
| MSD | Matrix Spike Duplicates |
| NPDES | National Pollutant Discharge Elimination System |
| NSBB | Nutrient Separating Baffle Box |
| PBMP | Permanent Best Management Practice |
| QA | Quality Assurance |
| QC | Quality Control |
| RPD | Relative Percent Difference |
| SOC | Schedules of Compliance |
| SWMP | Storm Water Management Program |
| SWMPP | Storm Water Management Program Plan |
| SWPCP | Storm Water Pollution Control Plan |
| TKN | Total Khedjahl Nitrogen |
| TMDL | Total Maximum Daily Load |
| TN | Total Nitrogen |
| TP | Total Phosphorus |
| TSS | Total Suspended Solids |
| WLA | Waste Load Allocation |
| °C | Degrees Celsius |

# CHAPTER 1
# MONITORING PROGRAM INTRODUCTION

This Storm Water Annual Monitoring Plan (hereinafter Monitoring Plan) is submitted to satisfy Part F.1 of the State of Hawaii Department of Transportation, Highways Division, Oahu District (DOT-HWYS) National Pollutant Discharge Elimination System (NPDES) Permit No. HI S000001 (hereinafter MS4 Permit). The MS4 Permit effective on October 28, 2013, and modified on April 1, 2016, expired on September 26, 2018, and is currently under administrative extension. Part F.1 of the MS4 Permit requires DOT-HWYS to submit a Monitoring Plan to the State of Hawaii Department of Health (DOH) for review and acceptance by June 1st of each year, which is then effective from July 1 through June 30 of that year.

The MS4 Permit requires DOT-HWYS to develop and implement a Storm Water Management Program (SWMP) to reduce the discharge of pollutants from the MS4 to the maximum extent practicable; and reduce the discharge of pollutants from DOT-HWYS baseyards to the appropriate discharge limitations subject to the Best Available Technology/Best Conventional Pollutant Control Technology discharge requirements, consistent with the Clean Water Act and other respective Federal and State requirements for such facilities. The MS4 Permit also requires that DOT-HWYS maintain a Storm Water Management Program Plan (SWMPP) that describes the DOT-HWYS SWMP.

Table 1 provides the MS4 Permit requirements for DOT-HWYS Monitoring Program and the corresponding section of the Monitoring Plan that addresses each permit requirement.

**Table 1. MS4 Permit Requirements for the Monitoring Program.**

| MS4 PERMIT REQUIREMENTS | PLAN SECTION |
|---|---|
| ***Part F.1.a*** *Annual Monitoring Plan – The Permittee shall submit the Annual Monitoring Plan to the Director by June 1st of each year for review and acceptance. The Annual Monitoring Plan shall be implemented over the coming fiscal year. The monitoring program must be designed and implemented to meet the following objectives:* | Section 1 |
| ***Part F.1.a.(1)*** *Assess compliance with this permit (including TMDL I&M Plans and demonstrating consistency with WLAs);* | Section 2.1 |
| ***Part F.1.a.(2)*** *Measure the effectiveness of the Permittee's storm water management program;* | Section 2.2 |
| ***Part F.1.a.(3)*** *Assess the overall health based on the chemical, physical, and biological impacts to receiving waters resulting from storm water discharges and an evaluation of the long term trends;* | Section 2.3 |
| ***Part F.1.a.(4)*** *Characterize storm water discharges;* | Section 2.4 |
| ***Part F.1.a.(5)*** *Identify sources of specific pollutants;* | Section 2.5 |
| ***Part F.1.a.(6)*** *Detect and eliminate illicit discharges and illegal connections to the MS4; and* | Section 2.5 |
| ***Part F.1.a.(7)*** *Assess the water quality issues in watershed resulting from storm water discharges to receiving waters.* | Section 2.3 |
| ***Part F.1.b.(1)*** *Written narrative of the proposed monitoring plan's objectives, including but not limited to the objectives identified in Part F.1.a., and description of activities;* | Section 2.1 – 2.5 |
| ***Part F.1.b.(2)*** *For each activity, a description of how the results will be used to determine compliance with this permit.* | Section 2.1 – 2.5 |
| ***Part F.1.b.(3)*** *Identification of management measures proven to be effective and/or ineffective at reducing pollutants and flow.* | Section 2.1 – 2.5 |
| ***Part F.1.b.(4)*** *Written documentation of the following:*<br>*(i) Characteristics (timing, duration, intensity, total rainfall) of the storm event(s);*<br>*(ii) Parameters for measured pollutant loads; and*<br>*(iii) Range of discharge volumes to be monitored, as well as the timing, frequency, and duration at which they are identified;* | Section 3.1.1 |
| ***Part F.1.b.(5)*** *Written documentation of the analytical methods to be used;* | Section 3.2 - 3.4 |
| ***Part F.1.b.(6)*** *Written documentation of the Quality Assurance/Quality Control procedures to be used; and* | Section 3.0 |
| ***Part F.1.b.(7)*** *Estimated budget to be implemented over the coming fiscal year.* | Section 3.5 |
| ***Part F.2*** *Storm Water Associated with Industrial Activities – The Permittee shall annually monitor the storm water runoff for the parameters specified below, for each DOT-HWYs Industrial Facility (i.e., baseyards), including any additional parameters which the Permittee also believes to be present in the storm water runoff.*<br>[See Table 4 of Plan for the detailed list of parameters specified in the MS4 Permit] | Section 4.0 |

## 1.1 Purpose

The purpose of this Monitoring Plan is to outline DOT-HWYS Monitoring Program for the monitoring year 2020 – 2021. The Monitoring Program is designed to provide DOT-HWYS with the data necessary to meet the following objectives of MS4 Permit Parts F.1.a.(1) through F.1.a.(7):

(1) Assess compliance with the MS4 Permit (including Total Maximum Daily Load [TMDL] Implementation and Monitoring [I&M] Plans and demonstrating consistency with Waste Load Allocations [WLAs]).

(2) Measure the effectiveness of DOT-HWYS Storm Water Management Program.

(3) Assess the overall health based on the chemical, physical, and biological impacts to receiving waters resulting from storm water discharges and an evaluation of the long-term trends.

(4) Characterize storm water discharges.

(5) Identify sources of specific pollutants.

(6) Detect and eliminate illicit discharges and illegal connections to the MS4.

(7) Assess water quality issues in watersheds resulting from storm water discharges to receiving waters.

## 1.2 Monitoring Program Framework Documents

The MS4 Permit requires five types of plans and reports to address monitoring of the SWMP program activities, and report on the results of the monitoring activities. The plans and reports, along with the MS4 Permit submittal date requirements for each, are as follows:

- SWMPP – submitted April 27, 2015.
- Annual Report – to be submitted each year by October 31st, reporting on the previous fiscal year.
- TMDL I&M Plans – five plans submitted October 28, 2014, one plan submitted May 8, 2020.
- Annual Monitoring Plan – to be submitted each year by June 1st, describing planned monitoring activities for the upcoming fiscal year.
- Annual Monitoring Report – to be submitted each year by October 31st, reporting on monitoring activities during the previous fiscal year.

These documents comprise the framework by which DOT-HWYS monitors and evaluates the compliance status, and effectiveness of the SWMP. Collectively, they detail program activities, standards and milestones, assessment methods, and results of SWMP implementation.

The *2015 SWMPP* and appendices are accessible at https://www.stormwaterhawaii.com/.

DOT-HWYS manages their Municipal Separate Storm Water System (MS4) by maintaining an inventory of assets, conducting field investigations, routine inspections and maintenance, scheduling training sessions, coordinating intradepartmental cooperation, updating plans and programs, and through public education. The Annual Report includes an assessment of the past reporting period's activities in comparison to the MS4 Permit requirements, and where applicable, includes documentation of accomplishments to meet specific measurable goals, standards and milestones, or other specific performance requirements. If requirements are not met, the report provides justification, and proposed corrective actions for meeting these goals in the future.

The Annual Report includes an assessment of the SWMP, which provides a summary of the implementation of each of the SWMP program components. Changes made to the SWMPP, associated plans, and physical modifications to the MS4 are documented in the Annual Report. Evaluation of each of the programs based on current data allows for the assessment of progress towards compliance goals and ensures that DOT-HWYS is using the most effective approach towards meeting compliance requirements. The *Annual Report 2020 – 2021* will be submitted to DOH by October 31, 2021. The TMDL I&M Plans for Ala Wai Canal, Kaneohe Stream, Kapaa Stream, Kawa Stream, and Waimanalo Stream are included in the appendices of the *2015 SWMPP*, and describe the activities planned to comply with WLA requirements for each of the TMDLs. As per the MS4 Permit Part F.3.c, DOT-HWYS must also meet the Schedules of Compliance (SOC), included in each of the TMDL I&M Plans. DOT-HWYS submitted WLA Completion Reports for Ala Wai Canal and Waimanalo Stream watersheds to DOH in October 2019, and is on schedule to meet the SOCs for Kawa Stream Watershed, Kapaa Stream Watershed and Kaneohe Stream Watershed.

The MS4 Permit Part F.4 requires that DOT-HWYS develop I&M Plans for TMDLs that are adopted by DOH and approved by the United States Environmental Protection Agency (EPA), which identify DOT-HWYS as a source, within one year of the TMDL approval date. The TMDL Report for Waikele Watershed was approved by EPA on May 9, 2019. The DOT-HWYS I&M Plan for the Waikele Watershed was submitted to DOH by May 8, 2020, in compliance with MS4 Permit Part F.4.

This Monitoring Plan summarizes DOT-HWYS planned monitoring activities during the 2020 – 2021 monitoring year to meet the objectives of MS4 Permit Parts F.1.a.(1) through F.1.a.(7). Reporting for the activities conducted during that period will be presented in the *2020 – 2021 Annual Monitoring Report* (hereinafter Monitoring Report) which will be submitted to DOH in October 2021.

# CHAPTER 2
# 2020 – 2021 MONITORING PROGRAM

The MS4 Permit Parts F.1.a.(1) through F.1.a.(7) describe the requirements of the Monitoring Program. This Chapter is organized according to the MS4 Permit to describe how DOT-HWYS Monitoring Program achieves these requirements. This Monitoring Plan provides the following information for each objective:

- **Written Narrative –** Part F.1.b.(1) *Written narrative of the proposed monitoring plan's objectives, including but not limited to the objectives identified in Part F.1.a, and description of activities.*
- **Determining Compliance –** Part F.1.b.(2) *For each activity, a description of how the results will be used to determine compliance with this permit.*
- **Effectiveness –** Part F.1.b.(3) *Identification of management measures proven to be effective and/or ineffective at reducing pollutants and flow.*

## 2.1 Compliance Assessment – F.1.a.(1)

*Part F.1.a.(1) Assess compliance with this permit (including TMDL I&M Plans and demonstrating compliance with WLAs).*

### 2.1.1 Written Narrative

This chapter of the Monitoring Plan describes DOT-HWYS compliance with the MS4 Permit TMDL I&M Plans, which is achieved through the ongoing evaluation of current data for each program.

The MS4 Permit Part F.3.c provides the TMDL SOCs, which include the milestones and deliverables required to document progress towards compliance with WLA reductions consistent with the assumptions of the applicable TMDL I&M Plan documents. In October 2019, DOT-HWYS submitted *TMDL Schedule of Compliance Status Report – Year 6* to DOH. This report included the Completion Reports for the Ala Wai Canal and Waimanalo Stream watersheds (which addressed the annual WLA reduction summaries for those two watersheds), as well as requirements related to Permanent Best Management Practice (PBMP) construction and monitoring for Kawa Stream Watershed, Kapaa Stream Watershed and Kaneohe Stream Watershed.

In October 2020, DOT-HWYS will submit a *TMDL Schedule of Compliance Status Report – Year 7* to DOH to document the implementation of activities required to demonstrate progress towards compliance with the TMDL I&M Plans and compliance with WLAs.

Table 2 shows the specific Milestones/Deliverables for the Year 7 Report.

**Table 2. TMDL Schedules of Compliance – Milestones and Deliverables for Monitoring Year 2020 – 2021.**

| TMDL DOCUMENT | MILESTONE/DELIVERABLE |
|---|---|
| Kawa Stream | PBMP: Finalize WLA Completion Report |
| Kapaa Stream | PBMP: Advertise/bid opening/award |
| Kaneohe Stream | PBMP: Advertise/bid opening/award |

## Monitoring Activities

During the monitoring year 2020 – 2021, DOT-HWYS Monitoring Program will conduct the following activities to collect data on PBMP performance:

- Ala Wai Canal Watershed – performance monitoring of bioretention swale.
- Kawa Stream Watershed – performance monitoring of Nutrient Separating Baffle Box and Water Polisher PLUS.
- Kaneohe Stream Watershed – performance monitoring of treatment train and three Nutrient Separating Baffle Boxes.

Appendix A PBMP Performance Monitoring Site Locations provides figures of the seven sites that will be monitored during the monitoring year 2020 – 2021. Selective monitoring of representative PBMPs is used to validate pollutant removal efficiencies for WLA compliance. More details about each site and monitoring activities are described below.

### *2.1.1.1 Ala Wai Canal Watershed*

The revised TMDL report for Total Nitrogen (TN) and Total Phosphorus (TP) for the Ala Wai Canal Watershed was approved by the EPA in 2002. DOT-HWYS submitted their WLA Completion Report for Ala Wai Canal Watershed to DOH in October 2018. DOT-HWYS has completed construction of PBMPs in this watershed, and will continue monitoring to verify the accuracy of literature removal efficiencies used to develop pollutant reduction estimates in the *2015 TMDL I&M Plan for Ala Wai Canal Watershed*.

## Bioretention Swale Monitoring

DOT-HWYS constructed two bioretention swales in the Ala Wai Canal Watershed. These projects are located within the H-1 Freeway and University Avenue interchanges makai (south) of the State route. The bioretention swales receive runoff from impervious highway surfaces and vegetated slopes of the cloverleaf. During the monitoring year 2020 – 2021, DOT-HWYS plans to continue monitoring bioswale performance at the west bioswale using a rain gauge, continuous flow monitoring equipment, and influent/effluent water quality grab samples.

Grab samples will be collected for a range of storm sizes at the Ala Wai Canal Watershed bioretention swale. Parameters that will be analyzed during each sampling event include TN, TP,

and Total Suspended Solids (TSS). Water quality samples collected before PBMP treatment (influent) will provide characterization of freeway storm water runoff. Paired influent and effluent water quality samples will provide PBMP performance data.

#### *2.1.1.2 Kawa Stream Watershed*

The revised TMDL Report for TN, TP, and TSS for Kawa Stream was approved by EPA in 2005. As MS4 Permit Part F.3.c.(2), the SOC requires that DOT-HWYS complete PBMP performance monitoring in the Kawa Stream Watershed by October 2019 and finalize the WLA Completion Report by October 2020. DOT-HWYS completed construction and performance monitoring of PBMPs in the watershed. During the monitoring year 2020 – 2021, DOT-HWYS will continue to monitor performance of the structural PBMP in the Kawa Watershed to verify that required nutrient load reductions continue to be met.

##### Nutrient Separating Baffle Box Monitoring

In 2018, DOT-HWYS completed construction of a Nutrient Separating Baffle Box (NSBB) in an open channel along Kamehameha Highway near Mahinui Road. This open channel receives runoff from the highway and a small portion of Hawaiian State Memorial Park.

The NSBB is a proprietary storm water treatment device that consists of three settling chambers with a raised metal cage and a hydrocarbon boom. The raised metal cage is designed to suspend floatables and vegetative material away from the settling chambers to prevent nutrients from leaching into the collected water. The settling chambers are designed to trap sediment up to a specified design flow rate. Storm water volumes that surpass the peak design flow rate of the unit will bypass over the baffle walls, thereby reducing storm water treatment efficiency.

During the monitoring year 2020 – 2021, device performance will be monitored through regular inspections and by assessing the quantity and quality of debris and sediments removed during cleanings.

##### Water Polisher PLUS Monitoring

DOT-HWYS maintains a Bio Clean Water Polisher PLUS along Kaneohe Bay Drive directly before a pipe outfall to Kawa Stream. This 24-inch pipe receives storm water runoff from an approximately one-half mile long stretch of Kaneohe Bay Drive. The majority of the drainage area consists of roadway and grassed median.

The Water Polisher PLUS is a proprietary storm water treatment device that is comprised of the same basic features of a NSBB, but also integrates an up-flow media filter within the third settling chamber. During the monitoring year 2020 – 2021, DOT-HWYS will continue monitoring to assess the performance of the Kawa Stream Watershed Water Polisher PLUS. This device will be monitored through regular inspections and by assessing the quantity and quality of debris and sediments removed during cleanings. Water quality samples will be collected from the influent and effluent to determine any changes in pollutant concentrations that occur as storm

water travels through the device. Manual samples will be collected for a range of storm sizes. Parameters that will be analyzed during each sampling event include TN, TP, and TSS. Water quality samples collected before PBMP treatment (influent) will provide characterization of roadway storm water runoff. Paired influent and effluent water quality samples will provide PBMP performance data.

#### *2.1.1.3 Kaneohe Stream Watershed*

A TMDL report for TN, TP, and TSS for Kaneohe Stream was approved by EPA in 2009. DOT-HWYS has completed construction of PBMPs in this watershed ahead of schedule, and will continue monitoring to verify accuracy of literature removal efficiencies used to develop pollutant reduction estimates in the *2015 TMDL I&M Plan for Kaneohe Stream Watershed*.

**Treatment Train Monitoring**

DOT-HWYS installed a series of PBMPs adjacent to Likelike Highway (Route 63) near the H-3 Freeway off-ramp. At this site, storm water from the Likelike Highway drains into a grass swale, through a settling basin, and then into a bioretention swale that leads to an infiltration trench. Storm water volumes are contained on site or are absorbed within the infiltration trench. DOT-HWYS will continue to assess the effectiveness of the treatment train by collecting manual samples of influent for a range of storm sizes, and will use rainfall data to estimate annual pollutant loading reductions. Parameters that will be analyzed during each sampling event include TN, TP, and TSS. The samples collected before PBMP treatment (influent) will provide characterization of highway storm water runoff.

**Nutrient Separating Baffle Box Monitoring**

DOT-HWYS completed construction of three NSBBs in the Kaneohe Stream Watershed in the vicinity of the Kamehameha Highway and the H-3 Freeway interchange. These devices receive runoff from impervious highway surfaces and vegetated medians. During the monitoring year 2020 – 2021, DOT-HWYS will monitor performance of the NSBBs through regular inspections and by assessing the quantity and quality of debris and sediments removed during cleanings.

### 2.1.2 Determining Compliance

DOT-HWYS will use data collected from PBMP performance monitoring sites during the monitoring year 2020 – 2021 to assess compliance with completed TMDL I&M Plans as described in Parts F.3 and F.4 of the MS4 Permit. Monitoring data and laboratory results from analysis of water quality samples collected will be used to verify literature removal efficiencies used to develop pollutant reduction estimates in the 2015 TMDL I&M Plans.

Chapter 3 details the Quality Assurance/Quality Control (QA/QC) protocols and standards that will be utilized for water quality sampling during the monitoring year 2020 – 2021.

### 2.1.3 Effectiveness

PBMP performance monitoring will allow DOT-HWYS to verify accuracy of literature removal efficiencies used to develop pollutant reduction estimates in the 2015 TMDL I&M Plans, and adjust implementation of activities required to demonstrate consistency with WLAs. PBMP performance monitoring data may also be used to aid decision-making for consideration of PBMPs in the future.

Effectiveness of program activities towards compliance with the MS4 Permit will be addressed in the *Annual Report 2020 – 2021*.

## 2.2 Program Effectiveness – F.1.a.(2)

*Part F.1.a.(2) Measure the effectiveness of the Permittee's storm water management program.*

### 2.2.1 Written Narrative

The objective of this section of the Monitoring Plan is to measure the effectiveness of the DOT-HWYS SWMP. In accordance with MS4 Permit Part G.1.d, DOT-HWYS submitted a *Program Effectiveness Strategy* in October 2014. The Program Effectiveness Strategy updated in 2019 and provided in the *2015 SWMPP* as Appendix L.1, includes program implementation monitoring information, water quality monitoring, and other performance indicators. DOT-HWYS will include a program effectiveness assessment and identify water quality improvements in the Annual Report and in the Annual Monitoring Report. Additionally, DOT-HWYS will analyze the data for each program component included in the Annual Report, and review and revise the SWMPP as needed.

Descriptions of past and future SWMP activities are organized by program component in the Annual Report. Measuring effectiveness of past activities will influence development of future activities, such as improvements to existing BMPs. In the *Annual Report 2018-2019*, DOT-HWYS identified new activities, referred to as "Enhanced BMPs", that will be implemented for select Program elements.

Table 3 lists the Enhanced BMPs to be pursued during the monitoring year 2020 – 2021, in complement to existing activities.

**Table 3. SWMP Enhanced BMPs.**

| PROGRAM COMPONENT | ENHANCED BMPS |
|---|---|
| Illicit Discharge Detection and Elimination | • Training – Improve formal Inspectors Training for individuals involved in this program. |
| Construction Site Runoff Control | • Contract Construction Project Inspections – Revise definition or timeframe for deficiencies to be consistent with the Enforcement Response Plan. |
| Post Construction | • Continue Post-Construction BMP Cleaning Contract |
| Pollution Prevention/Good Housekeeping Debris Control | • Street Sweeping – Target high trash level areas identified by VTA for increase sweeping frequency to aid in trash reduction.<br>• Storm Drain System Inspection and Cleaning – Execute 2020 Pipe Cleaning Contract.<br>• Permanent Erosion Control – Complete stabilization of seven slopes as a part of Project No. HWY-O-01-18.<br>• Action Plan to Address Erosion at Storm Drain System Outlets – Complete stabilization of one eroded outlet as a part of Project No. HWY-O-01-18. |
| Industrial and Commercial Activities Discharge Management | • Training – Improve formal Inspectors Training for individuals involved in this program. |
| Municipal Industrial Facilities | • Baseyard Inspections – Create deficiency levels and corrective action timeframes to address baseyard Storm Water Pollution Control Plan (SWPCP) inspection deficiencies.<br>• Revise SWPCPs and checklists. |
| Monitoring | • Storm Water Monitoring – Complete construction of additional structural BMPs at baseyards.<br>• Other TMDLs – Implementation and Monitoring Plan for the Waikele Watershed. |

The 2020 – 2021 Monitoring Program will be coordinated with the *Program Effectiveness Strategy* and Annual Report to satisfy the MS4 Permit Part F.1.a.(2).

### 2.2.2 Determining Compliance

The *2015 SWMPP* includes measurable standards and milestones for each component of the program and details activities required to complete these goals. The *Annual Report 2020 – 2021*

will document progress toward meeting these standards and milestones, which will determine compliance with the MS4 Permit, as well as effectiveness of the SWMP.

### 2.2.3 Effectiveness

The *2015 SWMPP* includes a "Monitoring Program Effectiveness" section that provides the methods and qualitative measures to determine the effectiveness of the specific management measures included in that chapter for each program component. The Monitoring Program will utilize the Monitoring Program Effectiveness section to identify specific management measures within each program component that prove to be effective and/or ineffective at reducing pollutants and flow.

The Annual Report will summarize each program's progress towards the methods and qualitative measures achieved during the reporting period. Select chapters will include the addition of Enhanced BMPs, which will be implemented to complement existing BMPs, and increase effectiveness of the particular program. The overall effectiveness of the SWMP will be determined based on the summation of each chapter's effectiveness evaluation.

## 2.3 Assess Watershed Health & Water Quality Issues – F.1.a.(3) and F.1.a.(7)

*Part F.1.a.(3) Assess the overall health based on the chemical, physical, and biological impacts to receiving waters resulting from [DOT-HWYS] storm water discharges and an evaluation of the long term trends.*

*Part F.1.a.(7) Assess the water quality issues in watershed resulting from [DOT-HWYS] storm water discharges to receiving waters.*

### 2.3.1 Written Narrative

MS4 Permit Part F.1.a.(3) and Part F.1.a.(7) are addressed together in Section 2.3, because both requirements are interrelated and will involve a similar analysis.

The objective of this section of the Monitoring Plan is to assess the overall health of watersheds and water quality issues based on the chemical, physical, and biological impacts to receiving waters as a result of DOT-HWYS storm water; and to provide an evaluation of long-term trends. DOT-HWYS will meet this objective by gathering and analyzing historical storm water and stream data. DOT-HWYS retains an inventory of water quality sampling data that will be used, together with water quality data from other sources on the Island of Oahu, to evaluate trends in overall water quality and impacts to receiving waters due to discharges from the DOT-HWYS MS4.

In the monitoring year 2020 – 2021, DOT-HWYS plans to review existing water quality data from Oahu's receiving waters (i.e., surface water such as streams, estuaries or marine

shorelines), and utilize these data together with relevant storm water discharges water quality data on Oahu. DOT-HWYS will use the combination of data to assess impacts to receiving waters and specific water quality issues resulting from storm water discharges from the DOT-HWYS MS4, as well as to evaluate the long-term trends.

### 2.3.2 Determining Compliance

DOT-HWYS will assess the overall health of receiving waters and watersheds by using the results of laboratory analyses from water quality samples collected from the MS4 to characterize the impact of DOT-HWYS discharges from the MS4 to receiving waters. DOT-HWYS will also obtain water quality sampling results from other sources (e.g., City and County of Honolulu, DOH, EPA, and United States Geological Survey), to develop a larger picture of watershed health, and the contributions attributed to discharges from the DOT-HWYS MS4 to receiving waters.

### 2.3.3 Effectiveness

The results of the assessment of DOT-HWYS impact to the overall health of the receiving waters, based on the chemical, physical, and biological impacts resulting from storm water discharges, will help DOT-HWYS identify management measures proven to be effective or ineffective at reducing pollutants and flow, and may provide guidance for future planning and design of PBMPs.

## 2.4 Characterize Discharges – F.1.a.(4)

*Part F.1.a.(4) Characterize storm water discharges [from DOT-HWYS MS4].*

### 2.4.1 Written Narrative

The objective of this section of the Monitoring Plan is to collect monitoring data in order to characterize storm water discharges from the MS4. DOT-HWYS will continue water quality sampling efforts as necessary to characterize storm water discharges from the MS4. The location of these samples will be identified through Asset Management System analysis and observations gathered during field reconnaissance conducted by DOT-HWYS and SWMP staff. This sampling effort will provide additional characterization of storm water discharges to supplement the existing discharge characterization data. As part of the PBMP performance monitoring described in Section 2.1, influent samples collected will provide additional data to characterize storm water discharges from DOT-HWYS roadways.

### 2.4.2 Determining Compliance

Water quality samples that are collected as part of DOT-HWYS Municipal Industrial Program and TMDL Program will be submitted for laboratory analyses. Results of the laboratory analyses will contribute to DOT-HWYS efforts to characterize storm water discharges from the MS4.

Sampling for these sites will follow protocols as defined in Chapter 3 of the Monitoring Plan, or the corresponding Storm Water Pollution Control Plan (SWPCP). Chapter 3 of this Monitoring Plan defines water quality sample collection procedures, laboratory analysis, and QA/QC for BMP effectiveness and other storm water discharge characterization. Chapter 4 of this Monitoring Plan discusses the storm water monitoring at DOT-HWYS baseyards with industrial activities. QA/QC protocols will help to verify that data collection and analysis procedures produce results which accurately characterize storm water discharges to the MS4.

### 2.4.3 Effectiveness

The results of laboratory analysis of water quality samples collected from storm water discharges in the monitoring year 2020 – 2021, combined with historical data collected, will allow DOT-HWYS to identify management measures that are effective or ineffective at reducing pollutants and flow, such as PBMPs and other operational activities identified in the SWMPP, WLA I&M Plans, and related documents.

## 2.5 Source Detection and Control – F.1.a.(5) and F.1.a.(6)

*Part F.1.a.(5) Identify sources of specific pollutants.*

*Part F.1.a.(6) Detect and eliminate illicit discharges and illegal connections to the MS4.*

### 2.5.1 Written Narrative

The objective of this section of the Monitoring Plan is to collect monitoring data in order to identify sources of specific pollutants, and detect and eliminate illicit discharges and illegal connections to the MS4. As part of the SWMP, DOT-HWYS manages an Illicit Discharge Detection and Elimination (IDDE) Program that administers permits for private drain connections to the MS4, screens outfalls, and conducts investigations of parcels suspected of illicit discharges or illegal connections. Suspected illicit discharges or illegal connections are investigated by tracing the source of the discharge or connection.

Investigations are prompted by the following:

- Scheduled inspections of industrial and commercial facilities and activities conducted by the Industrial and Commercial Activities Discharge Management Program (hereinafter Industrial and Commercial Program) of the SWMP.
- Water quality monitoring.

- Storm drain inspections and cleaning.
- Outfall field screening.
- Public reporting or complaints.
- Complaints received from the DOH or CCH.

The MS4 Permit requires DOT-HWYS to implement BMPs through the IDDE Program in order to monitor for illicit discharges and illegal connections. A detailed list of these mechanisms is presented in the SWMPP Table 3-4. The primary tools for identifying illegal connections and illicit discharges include outfall and structure inspections, and inspections of industrial and commercial facilities. DOT-HWYS implements the *Outfall Field Screening Plan* to identify sources of pollutants and detect and eliminate illicit discharges and illegal connections to the MS4. The *2015 SWMPP* Appendix C.3 Outfall Field Screening Plan provides guidance for the IDDE Program.

As per the MS4 Permit Part D.1.c.(3), DOT-HWYS uses the *Outfall Field Screening Plan* to prioritize areas for screening, frequency of screening, and the procedures to be followed if a discharge is observed. If an illegal connection and/or the source of the discharge is identified, inspectors initiate DOT-HWYS escalating enforcement actions that are administered by the Industrial and Commercial Program. The Enforcement Policy is described in the *2015 SWMPP* Section 10.8.

In the monitoring year 2020 – 2021, DOT-HWYS may utilize water quality sampling to identify pollutants of concern, and determine the source of pollutants when source tracing and other methods are not successful. The necessity for sampling will be decided after the investigation of a potential illicit discharge or illegal connection, per the IDDE Program protocols detailed in the *2015 SWMPP* Chapter 3. Desktop research about the parcel will provide background information on the property's activities. Site reconnaissance will further aid the inspectors in determining the type of pollutant potentially present in the discharge, and the feasibility of sampling.

Should it be determined that a water quality sample is required to identify the specific pollutant(s) emanating from an illicit connection or non-point source discharge, the IDDE Team will collect grab samples. Personnel will follow the standard sampling methodologies provided in Chapter 3 of the Monitoring Plan, in addition to the existing IDDE Program protocols. However, the specific parameters to be tested may differ from those listed in Table 4 of Section 3.2.

The location and frequency of sampling will be determined on an as-needed basis after recommendation from the IDDE Team. Samples will be collected by the IDDE Program inspectors or a designated individual from the Monitoring Program Team. Investigations for non-storm water discharges are normally conducted during dry weather, however IDDE sampling may be conducted in rainy conditions. The IDDE Team will determine the specific parameters for laboratory analysis on a case-by-case basis. The IDDE Team may use a field kit or submit samples to a certified laboratory for analysis.

### 2.5.2 Determining Compliance

DOT-HWYS determines compliance with the IDDE Program requirements by identifying sources of potential pollutants and detecting, investigating, and closing out IDDE investigations. DOT-HWYS will use data collected from the IDDE Program to identify sources of specific pollutants, and detect and eliminate illicit discharges and illegal connections to the MS4. When source tracing is not successful, water quality sampling may be used to assist in determination of pollutants of concern and source identification.

### 2.5.3 Effectiveness

The effectiveness of this MS4 Permit objective will be evaluated utilizing the standards and/or milestones defined in the 2015 SWMPP IDDE Program Monitoring Program Effectiveness section. This includes identification of management measures proven to be effective and/or ineffective at reducing pollutants and flow.

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# CHAPTER 3
# WATER QUALITY MONITORING REQUIREMENTS

Quality Assurance/Quality Control is an important element of an effective sampling program. As required by MS4 Permit Part F.1.b.(4) through F.1.b.(6), this chapter provides details of storm event characterization, laboratory analytical methods, QA/QC procedures to be used in sampling illicit discharges, PBMP effectiveness studies, and other storm water discharge characterization that is *not* part of the DOT-HWYS baseyards industrial activities monitoring. The QA/QC protocols for the Municipal Industrial sampling program at baseyards are discussed in Chapter 4.

This chapter also addresses MS4 Permit Part F.1.b.(7) which requires an estimated budget for the monitoring year 2020 – 2021.

## 3.1 Field Sampling Methods

This section provides information regarding the specific field methods that will be used to accomplish the water quality monitoring activities.

### 3.1.1 Precipitation Monitoring

Precipitation will be monitored using a combination of on-site or web-based rain gauges, and the Molokai radar managed by the National Oceanic and Atmospheric Administration's National Weather Service. This data will be used to delineate storm characteristics (timing, duration, intensity, and relative total rainfall), and the range of discharge volumes that occur during sampling events.

### 3.1.2 Automated Sample Collection

Automatic samplers may be used to collect samples and provide data control and logging for sensors. Each automatic sampler will be programmed to obtain a timed series of samples throughout a rainfall event. Once the water flow in the drainage structure reaches a predetermined depth, samplers will collect runoff at a prescribed time frequency. The samples are automatically collected by a pumping mechanism that draws water from the main channel of flow through a laboratory-grade vinyl tube and into a clean plastic bottle.

Automatic samplers will normally be programmed to collect samples every 10-30 minutes to increase the chances of capturing a runoff event. In the occurrence of larger storms, samples may be collected at less frequent intervals to provide a more accurate representation of runoff from the entire storm. Samples will be collected until runoff slows to a point where there is insufficient water at the intake, there is no flow, and/or the supply of bottles is exhausted.

Automatic samplers will be serviced immediately following a storm event. All samples will be delivered to the laboratory for analysis within 12 hours of collection of the first sample, or they will be placed on ice and maintained at a temperature equal to or less than 6 Degrees Celsius (°C) until they are delivered to the laboratory. Sample containers will be packaged and handled to protect the integrity of the water samples.

### 3.1.3 Manual Sample Collection

Manual samples may be collected by field personnel during a storm event. Storm events will be monitored by radar so that field personnel can be present in the watershed during active storms to obtain manual samples. Samples will be manually collected at 1-minute to 60-minute intervals depending on the anticipated storm duration and intensity. Samples will be deposited into clean, labeled plastic bottles. If necessary, an extension pole, rope or other apparatus can be used to aid in sample collection, especially during high flow conditions.

Manual samples will be delivered to the laboratory for analysis within 12 hours of collection of the first sample, or they will be placed on ice and maintained at a temperature equal to or less than 6°C until they are delivered to the laboratory. Sample containers will be packaged and handled to protect the integrity of the water samples.

### 3.1.4 Sampling Equipment Decontamination

Samples collected using non-disposable or non-dedicated equipment will require decontamination between samples to prevent cross-contamination. Prior to the start of sampling, surfaces of the sampling equipment that come into direct contact with sample water will be decontaminated. After each use, sample collection containers and lids will be decontaminated by a certified laboratory according to standard sampling protocols. In the event that this is not possible, containers will be washed using a non-phosphate detergent solution and brushed to remove sediment. Each bottle will then be triple rinsed and air-dried.

## 3.2 Sampling Parameters

Storm water samples will be collected and analyzed for TN (a calculation of Nitrate plus Nitrite, and Total Kjeldahl Nitrogen [TKN]), TP, and TSS by a State-approved laboratory. Table 4 lists the preferred analytical methods and their associated holding times and preservation methods. If the analytical methods in Table 4 are not available, alternative methods may be approved under the guidelines of *Code of Federal Regulations, Title 40, Subchapter D, Part 136 Guidelines Establishing Test Procedures for the Analysis of Pollutants*.

Holding time is the maximum suggested period between sample collection and laboratory analysis. The laboratory will notify the Project Manager and note in the Analytical Report if samples are received outside of the holding time. Holding times assume proper preservation methods have been followed.

Parameters tested for the IDDE Program may differ from those listed in Table 4. The IDDE Team will determine the specific parameters for laboratory analysis on a case-by-case basis.

**Table 4. Storm Water Monitoring Parameters.**

| PARAMETER | ANALYTICAL METHOD | HOLDING TIME (DAYS) | PRESERVATION METHOD |
|---|---|---|---|
| Total Kjeldahl Nitrogen (TKN) | EPA 351.2 | 28 | Cool to ≤6°C, pH<2 using sulfuric acid |
| Nitrate + Nitrite | EPA 353.2 | 28 | Cool to ≤6°C, pH<2 using sulfuric acid |
| Total Nitrogen (TN) | Calculated by TKN plus Nitrate + Nitrite | | |
| Total Phosphorus (TP) | EPA 365.3 | 28 | Cool to ≤6°C, pH<2 using sulfuric acid |
| Total Suspended Solids (TSS) | SM 2540D | 7 | Cool to ≤6°C |

## 3.3 Data Management

Precautions will be taken in the storage and analysis of data to prevent errors, loss or misinterpretation of data. Before data is modified or analyzed, a copy of the original data will be archived.

### 3.3.1 Documentation

Information will be hand recorded on standardized Field Logs and Chain of Custody (COC) forms, which are scanned and electronically filed in a dedicated project folder on a secure server. The COC forms will accompany all samples. A Field Log will be kept for each sampling site with the details of the date, time, personnel, purpose of visit, weather, conditions observed, samples collected, and actions performed. Photographs may be used to document field conditions and samples.

Hard copies of COC forms and Field Logs will be stored for at least 30 days after the *Annual Monitoring Report 2020 – 2021* is submitted to DOH.

#### *3.3.1.1 Sample Labeling*

All sample bottles are given simple consecutive labels specific to each sample location. Information such as sample date, time, analysis method, preservation method (if any), conditions, and personnel present are recorded in the Field Logs and COC forms, and linked to specific sample bottle numbers when appropriate.

#### *3.3.1.2 Chain of Custody*

The COC forms will be used to trace the possession of each sample from the time it is collected until completion of analyses. All samples submitted to the laboratory will be accompanied with a COC form. The COC form details the following information, at minimum:

- Name and contact information of sampling personnel
- Name and contact information for laboratory
- Sampling contract name
- Sample ID number
- Date and time of sample collection
- Sample matrix
- Sample location
- Number of containers
- Preservation method, if any
- Analytical test parameters
- Analytical method
- Sample temperature
- Signature(s) of persons involved in the Chain of Custody
- Date and method of delivery

DOT-HWYS and the laboratory will maintain electronic copies of each COC form. Electronic copies of the completed COC forms will be submitted to DOH as an appendix of the *Annual Monitoring Report 2020 – 2021*.

#### *3.3.1.3 Field Logs*

Fields Logs are completed during every sampling event to document the details of site visits such as location, date, time, personnel, purpose of visit, weather, conditions observed, samples collected, and actions performed.

#### *3.3.1.4 Photographs*

Before storm water or sediment samples are released to the laboratory, photographs may be taken of each sample to document visual characteristics of the sample contents. Photographs will be stored electronically in Joint Photographic Experts Group (JPEG) file format in a dedicated project folder on a secure server.

### 3.3.2 Analytical Results

Each set of sample results will be provided in the analytical laboratory's analysis results report. This report will contain relevant information about the sample receipt and analysis procedures, including descriptions of problems with the analyses, corrective actions if applicable, deviations

from analytical methods, QC results, and a definition list for each qualifier used. The laboratory analysis results reports will be maintained in a dedicated project folder on a secure server.

### 3.3.3 Data Quality Assessment

All generated data will undergo data verification and validation. The items listed below will be evaluated, as applicable to the analytical method. Qualifiers will be applied, as necessary.

- Deliverables
- Chain of Custody/Condition of samples at laboratory receipt
- Holding times
- Calibration (initial and continuing)
- Blanks (method and calibration)
- Laboratory replicates
- Laboratory Control Samples/Laboratory Control Sample Duplicates
- Matrix Spikes/Matrix Spikes Duplicates
- Field QC samples
- Compound quantification and reported detection limits
- Overall assessment of data

The data will be reviewed in accordance with appropriate EPA method-specific, and/or laboratory-specific QC guidance documents.

### 3.3.4 Data Analysis Procedure

If the QA/QC criteria are met, then the data will be used to confirm the literature PBMP removal efficiency for each analyte. This efficiency will be assessed in relation to the storm hydrograph—beginning, peak, or end—to allow for evaluation of removal efficiency in comparison to flow.

A performance efficiency per storm event will also be calculated using the average inlet and outlet concentrations. This will also be compared to rainfall intensity and therefore flow, in order to determine a range of flows and pollutant concentrations which can be sufficiently treated by the PBMP.

## 3.4 Quality Assurance/Quality Control

The field and laboratory QA/QC procedures ensure the reliability and validity of field and analytical laboratory data gathered as part of the overall program.

### 3.4.1 Field QA/QC

Field QA/QC is intended to provide an assessment of possible field contamination and an assessment of field variability. The latter may include variability in sampling techniques and instrumentation variability.

#### *3.4.1.1 Equipment Rinsate Blanks*

Equipment rinsate blanks verify the adequacy of the decontamination process and whether the equipment is a source of sample contamination. To confirm that non-dedicated, non-disposable sampling devices have been effectively decontaminated, rinsate samples will be collected and submitted to the laboratory for analysis. The equipment rinsate blank will be collected from the decontaminated equipment prior to sampling. These samples will be obtained by pouring distilled or deionized water through or over sampling equipment. The water will be collected in a clean sample container and will be transported to the laboratory for analysis.

Equipment rinsate blanks will be collected and analyzed for the same parameters listed in Table 4. Should the rinsate blank contain levels of contaminants within an order of magnitude above the analysis detection limits or within an order of magnitude of associated samples, potential contamination will be documented. No field rinsate blank is required for dedicated equipment (not reused to obtain other samples).

These samples will be submitted for analysis as normal samples. Equipment rinsate blanks will be collected at a frequency of one per twenty normal samples per matrix, or one per sampling event, whichever is more frequent.

#### *3.4.1.2 Field Duplicates*

A field duplicate will be collected at the same location immediately following the parent sample and will be composited with the parent sample. Duplicate samples will be assigned a different number but is labeled in a manner such that it is not apparent to the laboratory. Duplicate samples will be preserved, packaged, and sealed in the same manner as other samples of the same matrix. The field duplicates will be sent blind to the laboratory. A minimum of 10% of normal samples will be field duplicates.

Field duplicates will be collected and analyzed for the same parameters listed in Table 4. Results for field duplicates will be used to verify the precision of the laboratory and/or sampling method, and serve as an indicator of potential cross-contamination.

### 3.4.2 Laboratory Quality Assurance/Quality Control

Laboratory QC samples are analyzed as part of standard laboratory practice to ensure that laboratory equipment is functioning properly and adequately decontaminated.

#### *3.4.2.1 Container Certificate of Analysis*

Bottles used for preservation and shipping are provided by the laboratory and are certified according to the container manufacturer's Certificate of Analysis.

#### *3.4.2.2 Laboratory Quality Control Samples*

Laboratory QC samples are analyzed as part of standard laboratory practice. The laboratory monitors the precision and accuracy of the results of analytical procedures through the analysis of QC samples, including Laboratory Control Samples (LCS)/LCS Duplicate (LCSD) samples, method blanks, laboratory replicates, and Matrix Spikes (MS)/MS Duplicates (MSD) samples, one per batch per analysis. A routinely collected water sample contains sufficient mass for both routine sample analysis and additional laboratory QC analyses, with the exception of MS/MSD samples. These will be analyzed at a frequency of one per sampling event.

Precision, accuracy/bias, representativeness, completeness, and comparability are the data quality indicators used to assess the sampling results for usability. Each data quality indicator is described as follows, including a definition of the terminology and the process for calculating the indicator.

### 3.4.3 Precision

Precision criteria monitor analytical reproducibility, and is the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. The QC measures for precision include field duplicates, laboratory duplicates, LCS and LCSD samples, and MS and MSD samples. Precision is expressed as relative percent difference (RPD), which is calculated by dividing the absolute difference of two samples by their mean, as shown in the equation below.

The method performance criteria for precision is RPD ≤ 30%.

$$\textit{Relative Percent Difference} = \frac{(Result_{\text{Parent Sample}} - Result_{\text{Duplicate Sample}})}{\frac{(Result_{\text{Parent Sample}} + Result_{\text{Duplicate Sample}})}{2}}$$

Precision variability may be the result of one or more of the following: field instrument variation, analytical measurement variation, poor sampling technique, sample transport problems, or spatial variation (heterogeneous sample matrices). To identify the cause of imprecision, the field sampling design rationale and sampling techniques will be evaluated, and both field and analytical duplicate sample results will be reviewed. If poor precision is indicated in both the field and analytical duplicates, then the laboratory may be the source of error. If poor precision is limited to the field duplicate results, then the sampling technique, field instrument variation, sample transport, and/or spatial variability may be the source of error.

### 3.4.4 Accuracy/Bias

Accuracy is the degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) that are due to sampling and analytical operations. Examples of QC measures for accuracy include MS, LCS, and equipment rinsates (if non-dedicated sampling equipment is used). Accuracy is measured by the percent recovery for spiked samples (LCS/LSCD, and MS/MSD). The method performance criteria for accuracy/bias will be established based upon the specific laboratory's statistically determined internal performance QC limits.

### 3.4.5 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under correct, normal circumstances. Completeness is calculated and reported for each method, matrix, and analyte combination. The number of valid results divided by the number of possible individual analyte results, expressed as a percentage, determines the completeness of the data set. The method performance criteria for completeness is 90%. Completeness measures the effectiveness in sample collection, analysis, and result reporting of the entire Monitoring Program, and is calculated on a per-analyte basis by the percentage of usable data (usable data divided by the total possible data), as follows.

$$\% \ Completeness = \frac{Number \ of \ Valid \ Results}{Number \ of \ Possible \ Results} \ x \ 100$$

'Number of Valid Results' is the number of possible results minus the number of possible results not reported. Results may not be reported in instances which the of sample(s) are not analyzed for any reason (holding time violations in which resampling and analysis were not possible, samples spilled or broken, etc.).

### 3.4.6 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. In order to meet the needs of the data users, the samples will be collected using the Monitoring Plan guidelines, applicable field sampling techniques, and specific analytical methodology. If field QC issues affecting comparability are identified, data will be qualified as estimated.

### 3.4.7 Equipment Calibration

Field equipment will be calibrated according to manufacturer's instructions.

## 3.5 Fiscal Analysis

This section addresses MS4 Permit Part F.1.b.(7) of the 2020 – 2021 Monitoring Program. Elements that will require funding include the following:

- Sampling site setup and maintenance
- Storm water sampling and analysis
- Data analysis and reporting
- Administration and recordkeeping

Table 5 shows the estimated costs associated with water quality monitoring as detailed in Appendix A: PBMP Performance Monitoring Site Locations. These estimated costs do not cover water quality monitoring described in Chapter 4 Storm Water Monitoring Associated with Industrial Activities.

**Table 5. Estimated Costs Associated with the 2020 – 2021 Monitoring Program.**

| PROGRAM ELEMENT | ESTIMATED ANNUAL COST |
|---|---|
| Labor | $65,000 |
| Materials | $15,000 |
| Lab Analyses | $38,000 |
| Modem Accounts | $1,700 |
| **ESTIMATED TOTAL** | $119,700 |

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# CHAPTER 4

# STORM WATER MONITORING ASSOCIATED WITH INDUSTRIAL ACTIVITIES

As required by the MS4 Permit Part F.2 Storm Water Associated with Industrial Activities, DOT-HWYS will continue annual monitoring of storm water runoff at each industrial facility. DOT-HWYS has five baseyards that are monitored under the Municipal Industrial Facilities Program: Keehi, Kakoi, Pearl City, Waianae, and Windward Baseyards.

Complete details of the MS4 Permit requirements for storm water monitoring and reporting associated with the five baseyards sampling procedures, and QA/QC protocols are included in each baseyard SWPCP. The SWPCPs for the five industrial baseyards became effective January 27, 2014, and are updated annually as needed. The monitoring plans within each SWPCP were last revised in October 2019.

Table 6 shows the specific monitoring parameters for storm water associated with the five baseyards. However, additional parameters may be added if other storm water pollutants are suspected due to specific site conditions. Complete details of the sampling procedures and QA/QC are included in the most current revisions of the SWPCP, which are located at the respective baseyard and at https://www.stormwaterhawaii.com/.

**Table 6. Monitoring Parameters for Industrial Activities.**

| EFFLUENT PARAMETER (UNITS) | EFFLUENT LIMITATION {1} | TYPE OF SAMPLE {2} |
|---|---|---|
| Flow (gallons) | {4} | Calculated or Estimated |
| Biochemical Oxygen Demand (5-Day) (mg/l) | {4} | Composite {3} |
| Chemical Oxygen Demand (mg/l) | {4} | Composite {3} |
| Total Suspended Solids (mg/l) | {4} | Composite {3} |
| Total Phosphorus (mg/l) | {4} | Composite {3} |
| Total Nitrogen (mg/l) {5} | {4} | Composite {3} |
| Nitrate + Nitrite Nitrogen (mg/l) | {4} | Composite {3} |
| Oil and Grease (mg/l) | 15 | Grab {6} |

| EFFLUENT PARAMETER (UNITS) | EFFLUENT LIMITATION {1} | TYPE OF SAMPLE {2} |
|---|---|---|
| pH Range (Standard Units) | 5.5 - 8.0 {7}<br>7.6 - 8.6 {8} | Grab {9} |
| Ammonia Nitrogen (mg/l) | {4} | Composite |
| Turbidity (0.1 NTU) | {4} | Grab |
| Dissolved Oxygen (0.1 mg/l) | {4} | Grab |
| Oxygen Saturation (1%) | {4} | Grab |
| Temperature (0.1 ºC) | {4} | Grab |
| Salinity (0.1 ppt) | {4} | Grab |

Table 7 shows the additional monitoring requirements for DOT-HWYS baseyards.

**Table 7. Additional Monitoring Parameters for Baseyards.**

| EFFLUENT PARAMETER (UNITS) | EFFLUENT LIMITATION {1} | TYPE OF SAMPLE {2} |
|---|---|---|
| Benzene (µg/l) | 1,800 {10}<br>1,700 {11} | Grab |
| Toluene (µg/l) | 5,800 {10}<br>2,100 {11} | Grab |
| Ethylbenzene (µg/l) | 11,000 {10}<br>140 {11} | Grab |
| Cadmium (µg/l) {12} | 3+ {10}<br>43 {11} | Composite {3} |
| Chromium (VI) (µg/l) {12} | 16 {10}<br>1,100 {11} | Composite {3} |
| Lead (µg/l) {12} | 29+ {10}<br>140 {11} | Composite {3} |

mg/l = milligrams per liter = 1000 micrograms per liter (µg/l)

+ = The value listed is the minimum standard. Depending upon the receiving water CaCO3 hardness, higher standards may be calculated using the respective formula in the U.S. Environmental Protection Agency publication Quality Criteria for Water (EPA 440/5-86-001, Revised May 1, 1987).

NOTES:
{1} Pollutant concentration levels shall not exceed the storm water discharge limits or be outside the ranges indicated in the table. Actual or measured levels which exceed those storm water discharge limits or are

outside those ranges shall be reported to the CWB required in HAR, Chapter 11-55, Appendix B, Section 10(c).

{2} The Permittee shall collect samples for analysis from a discharge resulting from a representative storm. A representative storm means a rainfall that accumulates more than 0.1 inch of rain and occurs at least 72 hours after the previous measurable (greater than 0.1 inch) rainfall event. "Grab sample" means a sample collected during the first 15 minutes of the discharge. "Composite sample" means a combination of at least two (2) sample aliquots, collected at periodic intervals. The composite shall be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to the total flow of storm water discharge flow since the collection of the previous aliquot. The Permittee may collect aliquots manually or automatically. Samples for analysis shall be collected during the first 15 minutes of the discharge and at 15-minute intervals thereafter for the duration of the discharge, as applicable. If the discharge lasts for over an hour, sample collection may cease.

{3} If the duration of the discharge event is less than 30 minutes, the sample collected during the first 15 minutes of the discharge shall be analyzed as a grab sample and reported toward the fulfillment of this composite sample specification. If the duration of the discharge event is greater than 30 minutes, the Permittee shall analyze two (2) or more sample aliquots as a composite sample.

{4} Monitor and Report. The value shall not exceed the applicable limit as specified in Chapter 11-54 for the applicable classification of the receiving state waters. If no limitation is specified in Chapter 11-54, then the Permittee shall monitor and report the analytical result. The Department may include discharge limitations specified in Section 11-55-19 and discharge limitations based on Federal Register, Vol. 73, No. 189, Pages 56572–56578, dated September 29, 2008.

{5} The Total Nitrogen parameter is a measure of all nitrogen compounds in the sample (nitrate, nitrite, ammonia, dissolved organic nitrogen, and organic matter present as particulates).

{6} The Permittee shall measure Oil and Grease using EPA Method 1664, Revision A.

{7} This limitation applies to discharge into state waters classified as inland streams.

{8} This limitation applies to discharge into state waters classified as marine open coastal waters.

{9} The Permittee shall measure pH within 15 minutes of obtaining the grab sample.

{10} This limitation applies to discharge into freshwater.

{11} This limitation applies to discharge into saltwater.

{12} The Permittee shall test for the total recoverable portion of all metals.

DOT-HWYS implements various pollution control strategies to adaptively manage storm water runoff at each DOT-HWYS industrial facilities. In 2019, DOT-HWYS completed construction of storm water improvement projects for industrial facilities, which included the installation of various PBMPs at the Waianae and Windward Baseyards. At the Waianae Baseyard, storm water improvements and treatment included the construction of a Water Polisher PLUS, a new water quality sampling station, a new trench drain, and pavement rehabilitation of the parking area. At the Windward Baseyard, storm water improvements included construction of a grassed swale, two catch basin filter baskets, two new water quality sampling stations, and pavement rehabilitation of the parking area.

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# **Appendix A:**
# Permanent BMP Performance Monitoring Site Locations

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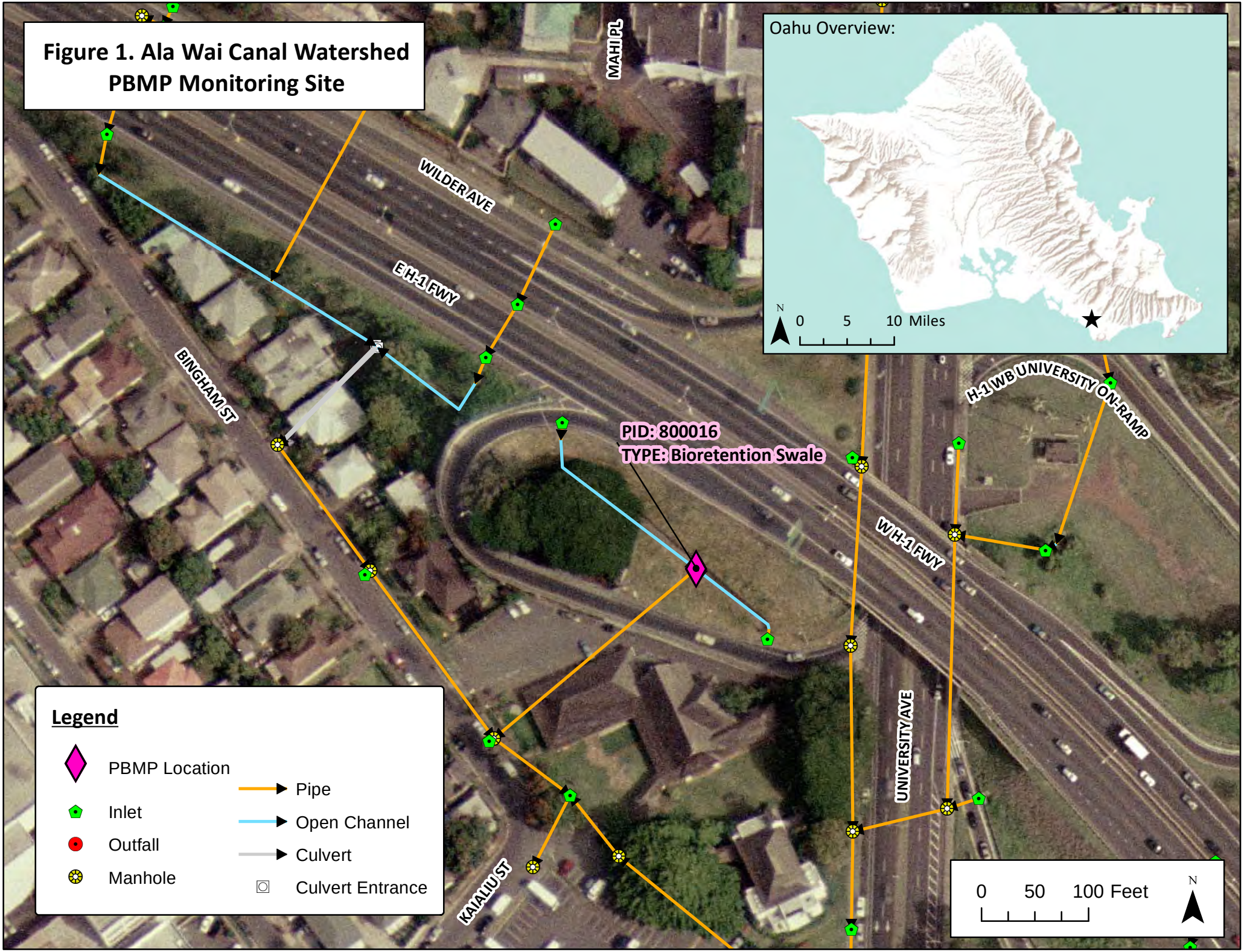
Figure 1. Ala Wai Canal Watershed
PBMP Monitoring Site
Oahu Overview:
N
0 5 10 Miles
MAHI PL
WILDER AVE
E H-1 FWY
BINGHAM ST
PID: 800016
TYPE: Bioretention Swale
H-1 WB UNIVERSITY ON-RAMP
W H-1 FWY
UNIVERSITY AVE
KAIALIU ST
Legend
PBMP Location
Inlet
Outfall
Manhole
Pipe
Open Channel
Culvert
Culvert Entrance
0 50 100 Feet
N

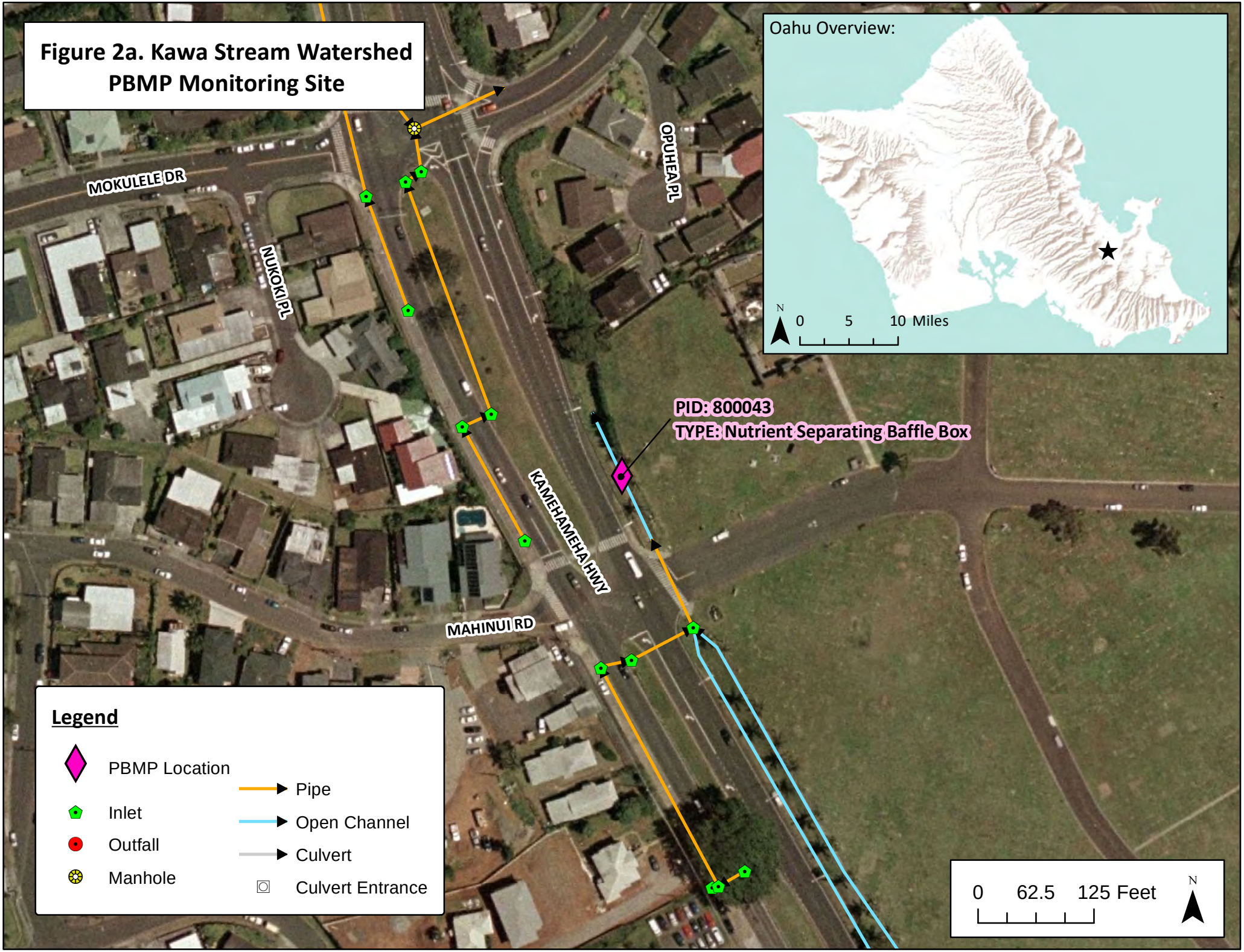
Figure 2a. Kawa Stream Watershed
PBMP Monitoring Site
Oahu Overview:
N
0 5 10 Miles
MOKULELE DR
NUKOKI PL
OPUHEA PL
KAMEHAMEHA HWY
MAHINUI RD
PID: 800043
TYPE: Nutrient Separating Baffle Box
Legend
PBMP Location
Inlet
Outfall
Manhole
Pipe
Open Channel
Culvert
Culvert Entrance
0 62.5 125 Feet
N

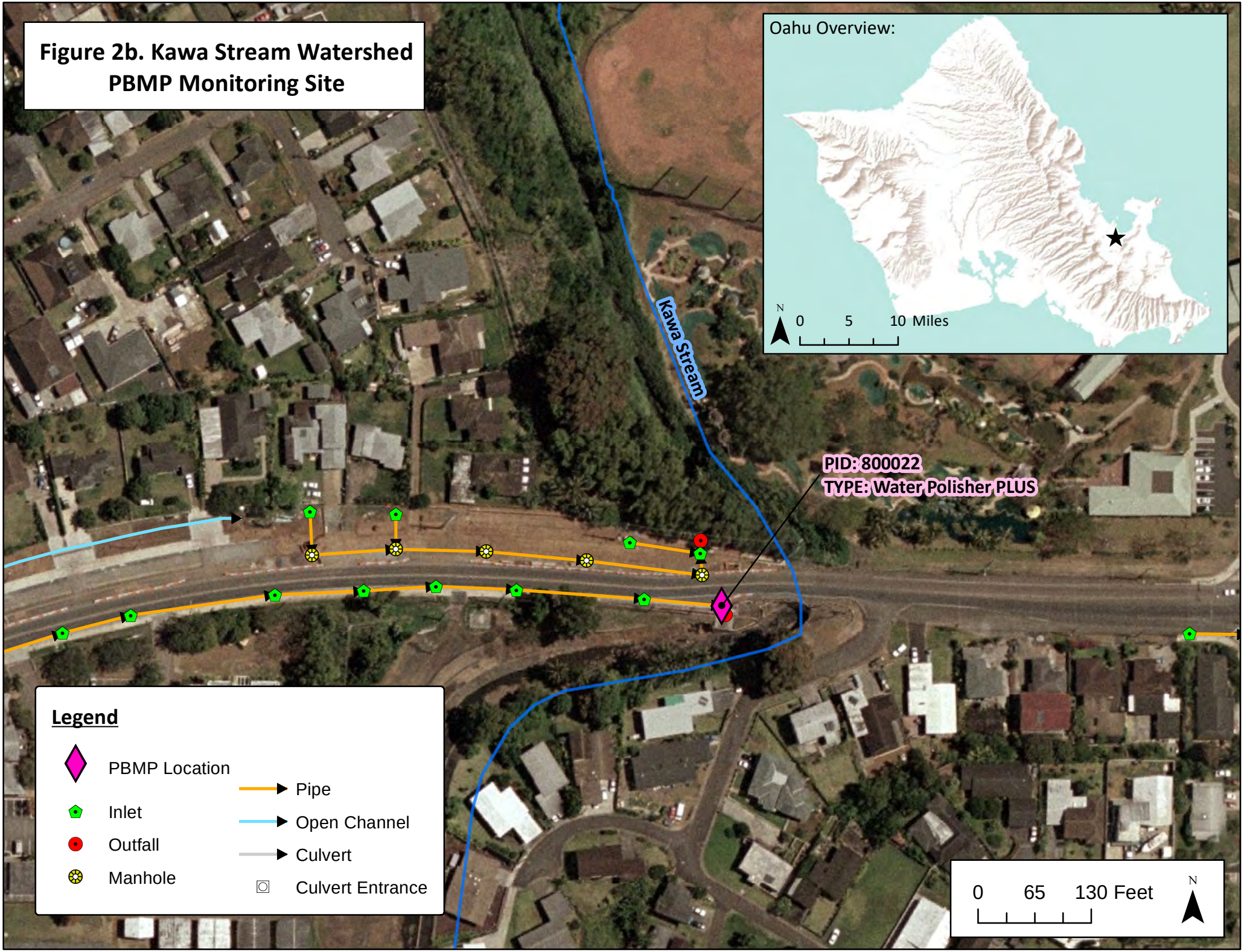
Figure 2b. Kawa Stream Watershed
PBMP Monitoring Site
Oahu Overview:
N
0 5 10 Miles
Kawa Stream
PID: 800022
TYPE: Water Polisher PLUS
Legend
PBMP Location
Inlet
Outfall
Manhole
Pipe
Open Channel
Culvert
Culvert Entrance
0 65 130 Feet
N

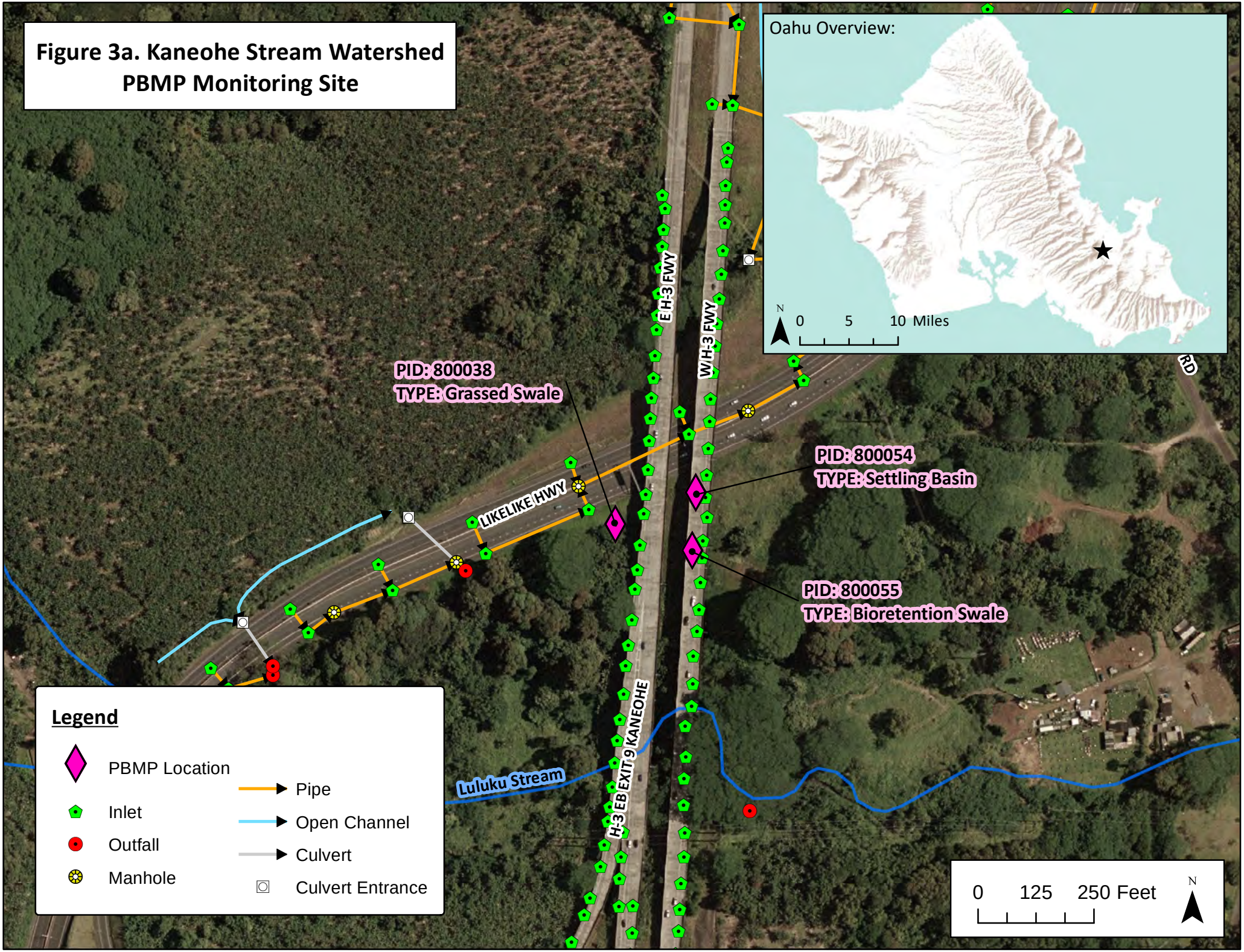
Figure 3a. Kaneohe Stream Watershed
PBMP Monitoring Site
Oahu Overview:
N
0 5 10 Miles
PID: 800038
TYPE: Grassed Swale
PID: 800054
TYPE: Settling Basin
PID: 800055
TYPE: Bioretention Swale
E H-3 FWY
W H-3 FWY
LIKELIKE HWY
H-3 EB EXIT 9 KANEOHE
Luluku Stream
Legend
PBMP Location
Inlet
Outfall
Manhole
Pipe
Open Channel
Culvert
Culvert Entrance
0 125 250 Feet
N

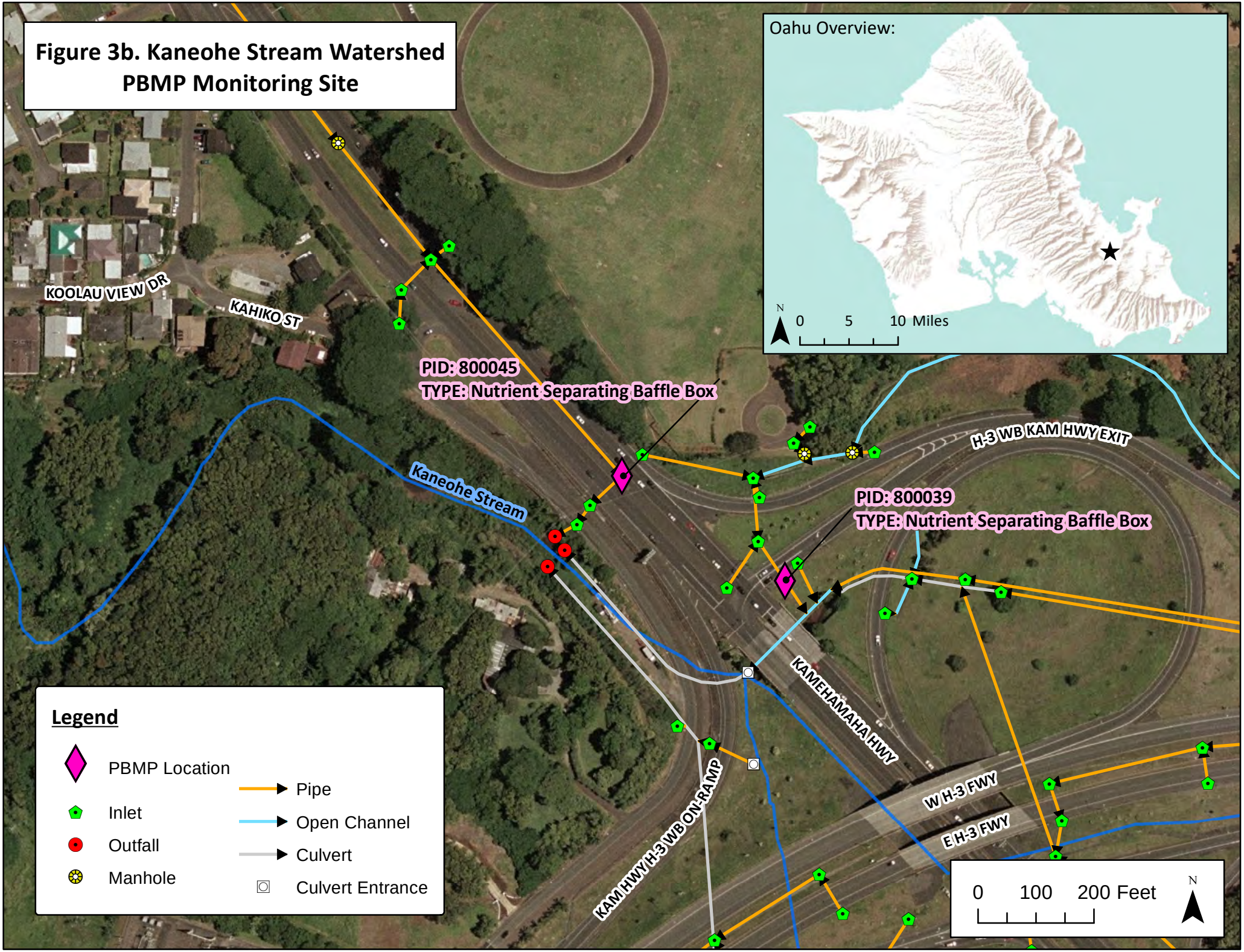
Figure 3b. Kaneohe Stream Watershed
PBMP Monitoring Site
Oahu Overview:
N
0 5 10 Miles
KOOLAU VIEW DR
KAHIKO ST
PID: 800045
TYPE: Nutrient Separating Baffle Box
Kaneohe Stream
H-3 WB KAM HWY EXIT
PID: 800039
TYPE: Nutrient Separating Baffle Box
KAMEHAMAHA HWY
KAM HWY H-3 WB ON-RAMP
W H-3 FWY
E H-3 FWY
Legend
PBMP Location
Inlet
Outfall
Manhole
Pipe
Open Channel
Culvert
Culvert Entrance
0 100 200 Feet
N

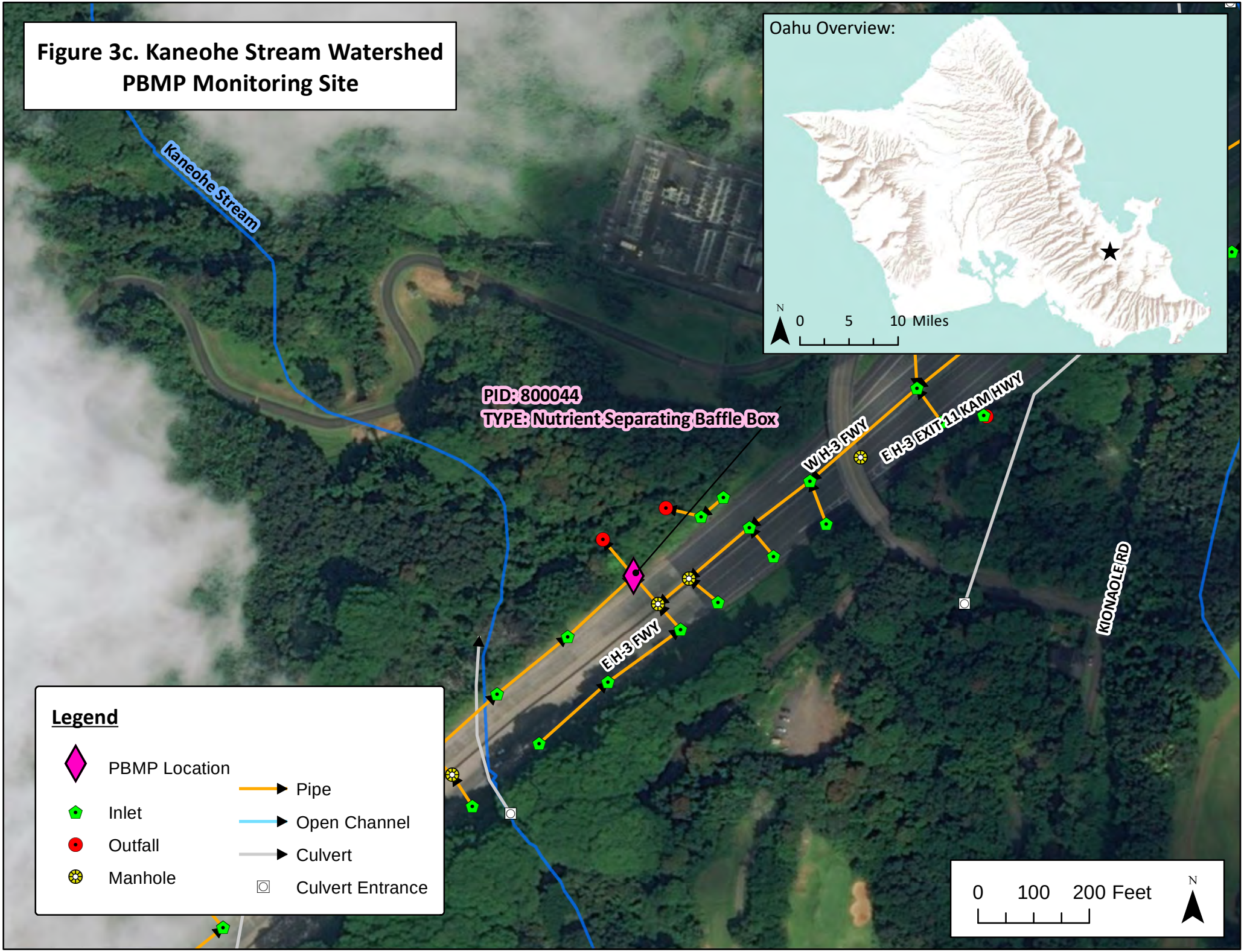
Figure 3c. Kaneohe Stream Watershed
PBMP Monitoring Site
Oahu Overview:
N
0 5 10 Miles
Kaneohe Stream
PID: 800044
TYPE: Nutrient Separating Baffle Box
W H-3 FWY
E H-3 EXIT 11 KAM HWY
E H-3 FWY
KIONAOLE RD
Legend
PBMP Location
Inlet
Outfall
Manhole
Pipe
Open Channel
Culvert
Culvert Entrance
0 100 200 Feet
N