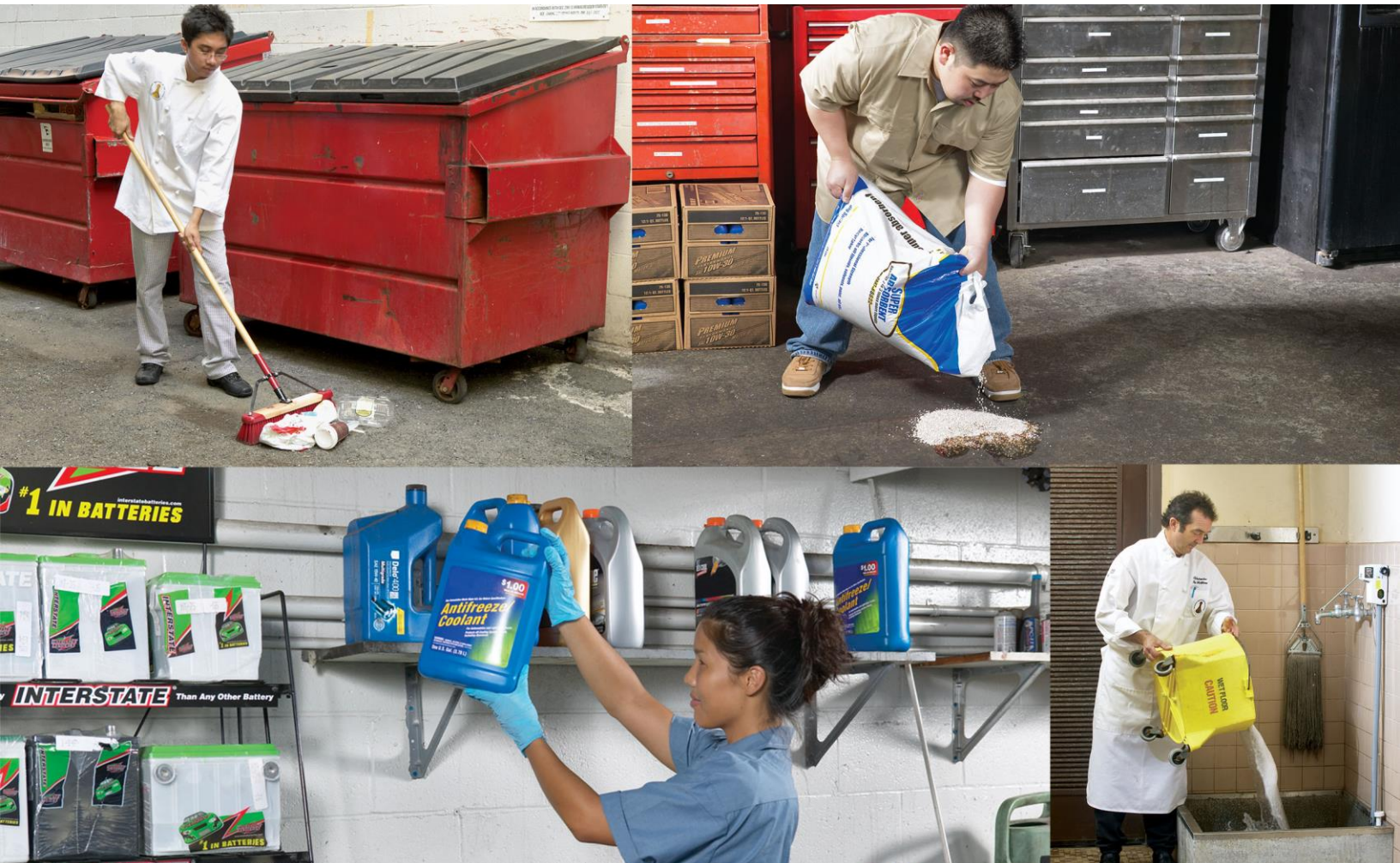
CITY AND COUNTY OF HONOLULU
STORM WATER BEST MANAGEMENT PRACTICE MANUAL

INDUSTRIAL & COMMERCIAL FACILITIES

December 2022

City and County of Honolulu,
Department of Facilities Maintenance



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CITY AND COUNTY OF HONOLULU
STATE OF HAWAII

Table of Contents

List of Appendices

B. Business Category BMP Guide Sheets

C. BMP Plan Forms

List of Abbreviations

BMP Best Management Practice
CASQA California Stormwater Quality Association
CCH or City City and County of Honolulu
CFR Code of Federal Register
CNEE Conditional "No Exposure" Exclusion
CWA Clean Water Act (Federal Water Pollution Control Act of 1972, amended 1987)
CWB Clean Water Branch, Department of Health, State of Hawai'i
DOH Department of Health, State of Hawai'i
ENV Department of Environmental Services, City and County of Honolulu
EPA United States Environmental Protection Agency
GSI Green Storm Water Infrastructure
HAR State of Hawai'i Administrative Rules
HRS State of Hawai'i Revised Statutes
IPM Integrated Pest Management
IWDP Industrial Wastewater Discharge Permit
MS4 Municipal Separate Storm Sewer Systems
NPDES National Pollutant Discharge Elimination System
O&M Operations and Maintenance
RC Regulatory Control, Branch of the City's Department of Environmental Services
ROH Revised Ordinances of Honolulu
SDS Safety Data Sheets
SIC Standard Industrial Classification
SPCC Spill Prevention Control and Cleanup
State State of Hawai'i
SWPCP Storm Water Pollution Control Plan
SWQ Storm Water Quality Division, Department of Facility Maintenance, City and County of Honolulu

Glossary

Best Management Practices (BMPs): Pollution control measures, applied to nonpoint sources, onsite or offsite, to control erosion and the transport of sediments and other pollutants which have an adverse impact on water quality. BMPs may include a schedule of activities, the prohibition of practices, maintenance procedures, treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, or drainage from raw material storage.

Catch Basin: Box-like underground concrete structure with openings in curbs and gutters designed to collect runoff from streets and pavement.

Chemicals: A compound or substance that has been purified or prepared, especially artificially. Storm water runoff pollutants may include the following types of chemicals: oils and grease, heavy metals (lead, copper, zinc and cadmium), sediments, oxygen-demanding substances (plant debris, food waste and chemical waste), nutrients (phosphorus and nitrogen from fertilizers, animal wastes, septic systems, detergents, and lawn clippings), toxic organic compounds (pesticides, herbicides, fungicides, rodenticides and PCBs including wood preservatives, antifreeze, dry cleaning chemicals, cleansers and a variety of other chemical products), and industrial processes that discharge acidic wastewater, solutions used in metal plating operations, acidic chemicals used in printing and graphic art businesses, cement used in concrete products and concrete pavement, and chemical cleaners used in homes and businesses.

City: City and County of Honolulu.

Clean Water Act (CWA): The law that established the basic structure for regulating pollutant discharges into the waters of the United States. Gives EPA the authority to implement pollution control programs. Requirements of the NPDES program are defined under Sections 307, 402, 318 and 405 of the CWA.

Commercial Facilities: These facilities are based on the Standard Industrial Classification (SIC) Codes and if a facility does not fall into the SIC code then they are defined as commercial.

Conditional No Exposure Exclusion (CNEE): Facilities that have no exposure of industrial materials or activities may qualify for a Conditional No Exposure Exclusion. See definition of No Exposure.

Construction Activity: Includes clearing, grading, excavation, and contractor activities that result in soil disturbance. Construction activities are regulated by the NPDES General Permit Coverage, HAR Chapter 11-55 Water Pollution Control, Appendix C - Storm Water Associated with Construction Activities.

Discharge: The deposit, disposal, injection, dumping, spilling, leaking, or placing of any substance into a drainage facility or natural watercourse (ROH Chapter 14-12.2).

Drainage Facility: Any City drainage structure or separate storm sewer system, including stream structures, constructed principally for the conveyance of storm and surface waters, street wash, or drainage (ROH Chapter 14-12.2).

Effluent: Any substance other than storm water runoff that is discharged onto a public right-of-way and/or into a drainage facility including non-storm water discharges which are not sources of pollutants, and any NPDES-permitted discharges (ROH Chapter 14-12.2).

Effluent Limits: Limitations on amounts of pollutants that may be contained in a discharge. Can be expressed in a number of ways including as a concentration, as a concentration over a time period (e.g., 30-day average must be less than 20 mg/l), or as a total mass per time unit, or as a narrative limit.

Erosion: The wearing away of the ground surface as a result of action by wind or water (ROH Chapter 14-13.3).

Excavation: Or "cut" means any act by which earth material is cut into, dug, or moved, and shall include the conditions resulting therefrom (ROH Chapter 14-13.3).

Fill: Any act by which earth materials are placed or deposited by artificial means and shall include the resulting deposit of earth material (ROH Chapter 14-13.3).

Grading: Any excavation or fill or any combination thereof (ROH Chapter 14-13.3).

Green Storm Water Infrastructure (GSI): systems and practices that use or mimic natural processes such as infiltration and evapotranspiration or use storm water to protect water quality and the aquatic habitat. At both site and regional scales, GSI aims to preserve, restore, and create green space using soils, vegetation, and rain harvest techniques.

General Permit: A general permit covers a group of dischargers with similar qualities within a given geographical location.

Hazardous Waste: A waste or combination of wastes that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either cause or significantly contribute to an increase in mortality or an increase in serious irreversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appears on special EPA or state lists. Regulated under the Federal Resource Conservation and Recovery Act. Defined in HRS Section 342D-38.

Illicit Discharges: Any discharge to a Municipal Separate Storm Sewer System (MS4) or receiving water that is not in compliance with applicable laws and regulations, e.g., is not discharge pursuant to an NPDES permit or applicable exemption or waiver.

Individual Permit: A permit specifically tailored to an individual facility.

Industrial Facilities: These facilities are based on the Standard Industrial Classification (SIC) Codes, and if a facility can be classified under a specific SIC code, then they are considered industrial.

Inlet: An entrance into a ditch, storm drain, or other waterway.

Integrated Pest Management (IPM): An ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism.

Municipal Separate Storm Sewer System (MS4): A municipal separate storm sewer system (MS4) is a publicly owned conveyance or system of conveyances (including but not limited to streets, ditches, catch basins, curbs, gutters, and storm drains) that is designed or used for collecting or conveying storm water and that discharges to surface waters of the State.

National Pollutant Discharge Elimination System (NPDES) Permit: NPDES is the national program for administering and regulating Sections 307, 318, 402, and 405 of the Clean Water Act (CWA).

- **Construction General Permit**: A NPDES Notice of General Permit Coverage (NGPC) permit is issued by the State of Hawai'i Department of Health Clean Water Branch for the discharge of storm water associated with construction activity from soil disturbance of one acre or more. Reference HAR Chapter 11-55, Water Pollution Control Appendix A, Standard General Permit Conditions, Appendix C, Discharges of Storm Water Associated with Construction Activities.

- **Industrial General Permit**: A NPDES Permit issued by the State of Hawai'i Department of Health Clean Water Branch Board for discharge of storm water associated with industrial activity.

- **City and County of Honolulu MS4 Permit**: A NPDES Permit issued by the State of Hawai'i DOH to the City and County of Honolulu to discharge storm water runoff from the City and County of Honolulu's Municipal Separate Storm Sewer System (MS4) into State waters in and around the Island of O'ahu.

No Exposure: No exposure means all industrial materials and activities are protected by a storm-resistant shelter to prevent exposure to rain and/or runoff. Industrial materials or activities include, but are not limited to, material handling equipment or activities, industrial machinery, raw materials, intermediate products, byproducts, final products, or waste products *(40 Code of Federal Register [CFR] 122.26(g))*.

Nonpoint Source Pollution: Pollution that does not come from a point source (a single identifiable sourced pollutant). Nonpoint source pollution is caused by storm water or irrigation water moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, such as sediment, nutrients (from fertilizers), bacteria (from animal waste), toxic chemicals, oil, and trash, and finally depositing them into streams, rivers, and coastal waters.

Nutrient Pollution: A form of water pollution, refers to contamination by excessive inputs of nutrients. It is a primary cause of eutrophication of surface waters, in which excess nutrients, usually nitrogen or phosphorus, cause excessive growth of algae. Sources of nutrient pollution include surface runoff from agricultural lands and urban areas where fertilizers are used, discharges from septic tanks and feedlots, emissions from combustion, and wastewater discharges from various industries. Pet wastes are also sources of nutrients.

Pollutant: Any substance introduced into the environment that adversely affects the usefulness of a resource, including but not limited to any waste, cooking or fuel oil, pesticide, paint, solvent, radioactive waste, hazardous substance, sewage, dredged spoils, chemical waste, rock, sand, biocide, toxic substance, fertilizers, or nutrients such as nitrogen and phosphorous, construction waste and material, and soil sediment. The term also includes commercial fats, oils, and grease waste as defined under Section 14-5A.1.

Point Source: Any single identifiable source of pollution from which pollutants are discharged, such as a pipe, ditch, ship, or factory smokestack.

Pollution Prevention: Practices and actions that reduce or eliminate the generation of pollutants.

Pollution Problem: The discharge of any pollutant into State waters directly or by conveyance through a drainage facility which creates a nuisance or adversely affects the public health, safety, or welfare, or causes a drainage facility to violate any provisions of the City's National Pollutant Discharge Elimination System permit or violates any water quality standards of the State of Hawai'i.

Precipitation: Any form of rain or snow.

Pretreatment: Treatment of waste stream before it is discharged to a collection system.

Private Storm Drain Connection: Any conveyance of storm water, including but not limited to any drainage pipe, ditch, or swale connected to any drainage facility or separate storm sewer system, including any curb or gutter.

Property Owner: The fee simple owner of record, lessee of record, administrator, executor, personal representative, receiver, trustee, property management agent, or any other individual, corporation, or unincorporated association who has the use, control, or occupation of land with claim of ownership, whether the owner's interest be in absolute fee or a lesser estate.

Receiving Waters: Water bodies, such as a river, lake, ocean, stream, or other watercourse that receive treated or untreated waste waters.

Retention: The storage of storm water to prevent it from leaving the development site.

Runoff: Water originating from rainfall and other sources (e.g., sprinkler irrigation) that flows over the land surface to drainage facilities, streams, springs, seeps, reservoirs, lakes, wetlands, and the ocean.

Run-on: Offsite storm water surface flow or other surface flow which enters a site.

Sediment: Soil, sand, and minerals washed from land into water, usually after rain, that collect in reservoirs, rivers, and harbors, destroying fish nesting areas and clouding the water, thus preventing sunlight from reaching aquatic plants. Farming, mining, and building activities without proper implementation of BMPs will expose sediment materials, allowing them to be washed off the land after rainfalls.

Sediment Control: Sediment controls are treatment control practices that trap soil particles after they have been detached and moved by rain, flowing water, or wind. Sediment control measures are usually passive systems that rely on filtering or settling the particles out of the water or wind that is transporting them.

Sheet Flow: Flow of water that occurs overland in areas where there are no defined channels and where the water spreads out over a large area at a uniform depth.

Source Control BMPs: Operational practices that reduce potential pollutants at the source.

Source Reduction (also source control): The technique of stopping and/or reducing pollutants at their point of generation so that they do not come into contact with storm water.

Standard Industrial Classification (SIC): A system for classifying industries by four-digit codes. It is a descriptor of the kind of work being done at a facility.

Stockpiling: Temporary open storage of earth materials in excess of 100 cubic yards upon any premises except the premises upon which a grading permit has been issued for the purpose of using the material as fill material at some other premises at a future time (ROH Chapter 14-13.3).

Storm Drains: Above- and below-ground structures for transporting storm water to streams or outfalls for flood control purposes.

Storm Water: Defined as urban runoff consisting only of those discharges which originate from precipitation events. Storm water is that portion of precipitation that flows across a surface to the storm drain system or receiving waters.

Storm Water Discharge Associated with Industrial Activity: Discharge from any conveyance which is used for collecting and conveying storm water from an area that is directly associated with industrial activity.

Storm Water Pollution Control Plan (SWPCP): A written plan that documents the facility activities, characterizes a site, and prompts for selection and implementation of actions which prevent the pollution of storm water discharges. The State of Hawai‘i Industrial NPDES permits can require a SWPCP.

Treatment Control BMPs: Treatment methods to remove pollutants from storm water.

Toxicity: Degree to which a chemical substance or a particular mixture of substances can damage an organism, including the effect on a whole organism, such as an animal, bacterium, or plant, as well as the effect on a substructure of the organism, such as a cell or an organ. The word is synonymous with poisoning.

Turbidity: Describes the ability of light to pass through water. The cloudy appearance of water caused by large number of particles, some which are invisible to the eye.

Urban Runoff: Storm water from city streets and adjacent domestic or commercial properties that carries pollutants (e.g., sediment, nutrients, bacteria, toxic chemicals, oil, and trash) into the sewer systems and receiving waters.

Vector: Organism that spreads disease (e.g., mosquitos and rodents).

Water Quality Standards: Defined as the water quality standards adopted by the State of Hawai‘i pursuant to HAR, Chapters 11-54 (Water Quality Standards).

Significant Additions and Revisions Made to the Industrial and Commercial Facilities Storm Water Best Management Practice Manual

This *City & County of Honolulu Industrial and Commercial Facilities Storm Water Best Management Practice (BMP) Manual* reflects the current industrial and commercial storm water quality best management practices and regulatory requirements for the State of Hawai'i. The manual's organization is based on the California Stormwater Quality Association (CASQA) Industrial & Commercial Stormwater Best Management Practice (BMP) Handbook published in 1993 and updated in 2003 and 2014 and includes content as well. Some sections have been renamed and appendix resources updated to reflect O'ahu businesses and storm water issues.

This manual is primarily for businesses that are not required to have a National Pollution and Discharge Elimination System (NPDES) permit and associated Storm Water Pollution Control Plans (SWPCP). This differs from the CASQA Stormwater BMP Handbook that is focused on SWPCP for NPDES Permit holders.

The following references and resources are referenced and/or cited in *Industrial and Commercial Facilities Storm Water BMP Manual* and provided guidance.

- California Stormwater Quality Association (CASQA) Industrial & Commercial Stormwater Best Management Practice (BMP) Handbook, 1993.
- City and County of Honolulu, Storm Water BMP Guide for New and Redevelopment, 2017.
- City and County of Honolulu, Storm Water Management Program Plan, Permit No. HI S000002, 2016.
- City and County of Honolulu, Storm Water BMP Manual for Construction, 2011.
- King County (Washington State), Stormwater Management Program Plan, 2017.
- King County (Washington State), Spill Response and Cleanup Plan Information Sheet, 2017.
- Minnesota Pollution Control Agency (Saint Paul, Minnesota), Industrial Stormwater Best Management Practices Guidebook Version 1.1, 2015.
- NPDES Compliance Inspection Manual (305-K-17-001), 2017.
- Sacramento Stormwater Management Program, Best Management Practices for Industrial Storm Water Pollution Control, 2003.

1. Introduction

Storm water occurs when rainwater hits the ground, picking up everything in its path; soil, oil and trash which is carried to the streams/ocean. Storm water does not enter the sanitary sewer, it is discharged directly to Oahu's streams and surrounding ocean. Common storm water pollutants from industrial and commercial activities include sediment, fertilizers, or nutrients such as nitrogen or phosphorous, bacteria, heavy metals, toxic chemicals, oil and grease, and trash which can destroy aquatic habitats and marine life, pose public health risks, and negatively impact Hawai'i's economy and way of life, which rely heavily on water quality.

As part of the Clean Water Act, the Environmental Protection Agency (EPA) established the National Pollutant Discharge Elimination System (NPDES) program. The NPDES program requires that anyone discharging pollutants from a point source to a body of water obtain an NPDES permit. Since the City and County of Honolulu's (City's) storm drain system discharges directly to streams and the ocean, the City is required to obtain an NPDES permit. This permit requires the City to reduce the amount of pollutants discharged from the City's storm drain system to meet the water quality standards of the State of Hawai'i to the maximum extent practicable.

MANUAL PURPOSE AND SCOPE

Industrial and commercial facilities have the potential for discharge into the City's storm water system and should implement storm water best management practices (BMPs). BMPs are water quality protective actions that prevent or control storm water pollutants from entering the storm drain system. BMPs can also be physical structures or technologies that protect storm water quality.

This manual provides industrial and commercial businesses with guidance for developing an Industrial/Commercial BMP Plan to reduce the discharge of pollutants. An Industrial/Commercial BMP Plan is a tool to communicate BMPs that a business will use to prevent or minimize pollutant discharges. It begins with identifying activities that could cause pollutants and determining the appropriate best management practices to prevent the pollutants from impacting water quality. Instructions and forms are provided to assist businesses in creating their own individual BMP Plan.

An Industrial/Commercial BMP Plan is recommended for industrial and commercial businesses on O'ahu. An Industrial/Commercial BMP Plan may be required for facilities that have had storm water quality violations to prevent future illicit discharges. Facilities that have the more stringent Storm Water Pollution Control Plan (SWPCP) required under their State Department of Health issued NPDES permit, do not need a City Industrial/Commercial BMP Plan. However, an Industrial/Commercial BMP Plan is recommended for businesses that have a Conditional No Exposure Exclusion (CNEE) Certificate.

The property owner is responsible for any pollution from the property and can be held responsible for water quality problems caused by tenants. Owners should make sure tenants are informed of their responsibilities described in this manual. The consequences of violations as described in the Revised Ordinances of Honolulu (ROH) are in the box on the next page.

REVISED ORDINANCES OF HONOLULU
Section 14-12.28 Violation provisions

(a) Administrative and Civil Penalties. Any person violating any provisions of Article 12 of this chapter, any order, permit or license issued hereunder, or any other standard or requirement shall be liable for an administrative or civil penalty of not less than $1,000.00 nor more than $25,000.00 per violation per day, except that in cases where such offense shall continue after due notice, each day's continuance of the same shall constitute a separate offense. In determining the amount of the fine, the chief engineer shall consider the seriousness of the violation or violations, any history of such violations, any good-faith efforts to comply with the applicable requirements, the economic impact of the fine on the violator, and such other considerations that have a bearing on the amount of the fine. In addition to the penalties provided herein, the city may recover reasonable attorney's fees, court costs, court reporter's fees and other expenses of litigation by appropriate suit at law against the person found to have violated this ordinance or the orders, rules, regulations, permits and licenses hereunder.

(b) Criminal Penalties. Any person:

(1) Who willfully, intentionally, recklessly or negligently violates any provision of Article 12 of this chapter, order, permit or license issued hereunder, or any other requirement, shall upon conviction be punished by a fine not less than $1,000.00 nor more than $25,000.00 or by imprisonment not exceeding 90 days, or both, except that in cases where such offense shall continue after due notice, each day's continuance of the same shall constitute a separate offense; or

(2) Who knowingly makes any false statement or misrepresentation in any record, report plan, or other document filed with the chief engineer, or tampers with or knowingly renders inaccurate any monitoring device or sampling and analysis method required under Article 12 of this chapter or by other law, shall be punished by a fine of not more than $25,000.00 or by imprisonment for not more than six months, or both. Unless otherwise provided, this section shall be controlled by the provisions of HRS, Hawai‘i Penal Code.

RELATIONSHIP TO OTHER MANUALS

This manual is one of three manuals developed by the City and County of Honolulu to address BMP selection and implementation to protect water quality. Collectively, the manuals address BMP selection and implementation throughout the life of a project from planning and design to construction and into operation and maintenance (**Figure 1**).

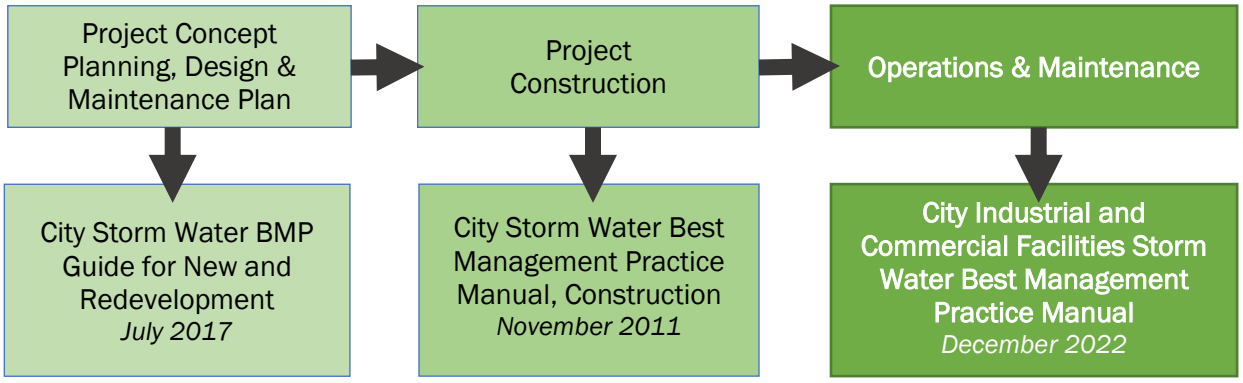


Figure 1 Project Lifecycle

STORM WATER POLLUTANTS AND IMPACTS ON WATER QUALITY

Industrial and commercial activities can increase pollutant concentrations to levels that may impact water quality. Potential pollutants associated with storm water runoff include sediment, nutrients, bacteria and viruses, biologicals, oil and grease, metals, synthetic organics, pesticides, and gross pollutants (such as trash, debris, and floatables).

Activities and operations that occur at industrial and commercial facilities are often exposed to wet weather. Runoff from rain and wind can carry materials and wastes into storm drainage systems and receiving waters.

Examples of storm water pollutants and their impacts are described in **Table 1**.

Table 1 Pollutants and Impacts on Water Quality

Type	Source	Impacts on Water Quality
Synthetic Organics	• Widely used adhesives, cleaners, sealants, solvents, etc. • Improperly stored and disposed synthetic organics.	• Cause environmental harm to waterways.
Oil and Grease	• Leakages and line breakage, spills, cleaning vehicle and equipment engines and suspensions, outdoor storage of equipment, maintenance activities, and hydraulic systems, restaurants, and waste oil disposal.	• Toxic to aquatic organisms. • Some oil and greases are toxic to aquatic organisms at low concentrations.
Sediment	• Dirt, sand, and other matter that settles to the bottom of storm water. • Sediments can be suspended in water; total suspended solids is a common water quality measurement. • Nutrients, trace metals, and hydrocarbons (petroleum, oil, dyes, pesticides, and plastics) can be transported on sediments.	• Can be detrimental to fish and other aquatic organisms by interfering with photosynthesis, respiration, growth, reproduction, and oxygen exchange.
Metals	• Lead, zinc, cadmium, copper, chromium, nickel, etc. • Metals are part of many artificial surfaces in the urban environment (i.e., galvanized metal, paint, anti-fouling paint application and removal and automobiles, or preserved wood as well as tires and vehicle brakes) which contain metals and enter storm water as the surfaces corrode, flake, dissolve, decay, or leach. • Metals can be carried in storm water sediments and is the case for over half the trace metal load.	• Can be toxic to aquatic organisms, can bioaccumulate (mercury and selenium can accumulate to toxic levels in aquatic animals such as fish). • Some metals have the potential to contaminate drinking water supplies.
Gross Pollutants	• Trash, debris, and floatables are common types of gross pollutants. • Plant debris (such as leaves and lawn-clippings from landscape maintenance), animal excrement, animals and invasives, street litter, and other organic matter are also types of gross pollutants.	• Create an aesthetic “eye sore” in waterways. • May harbor bacteria, viruses, hydrocarbons, and vectors. • May depress the dissolved oxygen levels in streams and canals, sometimes causing fish kills.
Pesticides	• Herbicides, fungicides, rodenticides, and insecticides. • Pesticides have been repeatedly detected in storm water at toxic levels, even when pesticides have been applied in accordance with label instructions.	• May impact non-target animals such as invertebrates and fish under certain conditions.
Nutrients	• Nitrogen and phosphorous, are commonly used as fertilizers. • Pet waste also contributes nutrients.	• Can result in accelerated algal growth which can smoother coral reefs and deplete oxygen. • Can be toxic to fish (this is true for un-ionized ammonia which is one form of the nitrogen).
Bacteria & Viruses	• Animal excrement, cesspools, failing septic systems and sanitary sewer overflow.	• Cause disease and can create a human health hazard. • Can cause beach closures.
Vector Production	• Mosquitoes, flies. and rodents with the most common being mosquitoes. • Sheltered habitats and standing water are associated with vector production.	• Can transmit diseases to humans and animals. • Can create a human health hazard and nuisance, both onsite and in the surrounding area.

2. Regulatory Requirements

In the following sections, Federal, State, and City programs are discussed in relationship to the control of pollutants in storm water. The owners and operators of industrial and commercial facilities must understand the relationship between the agencies, their jurisdictions, and the requirements of each, as shown in **Figure 2**.

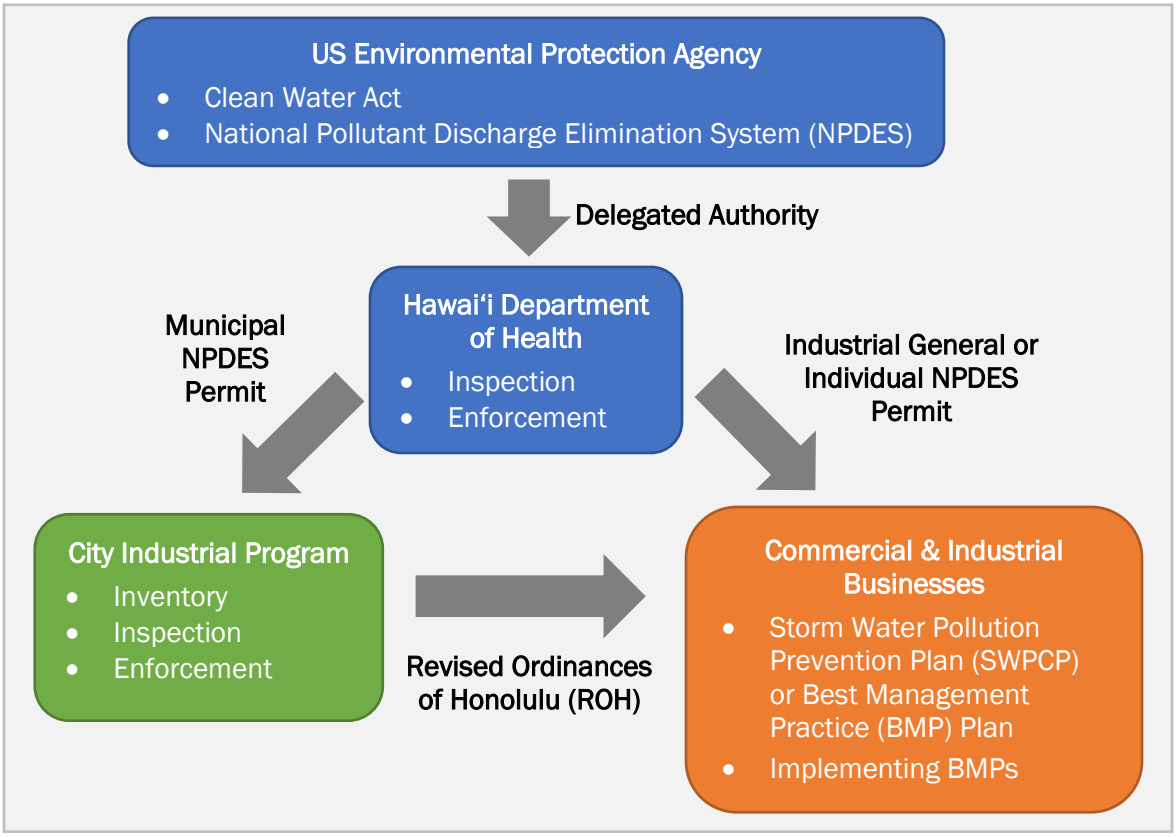


Figure 2 Framework Associated with Industrial Storm Water

FEDERAL NPDES PROGRAM

The Federal Water Pollution Control Act of 1972, also known as the Clean Water Act (CWA), as amended in 1987, is the principal legislation for establishing requirements for the control of storm water pollutants from urbanization and related activities. The storm water regulations associated with the CWA require specific categories of industrial facilities, which discharge industrial storm water, to obtain an NPDES permit. Those facilities that discharge industrial storm water, either directly to surface waters (e.g., streams, canals, lakes, etc.) or indirectly, through municipal separate storm sewer systems (MS4s) must be covered by a permit. This includes the discharge of "sheet flow" from an industrial facility.

Federal law requires that specific industrial storm water discharges meet all provisions of Section 301 and 402 of the CWA to control pollutant discharges. These provisions require the use of best available technology economically achievable and best conventional pollution control technology to reduce pollutants and any more stringent controls necessary to meet water quality standards.

STATE NPDES PROGRAM

The NPDES program requires businesses with regulated activities to obtain an NPDES permit from the USEPA or an authorized State agency. The State of Hawai'i, Department of Health (DOH), Clean Water Branch (CWB) has been delegated authority by the EPA to administer the NPDES Permit program in Hawai'i.

The two types of NPDES permits relevant to regulated industrial and commercial activities are 1) general permit and 2) the individual permit:

1) **General permits** authorize a category of discharges sharing similar discharge characteristics within a geographical area and most industrial facilities, which discharge storm water are permitted under general NPDES permits. The DOH webpage on General Permits (health.hawaii.gov/cwb/permitting/general-permits/) provides details, including general permit language. General Permit Authorizing Discharges of Storm Water Associated with Industrial Activities is found in Hawai'i Administrative Rules (HAR), Chapter 11-55, Appendices B through L.
2) **Individual permits** are written to address specific businesses and their discharges and are applicable to an individual facility or general permit to MS4 applicant based on discharge characteristics. Permits are issued at DOH's discretion, and businesses should confirm requirements with the State DOH CWB. DOH may permit commercial businesses that are significant sources of storm water pollution.

All facilities, discharges, and activities, with or without an NPDES permit, are required to comply with the State Water Quality Standards (HAR, Chapter 11-54). Failure to comply may result in significant fines for each violation and possible imprisonment.

Who must comply with the Industrial General Permit?

Storm water discharges associated with industrial activity are regulated under the storm water program in 40 Code of Federal Register (CFR) 122.26(b)(14)(i)-(xi). These categories are described in **Table 2**, excluding category (x) which is for construction and regulated separately. Certain industrial facilities require a storm water permit whenever any of the listed activities occur onsite, regardless of other types of activities or the facilities SIC code. **Table 3** lists the primary SIC codes covered by the storm water permitting requirements. The DOH CWB can require other facilities not listed in **Table 2** to obtain permit coverage as well via delegated authority from the EPA.

Under 40 CFR 122.26(g) operators of regulated industrial facilities in any of the 10 categories may qualify for an exclusion if none of the facility's industrial materials or activities are exposed to storm water. This exclusion is referred to as a Conditional "No-Exposure" Exclusion (CNEE) by the State of Hawai'i. No exposure means all industrial materials and activities are protected by a storm-resistant shelter to prevent exposure to rain and/or runoff. Industrial materials or activities include, but are not limited to, material handling equipment or activities, industrial machinery, raw materials, intermediate products, byproducts, final products, or waste products *(40 Code of Federal Register [CFR] 122.26(g)).*

For more information visit the State of Hawai'i, Department of Health, Clean Water Branch website at: health.hawaii.gov/cwb/permitting/industrial-storm-water/.

Table 2 Industrial Categories Associated with Industrial Activity

The 11 categories engaging in industrial activity are described below. Descriptions of SIC codes applicable to the storm water regulations are provided in Table 3.	
(i)	Facilities subject to storm water effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards under 40 CFR chapter I, subchapter N (except facilities with toxic pollutant effluent standards that are exempted under category (xi) below.
(ii)	Facilities classified as SIC 24 (except 2434), 26 (except 265 and 267), 28 (except 283), 29, 311, 32 (except 323), 33, 3441, and 373.
(iii)	Facilities classified as SIC 10 through 14 (mineral industry) including active or inactive mining operations (except for areas of coal mining operations no longer meeting the definition of a reclamation area under 40 CFR 434.11(l) because the performance bond issued to the facility by the appropriate SMCRA authority has been released, or except for areas of non-coal mining operations that have been released from applicable state or federal reclamation requirements after December 17, 1990) and oil and gas exploration, production, processing, or treatment operations, or transmission facilities that discharge storm water contaminated by contact with or that has come into contact with, any overburden, raw material, intermediate products, finished products, byproducts or waste products located on the site of such operations; (inactive mining operations are mining sites that are not being actively mined, but which have an identifiable owner/operator; inactive mining sites do not include sites where mining claims are being maintained prior to disturbances associated with the extraction, beneficiation, or processing of mined materials, nor sites where minimal activities are undertaken for the sole purpose of maintaining a mineral claim).
(iv)	Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under subtitle C of RCRA.
(v)	Landfills, land application sites, and open dumps that receive or have received any industrial wastes (waste that is received from any of the facilities described under this subsection) including those that are subject to regulation under subtitle D of RCRA.
(vi)	Facilities involved in the recycling of materials, including metal scrap yards, battery reclaimers, salvage yards, and automobile junkyards, including but not limited to those classified as SIC 5015 and 5093.
(vii)	Steam electric power generating facilities, including coal handling sites.
(viii)	Transportation facilities classified as SIC 40, 41, 42 (except 4221-25), 43, 44, 45, and 5171 that have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations. Only those portions of the facility that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, airport deicing operations, or that are otherwise identified under paragraphs (i)–(vii) or (ix)–(xi) of this section are associated with industrial activity.
(ix)	Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of 1.0 million gallons a day (MGD) or more, or required to have an approved pretreatment program under 40 CFR Part 403. Not included are farm lands, domestic gardens or lands used for sludge management where sludge is beneficially reused and that are not physically located in the confines of the facility, or areas that are in compliance with section 405 of the CWA.
(x)	Construction activity including clearing, grading and excavation activities except operations that result in the disturbance of less than five acres of total land area that are not part of a larger common plan of development or sale. Note—this category of industrial activity is typically covered under a construction storm water general permit, and not an industrial storm water general permit.
(xi)	Facilities under SIC 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 285, 30, 31 (except 311), 323, 34 (except 3441), 35, 36, 37 (except 373), 38, 39, 4221–4225, (and which are not otherwise included within categories (i)–(x).

Table 3 SIC Codes Regulated for Storm Water Discharges

SIC	Description
Mining	
10	Metal Mining
12	Coal Mining
13	Oil and Gas Extraction
14	Mining and Quarrying of Nonmetallic Minerals, Except Fuels
Manufacturing	
20	Food and Kindred Products
21	Tobacco Products
22	Textile Mill Products
23	Apparel and Other Finished Products Made from Fabrics and Similar Materials
24	Lumber and Wood Products, Except Furniture
2434	Wood Kitchen Cabinets
25	Furniture and Fixtures
26	Paper and Allied Products
265	Paperboard Containers and Boxes
267	Converted Paper and Paperboard Products, Except Containers and Boxes
27	Printing, Publishing, and Allied Industries
28	Chemicals and Allied Products
283	Drugs
285	Paints, Varnishes, Lacquers, Enamels, and Allied Products
29	Petroleum Refining and Related Industries
30	Rubber and Miscellaneous Plastic Products
31	Leather and Leather Products
311	Leather Tanning and Finishing
32	Stone, Clay, Glass, and Concrete Products
323	Glass Products, Made of Purchased Glass
33	Primary Metals Industry
34	Fabricated Metal Products, Except Machinery and Transportation Equipment
3441	Fabricated Structural Metal
35	Industrial and Commercial Machinery and Computer Equipment
36	Electronic and Other Electrical Equipment and Components, Except Computer Equipment
37	Transportation Equipment
373	Ship and Boat Building and Repairing
38	Measuring, Analyzing, and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks
39	Miscellaneous Manufacturing Industries
Transportation, Communications, Etc.	
40	Railroad Transportation*
41	Local and Suburban Transit and Interurban Highway Passenger Transportation*
42	Motor Freight Transportation and Warehousing*
4221	Farm Product Warehousing and Storage
4222	Refrigerated Warehousing and Storage
4225	General Warehousing and Storage
43	United States Postal Service*
44	Water Transportation*
45	Transportation by Air*
Wholesale Trade	
5015	Motor Vehicle Parts, Used
5093	Scrap and Waste Material
5171	Petroleum Bulk Stations and Terminals

*Only operations with activities such as vehicle maintenance and equipment cleaning are regulated.

CITY STORM WATER MANAGEMENT PROGRAM

A NPDES permit is required for the City and County of Honolulu to discharge storm water into receiving State water bodies because the City's MS4 is categorized as a large MS4 serving a population of more than 250,000. This City Industrial and Commercial Storm Water Best Management Practice Manual reflects the requirements of the City's MS4 NPDES Permit No. HI S000002 (Permit) issued by the DOH.

The City's NPDES permit requires implementation of an Industrial and Commercial Activities Discharge Management Program. The City's responsibilities include:

- Maintaining an inventory of industrial and commercial businesses/activities;
- Conducting education and outreach to owners and operators of industrial and commercial businesses/activities;
- Performing inspections to detect and eliminate illicit discharges; and
- Requiring facilities that conduct industrial activities to comply with City ordinances and requirements as related to the City's NPDES permit.

Industrial and commercial facilities discharging to the City, a regulated MS4, are subject to local ordinances and requirements pursuant to the City's NPDES permit in addition to any applicable State of Hawaii Department of Health requirements. Listed below are related Revised Ordinances of Honolulu (ROH) in summary and below with more details:

- Section 14-12.12 Connection to city-owned separate storm sewer system - Violation
- Section 14-12.22 Discharge of effluent other than storm water runoff - Violation
- Section 14-12.23 Environmental Quality Control - Violation

Water Quality Rules - DPP Administrative Rules Title 20, Article 3. Rules Relating to Water Quality

Requirements for construction site runoff control are promulgated in the Water Quality Rules. These rules also contain the standards for post-construction storm water quality requirements to meet the requirements of the City's NPDES Permit.

Storm Drain Connection License – ROH Section 14-12.12

The City requires private property connected to the City storm water drainage system to have a storm drain connection license issued to the property owner. Any private system that is connected to the City's storm water drainage system without a license is considered an illegal drainage connection under ROH, Section 14-12.12. See also BMP Fact Sheet A-5.

Illicit Discharges – ROH Section 14-12.22

Illicit discharges are discharges to the City's storm water system (or streams or oceans) that are not in compliance with applicable laws and regulations, such as the City's storm water system NPDES permit or the NPDES permit for the business. Here are excerpts from the ROH, Section 14-12.22 regarding discharges and violations.

(a) No person shall discharge any effluent other than storm water runoff onto any public right of way and/or into any drainage facility without first obtaining a permit from the chief engineer. The chief engineer will only issue a permit upon application when the chief engineer determines that such discharge will not create a drainage or pollution problem or cause a violation of any provisions of

the city NPDES permit. The chief engineer may condition the granting of the permit with requirements to prevent drainage and/or pollution problems or mitigative measures which will meet any conditions of the city NPDES permit. Except for those non-storm water discharges authorized by the city NPDES permit, no discharge shall commence unless an NPDES permit is first obtained from the Department of Health, State of Hawai'i, for the discharge of any pollutant into state waters through the municipal separate storm sewer system.

(e) Any discharge which violates any condition of the permit or the state water quality standards in Chapter 11-54, Hawai'i Administrative Rules (HAR), shall also be a violation of Article 12 of this chapter and may result in a cease and desist order. In addition, the city by written notice may terminate the permit for any discharge which violates any condition of the permit or the state water quality standards in Chapter 11-54, HAR.

Environmental Quality Control – ROH Section 14-12.23

It is unlawful for any person to discharge or cause to be discharged any pollutant into any drainage facility which causes a pollution problem in State water, or causes a violation of any provision of the City NPDES permit or the water quality standards of the State of Hawai'i per ROH Section 14.12.23 Environmental Quality Control.

3. Industrial/Commercial BMP Plan Development

This section provides guidance on developing an Industrial/Commercial BMP Plan. The Plan should communicate the BMPs to be used to prevent or minimize pollutant discharges into the storm drain system.

The components of an Industrial/ Commercial BMP Plan are shown in **Figure 3** and described on the following page with the corresponding forms that are provided in **Appendix C**.

These components are site characterization (using a business description and site map), identification of pollution control strategies (by listing potential pollutants and BMPs to address them), a spill response plan, self-inspections plan and employee training plan.

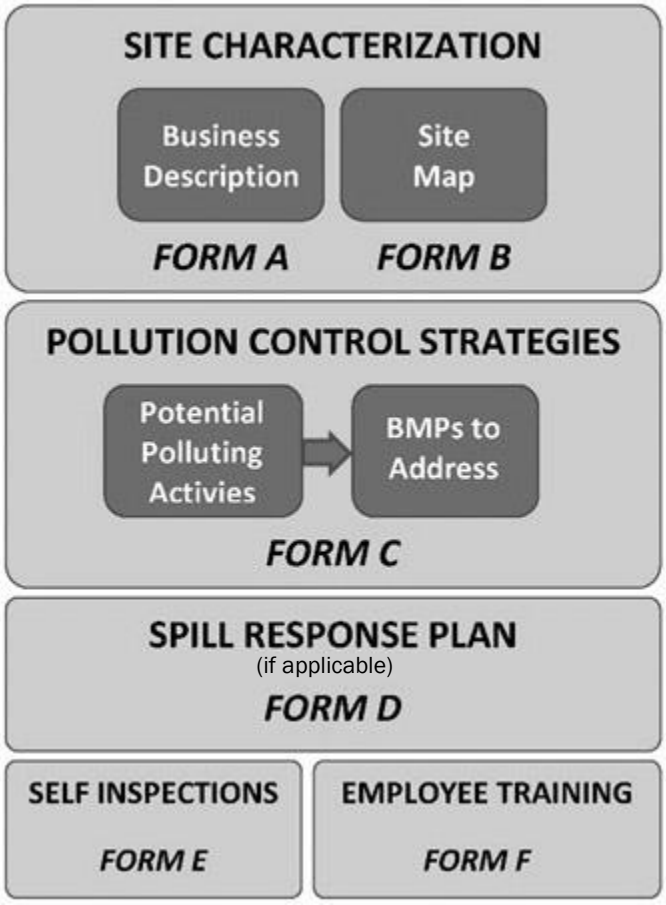


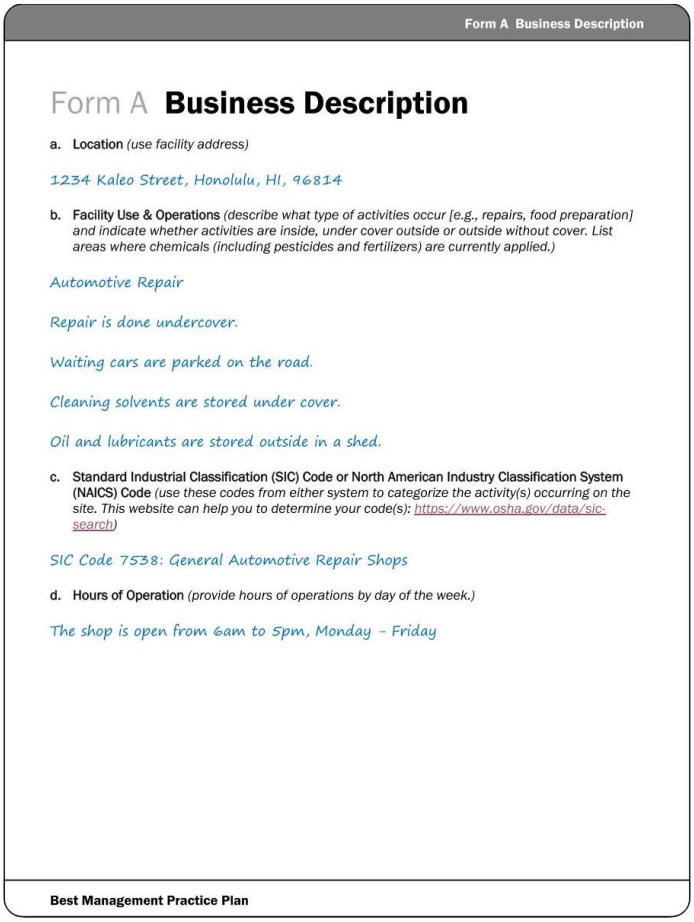
Figure 3 Industrial/Commercial BMP Plan Components

A. BUSINESS DESCRIPTION – FORM A

The business description is the first step in development of an Industrial/Commercial BMP Plan and helps to characterize the site. Describing activities and operations onsite aids in identifying potential sources of pollutants.

The following items should be covered in the facility description and are listed on Form A:

a. **Location** – use the facility address.
b. **Facility Use & Operations** – describe what type of activities occur (e.g., retail sales, repairs) and indicate whether activities are inside, under cover outside or outside without cover. List areas where chemicals (including pesticides and fertilizers) are currently applied.
c. **Standard Industrial Classification (SIC) / North American Industry Classification System (NAICS) Code(s)** – use these codes from either system to categorize the activity(s) occurring on the site. This website can help you to determine your code: https://www.osha.gov/data/sic-search
d. **Hours of Operation** – provide hours of operations by day of the week.



Form A Business Description

Form A **Business Description**

a. **Location** *(use facility address)*

1234 Kaleo Street, Honolulu, HI, 96814

b. **Facility Use & Operations** *(describe what type of activities occur [e.g., repairs, food preparation] and indicate whether activities are inside, under cover outside or outside without cover. List areas where chemicals (including pesticides and fertilizers) are currently applied.)*

Automotive Repair

Repair is done undercover.

Waiting cars are parked on the road.

Cleaning solvents are stored under cover.

Oil and lubricants are stored outside in a shed.

c. **Standard Industrial Classification (SIC) Code or North American Industry Classification System (NAICS) Code** *(use these codes from either system to categorize the activity(s) occurring on the site. This website can help you to determine your code(s): https://www.osha.gov/data/sic-search)*

SIC Code 7538: General Automotive Repair Shops

d. **Hours of Operation** *(provide hours of operations by day of the week.)*

The shop is open from 6am to 5pm, Monday - Friday

Best Management Practice Plan

*Forms can be found in **Appendix C.***

B. SITE MAP – FORM B

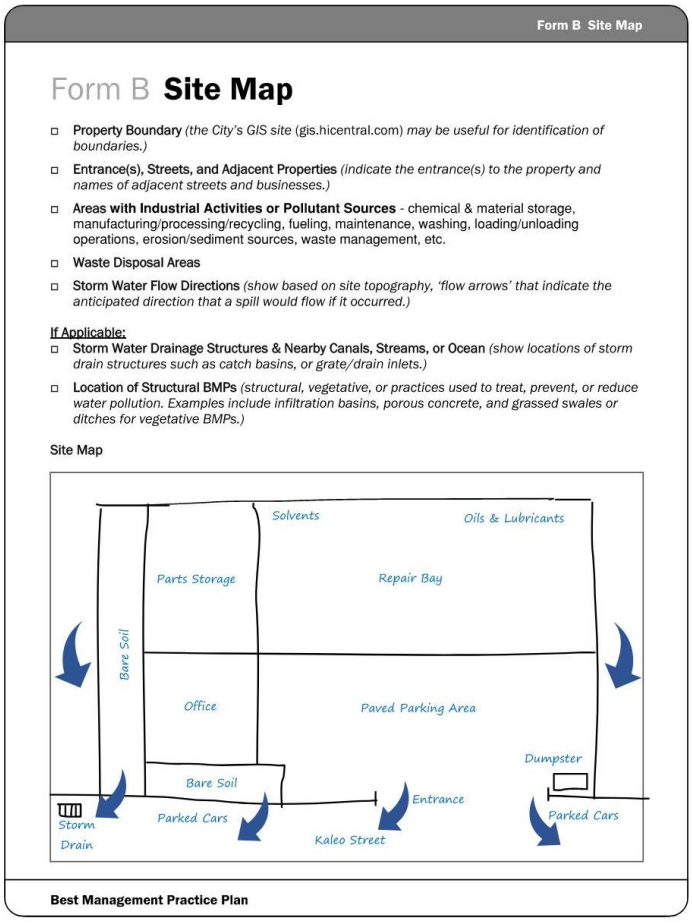
The site map helps in identification of potential sources of pollutants and expected flow directions should a spill or other discharge of pollutants occur.

The site map should include:

a. **Property Boundary** – the City's GIS site (gis.hicentral.com) may be useful for identification of boundaries.
b. **Entrance(s), Streets, and Adjacent Properties** – indicate the entrance(s) to the property and names of adjacent streets and businesses.
c. **Areas with Industrial Activities or Pollutant Sources** - chemical & material storage, manufacturing / processing / recycling, fueling, maintenance, washing, loading/unloading operations, erosion/sediment sources, waste management, etc.
d. **Waste Disposal Areas**
e. **Storm Water Flow Directions** – show based on site topography, 'flow arrows' that indicate the anticipated direction that a spill would flow if it occurred.

If Applicable:

f. **Storm Water Drainage Structures & Nearby Canals, Streams, or Ocean** - show locations of storm drain structures such as catch basins, or grate/drain inlets.
g. **Location of Structural BMPs** – structural or vegetative practices used to treat, prevent, or reduce water pollution. Examples include infiltration basins, porous concrete, and grassed swales or ditches for vegetative BMPs.

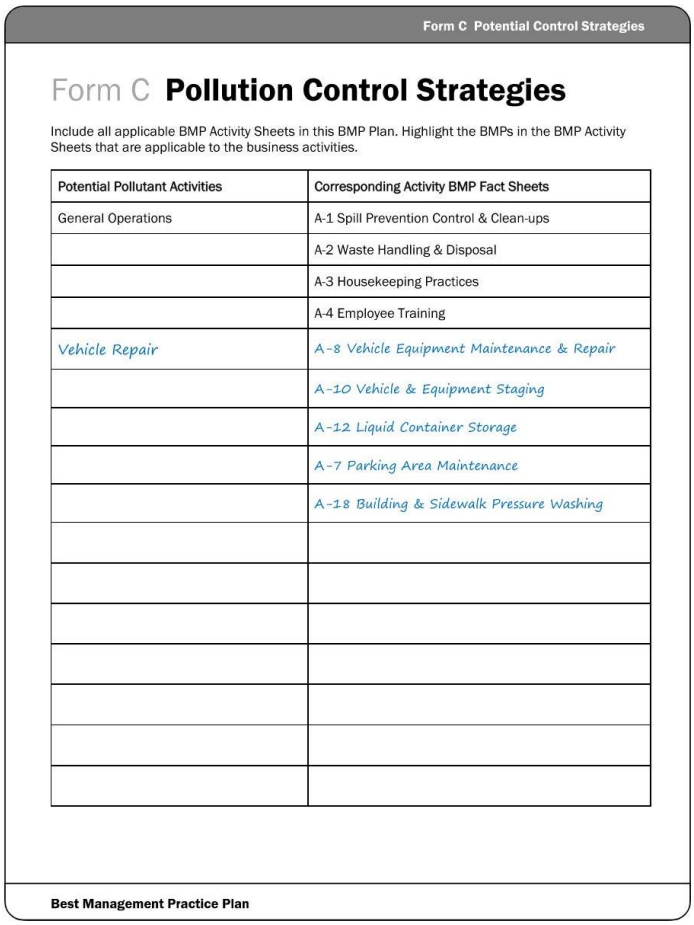


*Forms can be found in **Appendix C.***

C. POLLUTANT CONTROL STRATEGIES – FORM C

Pollutant control strategies are developed so that facilities are prepared to prevent, and address issues should they arise.

The first step is to identify **potential pollutant activities** and enter them in the first column on Form C. The potential pollutant activities are identified based on the activities conducted at the Facility. The second step is to match the sources with appropriate **best management practices (BMPs)** to prevent or contain potential discharges of polluted water from the site. The Activity BMP Fact Sheets (A-1, A-2, etc.) can be found in **Appendix A**. The BMPs should be entered in the second column on Form C.



Form C Potential Control Strategies

Form C **Pollution Control Strategies**

Include all applicable BMP Activity Sheets in this BMP Plan. Highlight the BMPs in the BMP Activity Sheets that are applicable to the business activities.

Potential Pollutant Activities	Corresponding Activity BMP Fact Sheets
General Operations	A-1 Spill Prevention Control & Clean-ups
	A-2 Waste Handling & Disposal
	A-3 Housekeeping Practices
	A-4 Employee Training
Vehicle Repair	A-8 Vehicle Equipment Maintenance & Repair
	A-10 Vehicle & Equipment Staging
	A-12 Liquid Container Storage
	A-7 Parking Area Maintenance
	A-18 Building & Sidewalk Pressure Washing

Best Management Practice Plan

*Forms can be found in **Appendix C.***

For selected types of commercial businesses, **Appendix B** provides Business Guide Sheets that match common pollutant generating activities with BMPs.

> The appropriate Activity BMP Fact Sheets should be included as part of the Industrial/Commercial BMP Plan. BMPs may also include maintenance of treatment control BMPs (such as detention basins or sand filters) which should also be listed on Form C. The Treatment Control BMPs Operations and Maintenance Fact Sheets from the City *Storm Water BMP Guide for New and Redevelopment* should be included in the Plan if applicable.

D. SPILL RESPONSE PLAN – FORM D

Any business which stores and/or uses hazardous materials should have a spill response plan. A spill response plan is a facility specific plan that explains how to respond to a spill if it occurs. The spill response plan should be understood by all employees and available as a reference.

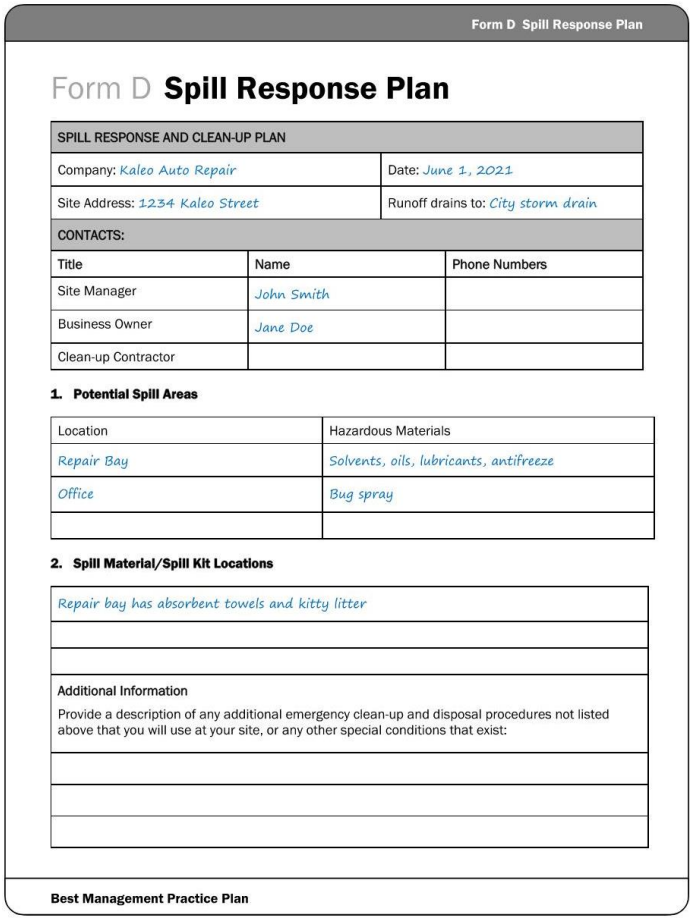
To prevent and prepare for potential spills, the following information should be included in the spill response plan and communicated to employees:

a. **Hazardous material storage areas and locations** – the site map can be used here.
b. **Material handling procedures** – Safety Data Sheets (SDS) can be included, and employees should know how spill clean-up should be handled for different types of materials (e.g., acids, oil, solvents).
c. **Spill response procedures to prevent/mitigate spills to storm drain systems**
d. **Locations of spill clean-up and materials** – These should be described and noted on a site map and included in the spill response plan.

Spill Documentation & Reporting - Releases of certain hazardous substances require immediate reporting per Hawai'i Administrative Rules 11-451-7. Reporting requirements guidance is provided on Form D. As part of the overall training program, personnel should be trained to prevent and control spills and proper spill clean-up procedures.

Following spill clean-up, a review should be conducted to assess whether the spill response plan is adequate for the site and determine areas for improvements.

The spill response plan should be reviewed regularly to make sure it is up to date. This could be done in conjunction with annual employee training.



Form D Spill Response Plan

Form D **Spill Response Plan**

SPILL RESPONSE AND CLEAN-UP PLAN	
Company: Kaleo Auto Repair	Date: June 1, 2021
Site Address: 1234 Kaleo Street	Runoff drains to: City storm drain

CONTACTS:		
Title	Name	Phone Numbers
Site Manager	John Smith	
Business Owner	Jane Doe	
Clean-up Contractor		

1. Potential Spill Areas

Location	Hazardous Materials
Repair Bay	Solvents, oils, lubricants, antifreeze
Office	Bug spray

2. Spill Material/Spill Kit Locations

Repair bay has absorbent towels and kitty litter

Additional Information

Provide a description of any additional emergency clean-up and disposal procedures not listed above that you will use at your site, or any other special conditions that exist:

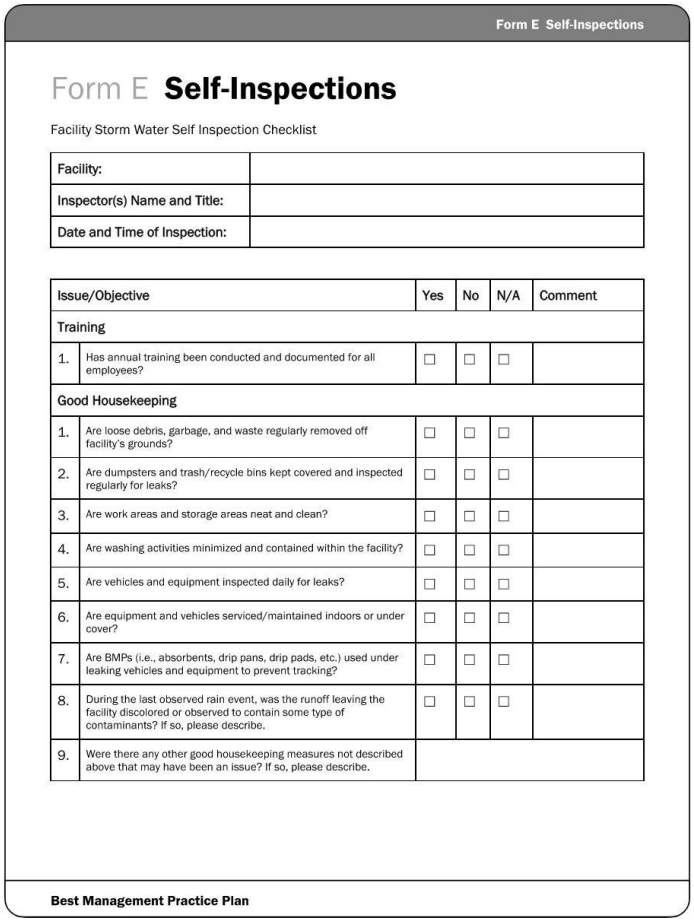
Best Management Practice Plan

*Forms can be found in **Appendix C.***

E. SELF-INSPECTIONS – FORM E

Monthly self-inspections help to ensure that the BMPs in the Industrial/Commercial BMP Plan are being implemented. Inspections can be used to create a tailored self-inspection form for the business. The most common areas and topics are listed on Form E and addition of inspection items specific to the business should be added to the form and copied for all future inspections.

City and State inspectors will conduct their own inspections.



Form E Self-Inspections

Form E **Self-Inspections**

Facility Storm Water Self Inspection Checklist

Facility:	
Inspector(s) Name and Title:	
Date and Time of Inspection:	

	Issue/Objective	Yes	No	N/A	Comment
Training					
1.	Has annual training been conducted and documented for all employees?	☐	☐	☐	
Good Housekeeping					
1.	Are loose debris, garbage, and waste regularly removed off facility's grounds?	☐	☐	☐	
2.	Are dumpsters and trash/recycle bins kept covered and inspected regularly for leaks?	☐	☐	☐	
3.	Are work areas and storage areas neat and clean?	☐	☐	☐	
4.	Are washing activities minimized and contained within the facility?	☐	☐	☐	
5.	Are vehicles and equipment inspected daily for leaks?	☐	☐	☐	
6.	Are equipment and vehicles serviced/maintained indoors or under cover?	☐	☐	☐	
7.	Are BMPs (i.e., absorbents, drip pans, drip pads, etc.) used under leaking vehicles and equipment to prevent tracking?	☐	☐	☐	
8.	During the last observed rain event, was the runoff leaving the facility discolored or observed to contain some type of contaminants? If so, please describe.	☐	☐	☐	
9.	Were there any other good housekeeping measures not described above that may have been an issue? If so, please describe.				

Best Management Practice Plan

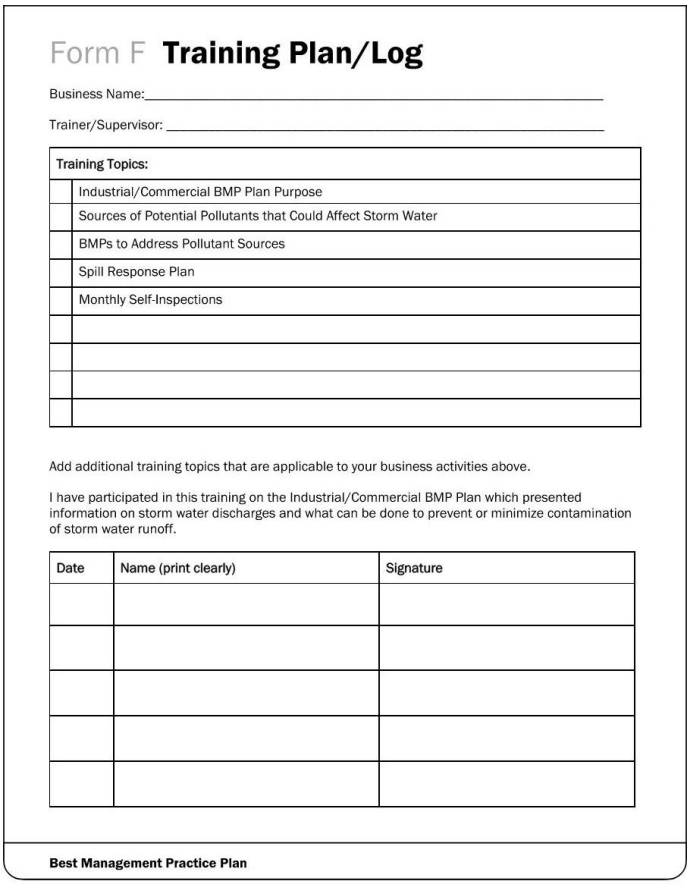
*Forms can be found in **Appendix C.***

F. TRAINING PLAN / LOG – FORM F

Employees need to know what to do in response to a potentially contaminating event. Train the employees who work with the materials or activities that could impact storm water, and who do inspections or maintenance of the storm water management methods or systems. Activity BMP Fact Sheet A-4 Employee Training provides training guidance.

The topics to be covered in the training include:

- Purpose of the Industrial/Commercial BMP Plan;
- Sources of potential pollutants that could affect storm water;
- BMPs to address pollutant sources;
- Spill Response Plan; and
- Monthly self-inspections.



Form F **Training Plan/Log**

Business Name:_____

Trainer/Supervisor: _____

	Training Topics:
	Industrial/Commercial BMP Plan Purpose
	Sources of Potential Pollutants that Could Affect Storm Water
	BMPs to Address Pollutant Sources
	Spill Response Plan
	Monthly Self-Inspections

Add additional training topics that are applicable to your business activities above.

I have participated in this training on the Industrial/Commercial BMP Plan which presented information on storm water discharges and what can be done to prevent or minimize contamination of storm water runoff.

Date	Name (print clearly)	Signature

Best Management Practice Plan

*Forms can be found in **Appendix C**.*

4. Industrial and Commercial Activity BMPs

Industrial and Commercial Activity BMPs, or Activity BMPs, reduce the exposure of materials and pollutants to storm water, thereby reducing the amount of pollutants picked up by the storm water. Activity BMPs are aimed at industrial and commercial activities that produce the potential for storm water contaminants.

The Industrial and Commercial Activity BMP Fact Sheets are listed in **Table 4** and provided in **Appendix A**. The Activity ("A") BMP Fact Sheets are for inclusion in a facility's BMP Plan and can be downloaded from the City's website at: CleanWaterHonolulu.com. For certain commercial businesses, separate Business Category BMP Guide Sheets have been developed that incorporate business-specific source control BMPs. These are discussed in the following section and provided in **Appendix B**.

Table 4 Industrial and Commercial Activity BMP Fact Sheets

General	
A-1	Spill Prevention, Control & Cleanup
A-2	Waste Handling & Disposal
A-3	Housekeeping Practices
A-4	Employee Training
A-5	Drain Connections
Vehicle & Equipment Management	
A-6	Vehicle & Equipment Fueling
A-7	Vehicle & Equipment Washing
A-8	Vehicle & Equipment Maintenance & Repair
A-9	Vehicle Painting
A-10	Vehicle & Equipment Staging
Material & Waste Management	
A-11	Loading/Unloading
A-12	Liquid Container Storage
A-13	Equipment & Operations Maintenance
A-14	Storage of Solid Materials & Products
Building & Grounds Management	
A-15	Contaminated or Erodible Areas
A-16	Building Repair & Construction
A-17	Parking Area Maintenance
A-18	Pressure Washing
A-19	Pool, Fountain & Spa Maintenance
A-20	Landscape Maintenance
A-21	Fire Sprinkler Testing
A-22	Drainage System Maintenance

5. Business Category BMP Guide Sheets

Business Category BMP Guide Sheets address activities typically associated with a certain type of business and identify Industrial and Commercial Activity BMP Fact Sheets for these activities. The guide sheets are meant to provide a framework and guidance for selection of BMPs for inclusion in the BMP Plan. Use of these guide sheets in the development of a BMP Plan does not guarantee compliance due to the diversity of activities and site conditions.

The Business Category BMP Guide Sheets include some of the more common business types that have high potential to pollute storm water based on their activities and/or the type of products they use. Most of the businesses discussed in this chapter are not required to obtain their own National Pollutant Discharge and Elimination System (NPDES) permit under State and Federal storm water regulations. However, these businesses still need to prevent pollutants from discharging off their property.

Table 5 lists the Business Category BMP Guide Sheets which are provided in Appendix B.

Table 5 Business Category BMP Guide Sheets

Automotive Services	
B-1	Auto Body Repair
B-2	Auto Maintenance
B-3	Retail Gas Stations
Restaurants & Food Industry	
B-4	Restaurants & Food Industry
B-5	Lunch Wagons, Food Trucks, Carts & Tents
Other Businesses	
B-6	Scrap Metal Recyclers & Towing Yards
B-6	Building & Property Maintenance
B-7	Contractor Baseyards
B-8	Repair Shops
B-9	Self-Storage
B-10	Small Animal Care Facilities
B-11	Wholesalers/Retailers

6. Treatment Control BMPs Operations & Maintenance Fact Sheets

Treatment control BMPs (also referred to as Permanent or Post-Construction BMPs) are ongoing treatment methods to remove pollutants from storm water. Inspection and maintenance are necessary to verify that each treatment control BMP performs efficiently throughout its life. Treatment Control BMPs Operations & Maintenance (O&M) Fact Sheets describe the minimum inspection and maintenance requirements for selected treatment control BMPs. In addition to regular self-inspections of the treatment control BMPs, the City's Storm Water Quality Division also conducts periodic inspections to ensure they are being properly maintained.

Treatment Control BMP O&M Fact Sheets are listed in Table 6 and provided in the City *Storm Water BMP Guide for New and Redevelopment, July 2017.*

Table 6 Treatment Control BMPs Operations & Maintenance BMP Fact Sheets

OM-01	Bio-Retention Basin
OM-02	Detention Basin
OM-03	Green Roof
OM-04	Infiltration Trench/Basin
OM-05	Manufactured Treatment Device
OM-06	Pervious Pavement
OM-07	Rainwater Harvesting
OM-08	Sand Filter
OM-09	Vegetated Biofilter
OM-10	Vegetated Swale/Strip

Appendix A

Industrial and Commercial Activity BMP Fact Sheets

A-1 Spill Prevention, Control & Cleanup

Spills and leaks are some of the largest contributors of storm water pollutants. Many industrial and commercial activities have the potential for accidental spills. Being prepared for these spills can minimize hazardous materials going into the storm drain system and into streams and the ocean.

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Spill Prevention and Preparedness

- Store and contain liquid materials in such a manner that if the container is ruptured, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters, or groundwater.
- Label all containers according to their contents (e.g., solvent, gasoline).
- Label hazardous substances regarding the potential hazard (corrosive, radioactive, flammable, explosive, poisonous).
- Prominently display required labels on transported hazardous and toxic materials (per US DOT regulations).
- Place drip pans or absorbent materials beneath all mounted taps, and at all potential drip and spill locations during filling and unloading of tanks.
- Check tanks and any containment sumps daily for leaks and spills. Replace tanks that are leaking, corroded, or otherwise deteriorating with tanks in good condition. If the liquid is oil, gas, or other material that floats on water, install a spill control device (such as a tee section) in the catch basins to collect runoff from the storage tank area.
- Cover outside storage areas either with a permanent structure or with a seasonal one such as a tarp so that rain cannot contact the materials.

- Recycle, reclaim, or reuse materials whenever possible. This will reduce the amount of process materials that are brought into the facility.

Spill Response Plan

- Develop a spill response plan for the business/site. **Appendix C** contains forms for developing a spill response plan specific to a business/site.

Spill Response

- Clean up leaks and spills immediately.
- Store and maintain an adequate supply of spill cleanup materials in readily accessible places.
- On paved surfaces, clean up spills with as little water as possible.
    - Use a rag for small spills.
    - Use dry absorbent material for larger spills.
    - If the spilled material is hazardous, then used cleanup materials are also hazardous and must be disposed of as hazardous waste or sent to a certified laundry.
    - Use a damp mop for general cleanup.
- For dry material spills
    - Use physical methods for the cleanup of dry chemicals (e.g., brooms, shovels, sweepers, or vacuums), if possible.
    - Sweep up the material and dispose of properly. Never hose down or bury dry material spills.

- Cleanup of large chemical spills should use adsorbents, gels, and foams. For small spills, use absorbent materials rather than hosing down the spill.
- Remove the adsorbent materials promptly and dispose of properly.
- If a dead-end sump is not used to collect spills, install an oil/water separator.
- For larger spills, a private spill cleanup company or Hazardous Materials (HAZMAT) response team may be necessary.

Reporting & Record Keeping

- Promptly report spills that pose an immediate threat to human health or the environment to the State of Hawai'i Department of Health, Hazard Evaluation & Emergency Response Office at (808) 586-4249 or (808) 247-2191 (after business hours).
- Federal regulations require that any oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 1-800-424-8802 (24 hour).
- Report spills into MS4 (City Street) to Storm Water Quality (SWQ) Division at (808) 768-3242.
- Report spills to 911 for dispatch and clean-up assistance when needed. Do not contact fire agencies directly.
- Comply with State regulations regarding spill reporting.

A-2 Waste Handling & Disposal

TARGETED POLLUTANTS

- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Improper storage and handling of liquid and solid wastes can allow toxic compounds, oils and greases, heavy metals, nutrients, suspended solids, and other pollutants to enter storm water runoff. The discharge of pollutants to storm water from waste handling and disposal can be prevented and reduced through source control pollution prevention and BMP implementation.

Waste Collection and Receptacle Area

- Keep waste collection areas clean. See also Activity BMP Fact Sheet A-18 Pressure Washing.
- Use only watertight dumpsters and keep the lids closed. Solid waste containers must be closed/covered tightly when not in use.
- Install a roof over the dumpster area or place waste containers under cover, if possible.
- Grade and pave the dumpster area to prevent run-on of storm water.
- Install a low containment berm around the dumpster area.
- Use and maintain drip pans under dumpsters.
- Do not fill dumpsters with washout water or any other liquid.
- Ensure that only appropriate solid wastes are added to dumpsters. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc. may not be disposed of in solid waste containers.
- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal.
- Post waste disposal charts in appropriate locations detailing for each waste its hazardous nature (poison, corrosive, flammable), prohibitions on its disposal (dumpster, drain, sewer) and the recommended disposal method (recycle, sewer, burn, storage, landfill).

Litter Control

- Provide a sufficient number of trash cans for the facility.
- Clean out trash cans frequently and cover to prevent spillage.

Transfers

- Transfer waste from damaged containers into safe containers.
- Take special care when loading or unloading wastes to minimize loses. Loading systems can be used to minimize spills and fugitive emission losses such as dust or mist. Vacuum transfer systems can minimize waste loss.
- Use drip pans or absorbent materials whenever grease containers are emptied by vacuum trucks or other means.

Storage Areas

- Cover storage containers with leak proof lids or other means. If waste is not in containers, cover all waste piles (plastic tarps are acceptable coverage) and prevent storm water run-on and runoff with a berm. Waste containers or piles must be covered except when in use.
- Check storage containers weekly for leaks and ensure that lids are on tightly. Replace any containers or lids that are leaking, corroded, or otherwise deteriorating.
- Sweep and clean the storage area regularly. Do not hose down the area to a storm drain.
- Dispose of rinse and wash water from cleaning waste containers into a sanitary sewer if allowed by the City's Department of Environmental Services. Do not discharge wash water to the street or storm drain.

Chemical/Hazardous Wastes

- Select designated hazardous waste collection areas onsite.
- Store hazardous materials and wastes in covered containers, protected from vandalism, and in compliance with fire and hazardous waste codes.
- Place hazardous waste containers in secondary containment.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.

Liquid Wastes

- Liquid wastes should not be disposed of down storm drains or into streams. Liquid wastes may include chemicals, beverages, food products or ingredients, wash water, etc.

Preventing Run-On & Runoff

- Prevent storm water run-on from entering the waste management area by enclosing the area or building a berm around the area.
- Prevent the waste materials from direct contact with rain.
- Cover waste piles with material such as reinforced tarpaulin, polyethylene, polyurethane, polypropylene, or hypalon for temporary protection.
- Cover the area with a permanent roof if feasible.
- Cover dumpsters to prevent rain from washing waste out of holes or cracks in the bottom of the dumpster.

Inspection & Maintenance

- Regularly inspect dumpsters for structural damage or leaks. Repair or replace damaged containers as necessary.
- Check storage areas weekly for leaks and ensure that lids or covers are on tightly.
- Inspect and repair leaking equipment including valves, lines, seals, or pumps promptly.
- Transfer waste from damaged containers into safe containers.

Waste Reduction – Reuse & Recycling

- Recycle waste whenever possible. Many types of waste can be recycled, recycling options for each waste type are limited. All gasoline, antifreeze, waste oil, and lead-acid batteries can be recycled. Latex and oil-based paint can be reused, as well as recycled.

A-3 Housekeeping Practices

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Poor housekeeping practices can potentially result in harmful materials such as fertilizers, pesticides, cleaning solutions, paint products, automotive products, and swimming pool chemicals entering storm water. A clean, organized workspace reduces this risk and can create a safer and more efficient workplace. Related information is provided in Activity BMP Fact Sheets A-1 Spill Prevention, Control & Cleanup and A-2 Waste Handling & Disposal.

Cleanup

- Keep work sites clean and orderly.
- Remove debris in a timely fashion.
- Sweep or vacuum work sites.
- When cleaning floors, use dry cleanup methods first before using wet cleanup methods.
- Dispose of wash water, or mop water into designated basins and sinks. If none are available, and so long as the mop water does not contain hazardous or toxic chemicals, wash water can be disposed of in landscaped areas, away from storm drain inlets.
- Dispose of sweepings in the trash.
- Recycle or dispose of fluids properly.
- Establish a daily checklist of office, yard and plant areas to confirm cleanliness and adherence to proper storage and security. Specific employees should be assigned specific inspection responsibilities and given the authority to remedy any problems found.

Storage

- Provide an adequate number of trash receptacles for your customers and employees. This helps keep trash from overflowing the receptacles.
- Avoid storage of large quantities of materials. Purchase only the amount of material that will be needed for foreseeable use.

A-4 Employee Training

A successful employee training program empowers employees to prevent pollutants from entering storm water. Employees should know the best management practices for the business activity they conduct. Employees should be regularly trained, and records should be kept of the trainings provided.

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Training Purpose

The four objectives for employee training are:

- Identify issues and activities with the potential to pollute storm water;
- Identify solutions (BMPs);
- Promote employee ownership of the problems and the solutions; and
- Integrate employee feedback into training and BMP implementation.

Training Methods

- Train employees who are involved in activities that may cause pollutants to enter the storm drain system.
- Cover topics of storm water management, potential contamination sources, and BMPs.
    - Train employees in standard operating procedures and spill cleanup techniques. See Activity BMP Fact Sheet A-1 Spill Prevention, Control & Cleanup. Employees trained in spill containment and cleanup should be present during the loading/unloading and handling of materials.
    - Train employees in the proper handling and disposal of waste. See Activity BMP Fact Sheet A-2 Waste Handling & Disposal. *Storm drains are not to be used for any type of waste disposal*. Nothing but rain should enter the storm drain.
    - Train employees who handle potentially harmful materials in the use of efficient and safe housekeeping practices (storage, use, and cleanup) when handling potentially harmful materials. See Activity BMP Fact Sheet A-3 Housekeeping Practices.
    - Make sure to identify locations of supplies and tools for BMP implementation (e.g., spill clean-up materials). Consider posting Activity BMP Fact Sheets around the workplace to reinforce the training.
- Use courses, seminars, workshops, product demonstrations, employee meetings, posters, and bulletin boards as appropriate.
- Train personnel who use pesticides. The State Department of Agriculture, Pesticides Branch, licenses pesticide dealers, certifies pesticide applicators, and conducts onsite inspections.

- Promote open communication between employees and management and improve storm water quality management based on past experience involving water quality problems. Implement revised practices and procedures in training. A successful employee training program empowers employees to prevent pollutants from entering storm water.
- Use and reward employee suggestions related to BMPs, hazards, pollution reduction, workplace safety, cost reduction, alternative materials and procedures, recycling, and disposal.

Training Frequency

- Train employees upon hiring and at least once per year.

Training Resources

- Resources are available on the City and County of Honolulu Storm Water Quality website: **CleanWaterHonolulu.com.**

Training Log

- Keep a training log that includes training topic, trainer, attendees, date, and frequency. The training log should help your business to track when training refreshers are needed. See **Appendix C** for a sample form. Having a training log demonstrates to City and State inspectors that pollution prevention training is occurring.

A-5 Drain Connections

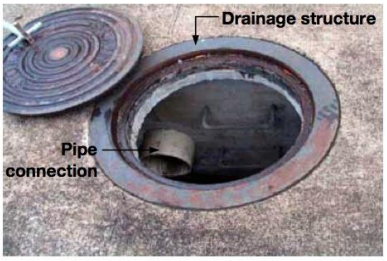
All drainage connections from non-municipal and private property to the City drainage system must have a storm drain connection license issued to the property owner.

A drainage connection can be via a drainage pipe, including pipes or hoses, that conveys water flow directly into a gutter, channel, or drainage structure. A drain connection can also be via a ditch (channel) or swale and may include private drainage systems that convey water flow into the City drainage system. The pictures below illustrate the most common types of commercial and industrial drain connections.

Commercial/Industrial

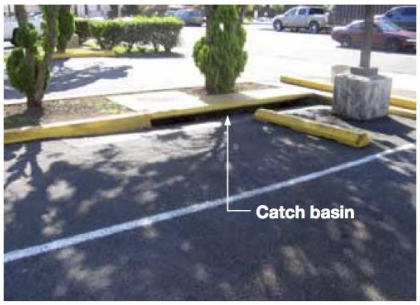
Underground pipes convey runoff to the gutter through the curb.

A drain pipe connects runoff from a parking lot directly into a City drainage channel.



A pipe from private property connects directly into a City storm drainage structure.

A drain inlet on a private road collects and conveys runoff into the City's storm drainage system.



A catch basin in a private parking lot collects and conveys runoff into the City's storm drainage system.

Runoff from private property is conveyed to the gutter through an opening in the sidewalk.

Drain Connection Requirements

- Each property owner of a shared private drainage system is required to have a private drain connection license.
- Property owners are responsible for the care and maintenance of their connection and/or private drainage system and should prevent pollutants from entering the City's drainage system to the maximum extent practicable.

Violations/Fines

- Any private storm drain system that is connected to the City's MS4 without a license issued to the property owner is considered an illegal storm drain connection.
- The City may issue warnings or fines depending on the severity of the violation, which could range from $1,000 to $25,000 per violation per day.

Drain Connection Licenses

- To apply for a storm drain license online:
    - Go online to CleanWaterHonolulu.com and click on Forms.
    - Click on the Private Storm Drain Connections application
    - Complete and send in per the instructions on the form.
    - For questions, call the Department of Planning and Permitting (DPP) at 768-8106.

Inspections & Maintenance:

- Refer to Activity BMP Fact Sheet A-22 Drainage System Maintenance.

A-6 Vehicle & Equipment Fueling

TARGETED POLLUTANTS

- Trash
- Metals
- Oil and Grease
- Organics

Fuel Dispensing Areas

- "Spot clean" leaks and drips routinely.
- Sweep the fueling area periodically, if it is paved, to collect loose particles, and wipe up spills with rags and other absorbent material immediately. Use dry cleaning methods. Do not hose down the area to a storm drain.
- Install vapor recovery nozzles to help control drips as well as air pollution.
- Fit fuel dispensing nozzles with automatic shutoffs except where prohibited by local fire departments.
- Post signs at the fuel dispenser or fuel island warning vehicle owners/operators to discourage "topping off" vehicle fuel tanks.

Fuel Dispensing Area Design

- Pave area with concrete rather than asphalt to prevent fuel from infiltrating into the ground. Use secondary containment when transferring fuel from the tank truck to the fuel tank. Cover storm drains in the vicinity during transfer.
- Ensure the following safeguards are in place:
    - Overflow protection devices on tank systems to warn the operator or automatically shut down transfer pumps when the tank reaches full capacity.
    - Protective guards around tanks and piping to prevent damage to tanks from vehicles or forklifts.
    - Clear tagging or labeling of all valves to reduce human error.
    - Emergency shut-off and emergency phone number.
- Ensure fueling area is covered and not exposed to rain.
- Minimize run-on to fueling area.

Air/Water Supply Area

- Minimize the possibility of storm water pollution from air/water supply areas by:
  - Spot cleaning leaks and drips routinely to prevent runoff of spillage.
  - Grading and paving the air/water supply area to prevent storm water from running onto the area.
  - Installing a roof over the air/water supply area.
- Install a low containment berm around the air/water supply area.

Operation & Maintenance

- Clean out of sumps and oil/water separators as required for devices to maintain their effectiveness, usually at least once a month. Sediment removal is also required on a regular basis to keep the device working efficiently.
- Keep ample supply of spill cleanup materials onsite.
- Inspect fueling areas, storage tanks, catch basin inserts, containment areas, and drip pans on a regular schedule and repair immediately.
- Comply with all federal and state requirements regarding underground storage tanks.

Inspection

- Above ground tank leak and spill control:
  - Check for external corrosion and structural failure
  - Check for spills and overfills due to operator error.
  - Check for failure of piping system.
  - Check for leaks or spills during pumping of liquids or gases from truck to a storage facility or vice versa.
  - Visually inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.
  - Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
  - Conduct integrity testing periodically by a qualified professional.
- Inspect and clean, if necessary, storm drain inlets and catch basins within the facility boundary before and after major storm events.

A-7 Vehicle & Equipment Washing

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Metals
- Oil and Grease
- Organics

Vehicle and equipment cleaning performed outdoors or in areas where wash water flows onto the ground can contribute toxic hydrocarbons and other organic compounds, oils and greases, nutrients, phosphates, heavy metals, and suspended solids to storm water runoff.

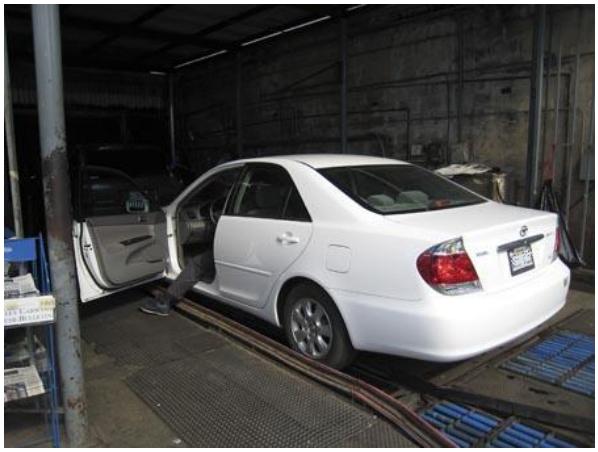
Vehicle & Equipment Cleaning

- Use dry cleaning methods to remove debris and sweep area; avoid washing with water when possible.
- Use biodegradable, phosphate-free detergents for washing vehicles.
- Map onsite storm drain locations to avoid discharges to the storm drain system.

Designated Wash Area

- Mark the area clearly as a wash area by:
  - Posting signs stating that only washing is allowed in wash area; and
  - Providing information on how washing is to be done.
- Have all vehicle and equipment washing done in areas designed to collect and hold the wash and rinse water and effluent generated. Recycle, collect, or treat wash water effluent prior to discharge to the sanitary sewer system (which goes to a wastewater treatment plant).
- If washing/cleaning must occur onsite, consider washing vehicles and equipment inside the building or on an impervious surface to control the targeted pollutants by directing them to the sanitary sewer, rather than the storm water system.
- If washing must occur onsite and outdoors:
  - Use designated paved wash areas. This area must be covered or bermed to collect the wash water and graded to direct the wash water to a treatment or disposal facility.

  - Do not conduct oil changes and other engine maintenance in the designated washing area. Perform these activities in a place designated for oil change and maintenance activities.
  - Cover the wash area when not in use to prevent contact with rain water.
  - Wash in an area where water can stay onsite and evaporate, if possible.
  - Use a wash bucket to limit the amount of wash water.



- Provide trash containers in wash area.
- Do not permit steam cleaning wash water to enter the storm drain system.
- Use hoses with nozzles that automatically turn off when left unattended.
- Install sumps or drain lines to collect wash water for treatment.

Managing Vehicle Wash Water

- Collect all wash water from vehicle and equipment cleaning operations. Treat and recycle the water - or discharge wash waters to a sanitary sewer system. Contact City and County of Honolulu Environmental Services regarding industrial wastewater discharge requirements of discharge to sanitary sewer.
- Large quantities of wash waters may require treatment at the facility. Treatment using a process treatment system (e.g., holding tank, filtration system) requires engineering and capital expenditures.
- Wash water that does not contain chemicals may be directed to a landscaped area. Wash water must be completely absorbed by the landscaping with no runoff.

Operation & Maintenance

- Perform regular wash and collection system inspections and repair.
- Sweep washing areas frequently to remove solid debris.
- Repair berms and dikes as necessary.
- Some areas may require pretreatment and monitoring of wash water discharges to the sanitary sewer.

Inspections

- Perform routine inspections of drain lines, holding tanks, and hoses and repair leaks immediately.
- Perform routine inspection and maintenance of wash water recycling and treatment systems.
- Inspect and maintain sumps, oil/water separators, and onsite treatment/recycling units.

A-8 Vehicle & Equipment Maintenance & Repair

TARGETED POLLUTANTS

- Metals
- Oil and Grease
- Organics

Vehicle or equipment maintenance and repair are potentially significant sources of storm water pollution due to use of harmful materials and wastes during maintenance and repair processes.

Designated Vehicle Maintenance Area

- Check incoming vehicles for leaking oil and fluids.
- Conduct maintenance and repair activities indoors whenever feasible.
- Keep storm or rainwater away from outside operations through berming and appropriate drainage routing.
- Cover the work area to limit exposure to rain.
- Sweep the maintenance area to collect loose particles. Wipe up spills with rags and other absorbent material immediately.
- Routine cleanout of oil and grease is required for storm water devices to maintain their effectiveness (usually at least once a month). During periods of heavy rainfall, cleanout is required more often to ensure pollutants are not washed through the trap. Sediment removal is also required.
- Avoid hosing down work areas. If work areas are washed, collect and direct wash water to sanitary sewer. Contact City and County of Honolulu Environmental Services regarding industrial wastewater discharge requirements of discharge to sanitary sewer.

Degreasing and Parts Cleaning

- Clean parts without using liquid cleaners whenever possible to reduce waste.
- Steam cleaning and pressure washing may be used instead of solvent parts cleaning.

- Choose cleaning agents that can be recycled; if solvents are used, ensure proper disposal via third party.
- Do all liquid cleaning at a centralized station so the solvents and residues stay in one area.
- Locate drip pans, drain boards, and drying racks to direct drips back into a solvent sink or fluid holding tank for reuse.
- Keep accurate maintenance logs to evaluate materials removed and improvements made.
- Post signs at sinks to remind employees not to pour wastes down drains.

Draining & Replacing Fluids

- Designate a special area to drain and replace motor oil, coolant, and other fluids. The area should not have connections to the storm drain or the sanitary sewer, and the surface should allow easy clean-up of drips and spills.
- Keep drip pans or containers under vehicles or equipment that may drip during repairs, while unclipping hoses, unscrewing filters, or removing other parts.
- Ensure that the drain pan or drip pan is large enough to contain drained fluids (e.g., larger pans are needed to contain antifreeze, which may gush from some vehicles).
- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.
- Use a tarp, ground cloth, or drip pans beneath the vehicle or equipment to capture all spills and drips if temporary work is being conducted offsite. Collected drips and spills must be disposed, reused, or recycled properly.

Equipment/Vehicle Storage

- Keep equipment clean; don't allow excessive build-up of oil and grease.
- Store unused/idle equipment under cover.
- Place barriers around the immediate boundaries of equipment to contain leaks and spills.
- Drain oil and other fluids first if the vehicle or equipment is to be stored outdoors. Elevate and tarp stored vehicles and equipment.
- Build a shed or temporary roof over areas where parked cars await repair or salvage, especially wrecked vehicles.
- Drain all fluids immediately from wrecked vehicles.

Preventative Maintenance & Repair Activities

- Inspect vehicles and equipment for leaks regularly and repair immediately.

- Do not allow leaking vehicles or equipment onsite. Pans should be placed under any leaks to collect the fluids for proper disposal or recycling until leaks can be fixed.
- Provide a designated area and spill kits for after-hour deliveries.

Waste Segregation, Storage and/or Recycling

- Recycle used motor oil, diesel oil, and other vehicle fluids and parts whenever possible.
- Separate wastes for easier recycling. Keep hazardous and non-hazardous wastes separate, do not mix used oil and solvents, and keep chlorinated solvents separate from non-chlorinated solvents.
- Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries).
- Store cracked batteries in a non-leaking secondary container and dispose of properly at recycling or household hazardous waste facilities.
- Recycle oil filters: refer to oil suppliers or recycler about recycling oil filters.

Storm Drain Management

- Paint signs on storm drain inlets to indicate that liquid or solid wastes should not go down the drain.
- Place barriers around the immediate boundaries of equipment to contain leaks and spills.

A-9 Vehicle Painting

Auto body painting is a potentially significant source of storm water pollution due to use of harmful materials and wastes during painting processes.

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Designated Auto Body Painting Area

- Conduct all painting indoors, preferably in a paint booth.
- Cover or enclose painting operations properly to avoid drift.
- Use a ground cloth to collect drips and residue properly.
- Wipe up spills with rags and other absorbent material immediately.
- Develop paint handling procedures for proper use, storage, and disposal.

Primers, Paints and Painting

- Test and inspect spray equipment prior to starting to paint. Tighten all hoses and connections and do not overfill paint containers.
- Mix paint indoors before using so that any spill will not be exposed to rain. Do so even during dry weather because cleanup of a spill will never be 100% effective.
- Cover nearby storm drain inlets prior to starting work if sand blasting is used to remove paint.
- Use a drop cloth for paint mixing and painting.
- Collect the chips/dust if scraping or sand blasting the existing surface and dispose of properly.
- Use a vacuum for fine particle cleanup in pavement cracks and crevices.

Minimizing Product Use

- When cleaning auto body parts before painting, minimize use of hose-off degreasers. Brush off dirt and use rags to wipe down parts. If an acid-based metal cleaner or cleaner/conditioner is used to treat bare metal and rinse water is recommended to stop the chemical reaction, use as little water as possible and wipe down the area with a rag or towel.
- Reduce waste by using low-volume paint mixing equipment and high-efficiency painting tools.
- Minimize waste paint and thinner by carefully calculating paint needs based on surface area and using the proper sprayer cup size.
- Clean brushes and tools covered with non-water-based paints, finishes, or other materials in a manner that enables collection of used solvents (i.e., paint thinner, turpentine, etc.) for recycling or proper disposal.

- Clean spray guns in a self-contained cleaner. The gun-cleaning solution, whether solvent or aqueous-based, should be recycled or disposed of properly when it becomes too dirty to use. Never discharge gun-cleaning solution to the sewer or storm drain.
- Do not use water to control overspray or dust in the paint booth unless it is sure to evaporate in the booth (so the dust can be swept up), or this wastewater is collected. The water should be treated prior to discharge into the sewer system.

Disposal

- Collect all metal filings, dust, and paint chips from grinding, shaving, and sanding, and dispose of the waste properly. Never discharge these wastes to the storm drain or sanitary sewer.
- Designate a special area to drain primers, paints, and other fluids. The area should not have connections to the storm drain or the sanitary sewer, and the surface should allow easy clean-up of drips and spills.
- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.
- Recycle paint when possible.
- All hazardous wastes must be labeled and disposed of according to hazardous waste regulations.

A-10 Vehicle & Equipment Staging

The storage of vehicle and equipment at staging areas can contribute pollutants to storm water runoff, including toxic hydrocarbons and other organic compounds, oil and grease, nutrients, phosphates, heavy metals, and trash.

TARGETED POLLUTANTS

- Sediment
- Metals
- Oil and Grease
- Organics

Vehicle & Equipment Storage

- Keep equipment clean; don't allow excessive build-up of oil and grease.
- Where possible, store unused/idle equipment under cover.
- Consider building a shed or temporary roof over areas where cars or equipment await repair or salvage, especially wrecked vehicles.
- Place barriers around stored equipment to contain leaks and spills.

On-Street Construction Staging Area

- Install appropriate drain inlet protection at the catch basins or grated inlets that may be affected.
- Place filter socks (e.g., curb biosocks) around the immediate boundaries of equipment to contain leaks and spills.
- Do not wash down the pavement to clean the street. If sweeping is ineffective or if it is necessary to wash the streets, wash water must be contained by vacuuming the wash water or diverting it to an acceptable disposal area.

Preventative Maintenance & Repair Activities

- Pans should be placed under any vehicle or equipment leaks to collect the fluids for proper disposal or recycling until leaks can be fixed.
- Drain all fluids immediately from wrecked vehicles, or vehicle and equipment to be stored outdoors.
- Ensure that the drain or drip pan is large enough to contain drained fluids (e.g., larger pans are needed to contain antifreeze, which may gush from some vehicles).
- Use a tarp, ground cloth, or drip pans beneath the vehicle or equipment to capture all spills and drips if maintenance work is being conducted at the staging area. If possible, perform fluid changes or removal under cover.
- Elevate and tarp stored vehicles and equipment.

- Wipe up oil and grease drips and spills immediately and dispose of properly.

Inspections & Maintenance

- Inspect vehicles and equipment regularly for leaks or spills.
- Inspect and clean, if necessary, storm drain inlets and catch basins within the area.

A-11 Loading/Unloading

The loading/unloading of materials usually takes place outside on docks or terminals; therefore, materials spilled, leaked or lost during loading/unloading may end-up in the soil or on other surfaces and could be carried away by storm water runoff or cleaning activities.

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Trash
- Metals
- Oil and Grease
- Organics

Loading/Unloading

- Park tank trucks or delivery vehicles in designated areas so that spills or leaks can be contained.
- Have employees load and unload all materials and equipment in covered areas such as building overhangs at loading docks.
- Avoid loading/unloading near storm drains.
- Post “no littering” signs.

Liquid Transfer Operations

- Contain leaks during transfer. Use drip pans underneath hose and pipe connections and other leak-prone spots.
- Store drip pans in a covered location near the liquid transfer area so that they are always available.
- Clean drip pans periodically.
- Dispose of drip collected materials to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.
- Spot clean leaks and drips routinely to prevent runoff of spillage.
- Keep valves tightly closed.
- Keep drums sealed.
- Avoid “topping off.”

Solid Material Transfer Operations

- Perform work area clean-up and dry sweep after daily operations.
- Do not load or unload materials that produce excessive dust unless the area is equipped with a dust control device and the dust is disposed of properly.
- Where door skirts are fitted to loading docks, make sure trailers are parked snug against the skirts before handling any materials.
- Immediately clean up any spilled materials to avoid tracking them away from the facility.

Design of Loading/Unloading Area

- Pave loading/unloading areas with concrete instead of asphalt.
- Cover designated loading/unloading areas to reduce exposure of materials to rain.
- Consider placing a seal or door skirt between delivery vehicles and building to prevent exposure to rain.
- Prevent storm water from other areas from running into the loading area by sloping the pad and using a curb, like a speed bump, around the uphill side of the loading/unloading area. Position the roof downspouts so they direct storm water away from the area.
- Avoid placing storm drain inlets within loading areas.
- Prevent spilled liquids from entering the storm drain system by grading and/or berming the loading/unloading area and direct drainage to a dead-end sump or to the sanitary sewer. Regularly remove materials accumulated in the sump.

Operations Plan

- Develop an operations plan that describes procedures for loading and/or unloading.
- Limit materials and equipment rainfall exposure to all extents practicable.
- Conduct regular inspections and make repairs and improvements as necessary.
- Check loading and unloading equipment regularly for leaks.
- Conduct regular broom dry sweeping of area. Do not wash with water.
- Require employees to understand and follow spill and leak prevention BMPs.

A-12 Liquid Container Storage

TARGETED POLLUTANTS

- Nutrients
- Metals
- Oil and Grease
- Organics

Accidental releases of materials from aboveground liquid storage tanks, drums, and dumpsters have the potential for contaminating storm water with many different pollutants.

Containment

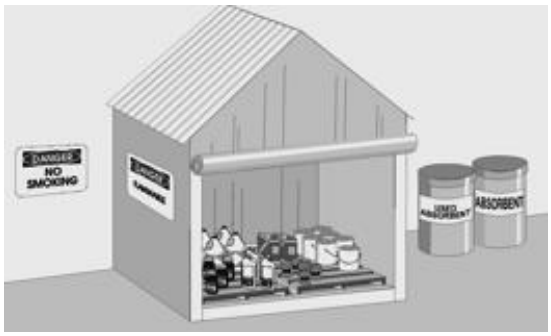
- Secure storage drums in an area where unauthorized persons may not gain access to prevent accidental spillage, pilferage, or other unauthorized use.
- Install curbing or berms along the perimeter of the area to prevent the run-on of uncontaminated storm water from adjacent areas as well as runoff of storm water from the stockpile areas.
- Slope paved areas to minimize pooling of water on the site, particularly with stored materials that may leach pollutants into storm water and/or groundwater, such as compost, logs, and wood chips. A minimum slope of 1.5% is recommended.
- Slope the area inside the curb or berm to a drain with sump. The sump should be equipped with an oil and water separator if applicable for materials stored onsite.
- The area should be sloped to drain storm water to the perimeter where it can be collected or to internal drainage alleyways where material is not stockpiled.
- The storm drainage system should be designed to minimize use of catch basins in the interior of the area as they tend to rapidly fill with manufacturing material.
- Storm water runoff that could potentially be contaminated by materials stored outdoors should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.

Storage Containers

- Use only watertight containers with tight-fitting lids.
- Keep chemicals in their original containers and well labeled.
- Keep an up-to-date inventory of the materials delivered and stored onsite.

Storage Areas

- Cover the storage area with a roof that prevents rain from falling on the liquid storage containers.
- Provide containment for potential leaks and spills by:
    - Enclosing the container storage area.
    - Building or providing a low barrier around the storage area.
    - Using a walled structure for storage of liquid containers.
    - Raising containers off the ground by use of pallet or similar method, with provisions for spill control.



- The "doghouse" design has been used to store small liquid containers. The doghouse has two solid structural walls and two canvas covered walls. The flooring is wire mesh over secondary containment. The roof and flooring design prevent direct contact with rain or runoff.
- Do not store liquid containers near the storm drainage system or surface waters.
- Provide barriers such as posts or guardrails, where tanks are exposed, to prevent collision damage from vehicles.
- Provide secure storage to prevent vandalism-caused contamination.
- Immediately clean up any spilled materials to avoid tracking them.

Curbed Areas

- Immediately remove spilled materials from curbed areas to allow space for future spills. Curbed areas are designed only for smaller spills.
- Remove accumulated storm water after rain events and dispose of properly.
- Inspect regularly to clear clogging debris.
- Use manually-controlled pump systems rather than common drainage systems for collection of spilled materials.
- Curbing has the following advantages:
    - Keeps storm water from other areas out of the curbed storage area;
    - Inexpensive;
    - Ease of installment;
    - Provides option to recycle materials spilled in curb areas.

Aboveground Tanks & Containers Safeguards and Spill Control

- Use overflow protection devices to warn operator or automatic shutdown transfer pumps.
- Provide protection guards (bollards) around tanks and piping to prevent damage from a vehicle or forklift.
- Tag or label valves, and restrict access, to reduce human error.
- Provide storage tank piping located below product level with a shut-off valve at the tank; ideally this valve should be an automatic shear valve with the shut-off located inside the tank.
- Berm or surround tank or container with secondary containment system, including dikes, liners, vaults, or double walled tanks.
- Secondary containment areas may be required to connect to the sanitary sewer, prohibiting any hard connections to the storm drain.
- Contact the appropriate regulatory agency regarding environmental compliance for facilities with "spill ponds" designed to intercept, treat, and/or divert spills.
- Use Safety Data Sheets (SDS) to identify hazardous components and keep incompatible products apart. Make sure appropriate personal protective equipment and clean-up products are nearby.
- Pave areas around aboveground tanks with cement concrete to be free of cracks and gaps and to contain leaks and spills.
- Store liquid materials in Underwriters Laboratories Inc. (UL) approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10% total of the volume of the containers or 110% of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain.
- For used oil or dangerous waste, install a dead-end sump in the drain.
- Drain other liquids to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- Pass accumulated storm water in petroleum storage areas through an oil/water separator.

Dikes for Large Liquid Storage Tanks and Trucks

- Containment dikes should be large enough to hold single-wall storage tank contents plus rainwater.
- For trucks, diked areas should be capable of holding an amount equal to the volume of the tank truck compartment. Diked construction material should be strong enough to safely hold spilled materials.
- Dike materials can consist of earth, concrete, synthetic materials, metal, or other impervious materials.
- Strong acids or bases may react with metal containers, concrete, and some plastics, so where strong acids or bases are stored, alternative dike materials should be considered. More active organic chemicals may need certain special liners for dikes.
- Dikes may also be designed with impermeable materials to increase containment capabilities.
- Dikes should be inspected during or after significant storms or spills to check for washouts or overflows.
- Regular checks of containment dikes should be conducted to ensure the dikes are capable of holding spills.
- Storm water overflow, dike erosion, soggy areas, or changes in vegetation indicates problems with dike structures. Damaged areas should be patched and stabilized immediately.

- Earthen dikes may require special maintenance of vegetation such as mulching and irrigation.
- Remove accumulated storm water after precipitation events and dispose of according to local regulations.

Inspections & Maintenance

- Inspect storage areas regularly for leaks or spills.
- Sweep and clean the storage area regularly if it is paved, and do not hose down the area to a storm drain.
- Check for storage containers and piping for external corrosion and structural failure.
- Replace containers that are leaking, corroded, or otherwise deteriorating with ones in good condition. If the liquid chemicals are corrosive, containers made of compatible materials must be used instead of metal drums.
- New or secondary containers must be labeled with the product name and hazards.
- Check for spills and overfills due to operator error.
- Check for leaks or spills during pumping of liquids or gases from truck to a storage facility or vice versa.
- Check for failure of piping system (pipes, pumps, flanges, coupling, hoses, and valves).
- Inspect new tank or container installations for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Have periodic integrity testing conducted by a qualified professional.
- Frequently release accumulated storm water during wet season.

Building & Fire Code Standards

- Storage sheds often must meet City and County code amendments of the International Building Code (IBC) and NFPA 1 of the National Fire Protection Association.
- The local fire district must be consulted for limitations on clearance of roof covers over containers used to store flammable materials.
- All specific standards set by Federal and State laws concerning the storage of oil and hazardous materials must be met.
- Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code.
- Storage of oil and hazardous materials must meet specific Federal and State standards including:
    - Spill Prevention Control and Countermeasure (SPCC) Plan;
    - Secondary containment;
    - Integrity and leak detection monitoring; and
    - Emergency preparedness plans.

A-13 Equipment & Operations Maintenance

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Operating and maintaining equipment outdoors are potentially significant sources of storm water pollution due to use of harmful materials and wastes during maintenance and repair processes.

Process Equipment Operations and Maintenance

- Perform operations and maintenance during dry periods whenever possible.
- Ensure wind erosion controls are in place to prevent wind transport of particulates or pollutants.
- Minimize contact of storm water with outside process equipment operations through berming and drainage routing that prevents storm water from running into the operations area (run-on prevention).
- Dry clean the work area regularly. Do not wash outdoor equipment with water if there is a direct connection to the storm drain.
- "Spot clean" leaks and drips routinely. Leaks are not cleaned up until the absorbent is picked up and disposed of properly.
- Use drop cloths for sanding and painting operations.
- Use a vacuum for fine particle clean-up in pavement cracks and crevices.
- Use roll down or permanent walls when it is windy/breezy to prevent wind transport of particulates/pollutants.
- Paint signs on storm drain inlets to indicate that they are not to receive liquid or solid wastes.

Designated Equipment Areas

- When selecting a designated equipment area, choose a concrete area rather than asphalt.
- Consider building a permanent shed or temporary roof over work area where possible. Sheds must meet building and fire code requirements.

- Install secondary containment measures where leaks and spills may occur. Containment measures may include drip pans, tarps, ground cloths or spill cleanup materials.
- Minimize contact of storm water with outside process equipment operations through berming and drainage routing that prevents storm water from running into the operations area (run-on prevention).
- Use a perimeter drain or slope pavement inward with drainage to sump.
- Connect process equipment area to the sanitary sewer or facility wastewater treatment system when possible. Contact City and County of Honolulu Environmental Services for industrial wastewater discharge permit.
- Paint signs on storm drain inlets to indicate that they are not to receive liquid or solid wastes.

Inspections & Maintenance

- Regularly inspect outdoor equipment for leaks or spills and repair immediately. See Activity BMP Fact Sheet A-8 Vehicle & Equipment Maintenance & Repair.
- Check for structural failure, spills and overfills due to operator error, and/or failure of piping system.
- Inspect and clean storm drain inlets and catch basins within the equipment area, if necessary.
- Routine cleanout of oil and grease is required for storm water devices to maintain their effectiveness, (usually at least once a month). During periods of heavy rainfall, cleanout is required more often to ensure pollutants are not washed through the trap. Sediment removal is also required.

A-14 Storage of Solid Materials & Products

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Metals
- Oil and Grease
- Organics

Solid materials and products exposed to rain and/or runoff can pollute storm water.

Storage Areas

- Store materials that could contaminate storm water inside or under permanent cover.
- If raw materials cannot all be stored inside or under permanent cover, prevent exposure to direct rain and storm water run-on by installing a storm-resistant waterproof covering made of polyethylene, polypropylene, or hypalon over all materials stored outside. The covers must be in place at all times when work with the stockpiles is not occurring.
- Elevate and tarp solid materials such as beams, metal, etc.
- Cover wood products treated with chromated copper arsenate, ammoniacal copper zinc, arsenate, creosote, or pentachlorophenol with properly secured tarps or store indoors.
- Keep storage areas clean and dry.
- Do not store materials on top of or directly adjacent to storm drain inlets.
- Storage sheds and storage of reactive, ignitable, or flammable liquids must comply with the Uniform Fire Code and the National Electric Code.
- The local fire district must be consulted for limitations on clearance of roof covers over containers used to store flammable materials.
- Do not store sand, soil, mulch, or other landscaping materials on permeable/porous pavements to avoid clogging the surface.

Inventory

- Minimize the inventory of raw materials stored outside.
- Accurate and up-to-date inventories should be kept of all stored materials and materials delivered.

Erosion Control Practices

- Keep materials covered to prevent erosion of stockpiles. This may not be feasible for large stockpiles.
- If the stockpiles are so large that they cannot feasibly be covered and contained, implement the sediment control practices described below.

Sediment Control Practices

- Install sediment controls such as fiber rolls around the perimeter of stockpiles to prevent transport of raw materials to the storm drain.
- Install drain inlet protection around all inlets to prevent raw materials from entering storm drain.
- Install sediment controls such as silt fences around the perimeter of the site to prevent transport of raw materials to the storm drain or offsite surface waters.

Inspections & Maintenance

- Maintain outdoor waterproof covers (e.g., tarps) in good condition and properly secure them to be storm resistant. Regularly replace tarps damaged by UV exposure or wear and tear.
- Perform routine inspection of storm drains and sumps and regularly remove accumulated materials.
- Routinely inspect berms and sediment controls for proper function; repair as necessary.
- Sweep parking lots or other surfaces near bulk materials storage areas periodically to remove debris blown or washed from storage areas.
- Sweep paved storage areas regularly for collection and disposal of loose solid materials; do not hose down the area to a storm drain or conveyance ditch.

A-15 Contaminated or Erodible Areas

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Metals
- Bacteria
- Oil and Grease
- Organics

Baseyards, recycling and scrap yards, quarries and their industrial and commercial activities with bare soils need to implement erosion and sediment control BMPs to stabilize soils and reduce pollutant discharges from contaminated or erodible surfaces. In addition, these areas may be contaminated from past or current activities. Sites with excessive erosion or the potential for excessive erosion should also employ the soil erosion BMPs identified in the Construction BMP Manual.†

Erosion & Sediment Controls

- Implement wind erosion control measures as necessary. Refer to WE-1 Wind Erosion Control, in the Construction BMP Manual.†
- Stabilize all roadways, entrances, and exits to sufficiently control erodible materials from discharging or being tracked off the site. Refer to Tracking Control (TR) Fact Sheets in the Construction BMP Manual.†
- Preserve as much native vegetation onsite as possible. Vegetation provides a natural buffer zone and an opportunity for infiltration of storm water and pollutant capture in the soil matrix. This practice can be used as a permanent source control measure. Refer to Erosion Control Fact Sheet EC-2 Preservation of Existing Vegetation in the Construction BMP Manual.†

Revegetation & Stabilization of Erodible Areas

- Stabilize loose soils by re-vegetating.
- Lack of vegetation may be due to the lack of water, poor soils and/or soil compaction; the soil may need fertilization, and/or tillage.
- Different species, soil types, and climatic conditions will require different maintenance activities such as mulching, fertilizing, liming, irrigation, pruning and weed and pest control.
- Refer to EC-4 Hydroseeding, in the Construction BMP Manual.†

Chemical Stabilization

- Chemical stabilization can be used as an alternate method of erosion control in areas where temporary seeding practices cannot be used because of season or climate. It can provide immediate, effective, and inexpensive erosion control. See EC-5, Soil Binders, in the Construction BMP Manual.†

Non-Vegetated Stabilization

- Non-vegetated stabilization methods are suitable for permanently protecting from erosion by water and wind.
- Non-vegetated stabilization should only be utilized when vegetation cannot be established due to soil or climactic conditions, or where vegetation may be a potential fire hazard.
    - *Decomposed Granite (DG) and Gravel Mulch* are suitable for use in areas where vegetation establishment is difficult, on flat surfaces, trails, and pathways, and when used in conjunction with a stabilizer or tackifier, on shallow slopes. DG and gravel can also be used on shallow rocky slopes where vegetation cannot be established for permanent erosion control.
    - *Degradable Mulches* can be used to cover and protect soil surfaces from erosion both in temporary and permanent applications. In many cases, the use of mulches by themselves requires routine inspection and re-application. See Erosion Control (EC) Fact Sheets in the Construction BMP Manual† for more information.
    - *Geotextiles and Mats* can be used as a temporary stand-alone soil stabilization method. Depending on material selection, geotextiles and mats can be a short-term (3 months – 1 year) or long-term (1-2 years) temporary stabilization method. See EC-7 Geotextiles and Mats in the Construction BMP Manual.†
    - *Rock Slope Protection* can be used when the slopes are subject to scour or have a high erosion potential, such as slopes adjacent to flowing waterways or slopes subject to overflow from detention facilities (spillways).
    - *Soil Binders* can be used for temporary stabilization of stockpiles and disturbed areas not subject to heavy traffic. See EC-5 Soil Binders in the Construction BMP Manual.†

Contaminated Soils

- Cover exposed contaminated material with plastic sheeting. Install sediment controls such as filter socks around the perimeter of stockpiles to prevent transport of contaminated materials to the storm drain.
- Remove contaminated soil and dispose of in accordance with all applicable state and federal regulations.

Inspection & Maintenance

- Maintain outdoor waterproof covers (e.g., tarps) in good condition and properly secure them. Regularly replace tarps damaged by UV exposure or wear and tear.
- Perform routine inspection of storm drains and sumps and regularly remove accumulated materials.
- Routinely inspect berms and curbs for proper function; repair as necessary.

- Sweep parking lots or other surfaces near bulk materials storage areas periodically to remove debris blown or washed from storage areas.
- Inspect sediment and erosion control BMPs daily during periods of wet weather and repair or improve BMP implementation as necessary.

†The Construction BMP Manual is available on the City's website at CleanWaterHonolulu.com.

A-16 Building Repair & Construction

Building repair and construction may vary from minor and normal building repair to major remodeling, or the construction of new facilities. These activities can generate pollutants including solvents, paints, paint and varnish removers, finishing residues, spent thinners, soap cleaners, kerosene, asphalt and concrete materials, adhesive residues, and old asbestos installation.

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

This fact sheet is intended to be used for minor repairs and construction. For major construction, follow the guidelines in the Construction BMP Manual.

Repair & Remodeling

- Keep the work site clean and orderly. Remove debris in a timely fashion. Sweep and vacuum the area regularly to remove sediments and small debris.
- Avoid outdoor repairs and construction during periods of wet weather.
- Cover raw materials that must be left outside, particularly during the rainy season. Refer to Activity BMP Fact Sheet A-14 Storage of Solid Materials & Products.
- Properly store liquid materials that are normally used in repair and remodeling such as paints and solvents. Refer to Activity BMP Fact Sheet A-12 Liquid Container Storage.
- Use equipment and tools such as bag sanders to reduce accumulation of debris.
- Limit/prohibit work on windy days; implement roll-down walls or other measures to reduce wind transport of pollutants.
- Sweep out rain gutters or wash the gutter and trap the particles at the outlet of the downspout. A sock or geofabric placed over the outlet may effectively trap the materials.
- Clean the storm drain system in the immediate vicinity of the construction activity after it is completed. Refer to Activity BMP Fact Sheet A-22 Drainage System Maintenance.

Painting & Paint Removal

- Enclose painting operations consistent with local air quality and OSHA regulations.
- Local air pollution regulations may specify painting procedures, which if properly carried out, are usually sufficient to protect water quality.
- Follow product manufacturer's procedures for proper use, storage, and disposal of paints.
- Transport paint and materials to and from job sites in containers with secure lids and tied down to the transport vehicle.
- Test and inspect spray equipment prior to starting to paint. Tighten all hoses and connections and do not overfill paint containers.

- Mix paint indoors before using so that any spill will not be exposed to rain. Do so even during dry weather because cleanup of a spill will never be 100 percent effective.
- Transfer and load paint and hot thermoplastic away from storm drain inlets.
- Plug nearby storm drain inlets prior to starting painting or if sand blasting is used to remove paint. Remove plugs when job is complete.
- Collect the chips if painting requires scraping or sand blasting of the existing surface. Dispose of the residue properly.
- Cover or enclose painting operations properly to avoid drift.
- Clean paint brushes and tools used with **water-based paints** in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain.
- Clean brushes and tools used with **non-water-based paints, finishes, or other materials** in a manner that enables collection of used solvents (i.e., paint thinner, turpentine, etc.) for recycling or proper disposal.
- Capture all cleanup water and dispose of properly.
- Properly store leftover paints if they are to be kept for the next job. Dispose of unused paints properly by allowing latex paints to dry and harden and absorbing oil-based paints in motor oil change kits before placing in the trash.
- Properly dispose of paints containing lead or tributyl tin and consider as hazardous waste.

Concrete Installation, Repair & Removal

- Schedule asphalt and concrete activities for dry weather.
- Install drain inlet protection at storm drain inlets and adjacent watercourses prior to breaking up asphalt or concrete.
- When making saw cuts in pavement, use as little water as possible. Cover each storm drain inlet completely with filter fabric during the sawing operation and contain the slurry by placing straw bales, sandbags, or gravel dams around the inlets. After the liquid drains or evaporates, shovel or vacuum the slurry residue from the pavement or gutter and remove from site.
- Limit the amount of fresh concrete or cement mortar mixed; mix only what is needed for the job.
- Store concrete materials off the ground and under cover, away from drainage areas. Secure bags of cement after they are open. Keep wind-blown cement powder away from streets, gutters, storm drains, rainfall, and runoff.
- Return leftover materials to the transit mixer. Dispose of small amounts of hardened excess concrete, grout, and mortar in the trash.
- Construct and maintain a washout to contain all liquid and concrete waste generated. Do not allow excess concrete to be dumped onsite.
- Wash concrete trucks offsite or in designated areas onsite designed to prevent discharge of wash water to drainage system.

- Protect applications of fresh concrete from rainfall and runoff until the material has dried.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile or dispose in the trash.

Waste Management

- Designate solid waste collection areas. Solid waste containers must be closed/covered tightly when not in use.
- Keep waste collection areas clean. Clean out and cover waste receptacles frequently to prevent spillage.
- Ensure that only appropriate solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc., may not be disposed of in solid waste containers.
- Do not fill waste containers with washout water or any other liquid.
- Do not dump waste liquids down the storm drain.
- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal. Affix labels to all waste containers.
- Dispose of wash water, sweepings, and sediments properly.
- Inspect solid waste containers for structural damage regularly. Repair or replace damaged containers as necessary.
- Hazardous waste must be collected, removed, and disposed of only at authorized disposal areas by a certified/licensed hazardous waste hauler.

Inspections & Maintenance

- Require employees and offsite contractors to understand and follow good housekeeping and spill and leak prevention BMPs.
- Store materials that could contaminate storm water inside or under permanent cover.
- Maintain outdoor waterproof covers (e.g., tarps) in good condition and properly secure them to be storm resistant. Regularly replace tarps damaged by UV exposure or wear and tear.
- Sweep paved storage areas regularly for collection and disposal of loose solid materials properly. Do not hose down the area to a storm drain or conveyance ditch.

A-17 Parking Area Maintenance

TARGETED POLLUTANTS

- Sediment
- Trash
- Metals
- Oil and Grease
- Organics

Parking lots can contribute pollutants such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals to the storm water drainage system and streams and oceans.

Litter Control

- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Keep all parking areas clean and orderly. Remove debris, litter, and sediments in a timely fashion.
- Post “No Littering” signs and enforce anti-litter laws.

Surface Cleaning

- Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the storm water conveyance system if possible.
- Sweep all parking lots at least once before the onset of the wet season.
- Establish frequency of parking lot sweeping based on usage and field observations of waste accumulation.
- Use only as much water as necessary for dust control during sweeping to avoid runoff.
- Dispose of parking lot sweeping debris and dirt as a solid waste.
- When spot-cleaning heavy oil deposits use absorbent materials to soak up oils and sweep up spent materials. Dispose of spilled materials and absorbents appropriately.

- If water is used to clean surfaces, follow the procedures below:
    - Block the storm drain or contain runoff. Do not allow wash water to enter storm drains.
    - Clean oily spots with absorbent materials and sweep up. Dispose of spilled materials and absorbents appropriately.
    - Redirect water to a grassy area or permeable surface and allow it to soak into the ground, or collect and pump wash water to the sanitary sewer. A permit may be required for discharges to the City sanitary sewer system.

Surface Repair

- Preheat, transfer, or load hot bituminous material away from storm drain inlets.
- Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting storm water runoff.
    - Before applying concrete, asphalt, seal coat or slurry seal, cover and seal nearby manholes and storm drain inlets (with waterproof material or mesh).
    - Use only as much water as necessary for dust control during sweeping to avoid runoff.
    - Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.
    - Do not seal permeable pavement surfaces with a slurry or other sealer.

Inspections & Maintenance

- Sweep and clean parking lots regularly to minimize pollutant transport into storm drains from storm water runoff.
- Regularly inspect the condition of parking areas and their storm water conveyance systems.
- Clean accumulated sediment/debris from drain inlets and catch basins within the parking area.
- Regularly inspect cleaning equipment/sweepers for leaks.
- Clean out oil/water/sand separators regularly, especially after heavy storms.

Parking Lot Design

- When possible, direct sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low quantities.
- Arrange roof top downspouts and drains to prevent drainage directly onto paved surfaces.
- Consider including permeable pavements in the parking area design to minimize runoff.

A-18 Pressure Washing

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Pollutants resulting from pressure washing activities in areas such as sidewalks, plazas, other pedestrian, parking lots, and other vehicle use areas, as well as building exteriors can include litter, dirt, food particles, human and pet waste, and residue from vehicle fluids.

Recovery of Visible Pollutants

- Sweep and/or clean the surface of any visible pollutants and dispose of the collected material in trash containers.
- Clean surface oil with rags or other absorbents. If using granular absorbent material (e.g., cat litter), sweep and dispose of before washing.

Pressure Washing of Sidewalks, Walkways & Plazas

- Install barriers or geotextile filters at storm drain inlets.
- Contain and collect runoff when washing heavily soiled surfaces and/or using soaps and chemicals. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.
- Wash water from lightly soiled surfaces may be directed to landscaped areas within the property that are large enough to completely absorb the water. If no such areas are present, wash water containing soaps or chemicals must be collected for disposal in the sanitary sewer (see the **Wash Water Discharge to Sanitary Sewer** section, below).
- Wash water that is discharged to the City drainage system must be colorless and odorless, contain no soaps or chemicals, and must be filtered through a geotextile filter.
    - Filter fabric should be removed when pressure washing activities are concluded.
    - Filtered residue and fabric should be disposed of through acceptable means.
- Wash water may be left to evaporate naturally in areas with no storm drain system.

Pressure Washing of Trash Enclosures and Vehicle Use Areas

- Install barriers to block water from entering nearby storm drain inlets.
- Contain and collect wash water and runoff. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.
- Wash water may be directed to landscaped areas within the property that are large enough to completely absorb the water. If no such areas are present, wash water containing soaps or chemicals must be collected for disposal in the sanitary sewer system (see the **Wash Water Discharge to Sanitary Sewer** section, below).

Pressure Washing of Building Exteriors

- Pressure washing should ***not*** be used as a paint removal method.
- Avoid pressure washing of building exteriors during rain events.
- Collect wash water for disposal via a landscaped area that can completely absorb the wash water or via sanitary sewer (see the **Wash Water Discharge to Sanitary Sewer** section, below).
- Wash water from building exteriors may be discharged to the storm drain if:
  - No soaps, chemicals or detergents were used when washing, water is colorless and odorless and a lead-based paint surface was not washed; and
  - Storm drain filtration measures (i.e., geotextiles) are in place to keep dirt and paint particles out.

Wash Water Discharge to Sanitary Sewer

- An approved Industrial Wastewater Discharge Permit (IWDP) from the Regulatory Control (RC) Branch of the City's Department of Environmental Services (ENV) is required for discharge to the City's sanitary sewer. Applications are available at Kapolei Hale, 1000 Uluohia Street, Suite 212, Kapolei, Hawaii 96707. For more information, please call Regulatory Branch of ENV at 768-3262.

A-19 Pool, Fountain & Spa Maintenance

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

The primary pollutant of concern in swimming pool or spa water is chlorine or chloramine used as a disinfectant. This water, if discharged to the storm drain system, can be toxic to aquatic life. In fountains and lagoons, the pollutants of concern are chemical algaecides that are added to control algae mainly for aesthetic reasons (visual and odor).

Cleaning & Chemicals

- Prevent algae buildup with regular cleaning, consistent adequate chlorine levels, and well-maintained water filtration and circulation systems.
- Do not use copper-based algaecides (ineffective against certain species of algae and known to stain walls). Control algae with chlorine or other alternatives, such as sodium bromide.
- Manage pH and water hardness to minimize corrosion of copper pipes.
- Use cleaning products as described on their labels. Dispose of according to instruction.

Filter Cleaning

- Never clean a filter in the street or near a storm drain.
- Rinse cartridge filters onto a grass area, and spade filter residue into soil.
- Backwash diatomaceous earth filters onto grass. Dispose of spent diatomaceous earth in the garbage. Spent diatomaceous earth cannot be discharged to surface waters, storm drainage systems, septic systems, or on the ground.

Draining Pools & Water Features

- Obtain the necessary permits prior to discharging pool water. If intending to drain to a City storm drain or a private drain, a City discharge permit is required. Visit CleanWaterHonolulu.com's Forms section to access the permit application. Discharges to the state's storm drain system require a permit from the state. Private drains also require a drain connection license.

- To follow the City discharge permit requirements you will need to:
  - Dechlorinate pool water to 0.01 parts per million (ppm) or less with a neutralizing chemical or by allowing chlorine to dissipate for a few days.
  - Notify the city at least 72 hours prior to disposing of dechlorinated pool water. Water must be tested prior to discharge to ensure that chlorine levels have reached the target level of 0.01 ppm or less.
  - Recycle/reuse dechlorinated water by draining it gradually draining onto a landscaped area that can absorb the water completely. As long as the effluent remains on the property, no permit is required.
  - If discharging to a storm drain, pump the water through a hose directly into the drain. Discharge flows should be kept to low rates. Higher flow rates may be prohibited. Do not allow effluent to run down the street or gutter.
  - Prevent backflow if draining a pool to the sanitary sewer by maintaining an "air gap" between the discharge line and the sewer line (do not seal the connection between the hose and sewer line).

Lagoons/Water Features

- Reduce fertilizer use in areas around the water body. High nitrogen fertilizers can produce excess growth requiring more frequent mowing or trimming and may contribute to excessive algae growth.
- To control bacteria, discourage the public from feeding birds and fish (i.e., place signs that prohibit feeding of waterfowl).
- Mechanically remove pond scum (blue-green algae) using a 60 micron net.
- Avoid landscape wastes in and around lagoons/water features by either using bagging equipment or by manually picking up the material. Collect trash and debris from within water bodies where feasible.
- Provide and maintain trash receptacles near water features.

Inspection & Maintenance

- Train maintenance personnel to test chlorine levels and to apply neutralizing chemicals.
- Train personnel regarding proper maintenance of pools, water features and lagoons.

A-20 Landscape Maintenance

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Landscape maintenance activities include vegetation removal, herbicide and insecticide application, fertilizer application, watering and other gardening and lawn care practices. These maintenance practices have the potential to contribute pollutants to the storm drain system. Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation.

Fertilizer Use

- Follow the label instructions and all Federal, State, and local laws and regulations governing the use, storage, and disposal of fertilizers and training of pesticide applicators.
- Use the minimum amount needed for the job. Calibrate fertilizer distribution to avoid excessive application.
- Use appropriate equipment to distribute fertilizer evenly. Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Periodically test soils for determining proper fertilizer use. Use a slow-release fertilizer on a regular basis with a balance N-P-K to avoid excess growth requiring more frequent mowing or trimming.
- Sweep up spilled fertilizer from pavement or sidewalk before applying irrigation water.
- Inspect fertilizer equipment and transportation vehicles prior to use.

Pesticide Use

- Follow recommended usage instructions and all federal, state, and local laws and regulations governing the use, storage, and disposal of pesticides.

- Use pesticides only if there is an actual pest problem (not on a regular preventative schedule).
- Do not use pesticides if rain is expected.
- Do not apply during high winds and apply in a manner to avoid spray drift of pesticides.
- Do not mix or prepare pesticides for application near storm drains.
- Employ techniques to minimize off-target application (e.g., spray drift) of pesticides, including consideration of alternative application techniques.
- Purchase only the amount of pesticide that you can reasonably use in a given time period (month or year depending on the product).
- Triple rinse containers and use rinse water as product. Dispose of unused pesticide as hazardous waste.

- Dispose of empty pesticide containers according to the instructions on the container label.
- Educate and train employees on pesticide use and application techniques to prevent pollution.
- All employees who handle restricted use pesticides should be certified in accordance with state regulations. Contracts for landscape maintenance should include similar requirements.
- The Federal Pesticide, Fungicide, and Rodenticide Act and Chapter 149A Hawaii Pesticides Law 1996, Act 281, place strict controls over pesticide application and handling and specify training, annual refresher, and testing requirements. The regulations generally cover: a list of approved pesticides and selected uses, updated regularly; general application information; equipment use and maintenance procedures; and record keeping.
- The State of Hawaii Department of Agriculture Plant Industry Division coordinates and maintains the state's licensing and certification programs.

Irrigation

- Apply water at rates that do not exceed the infiltration rate of the soil.
- Irrigate slowly or pulse irrigate to prevent runoff; only irrigate as much as is needed.
- Where practical, use automatic timers to minimize runoff.
- Consider drip irrigation.
- Consider using recycled rainwater (cisterns/pools) as a source of irrigation water.

- Inspect irrigation systems periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering and repair leaks in the irrigation system as soon as they are observed.
- Conduct appropriate maintenance (i.e., properly timed fertilizing, weeding, pest control, and pruning) to help preserve water efficiency.

- Use pop-up sprinkler heads in areas with a lot of activity or where there is a chance the pipes may be broken. Consider the use of mechanisms that reduce water flow to sprinkler heads if broken.
- If bailing of muddy water is required (e.g., when repairing a water line leak), do not put it in the storm drain; pour over landscaped areas.
- Ensure that there is no runoff from the landscaped area(s) if re-claimed water is used for irrigation.

Mowing, Trimming and Weeding

- Do not mow before heavy rains.
- Use mechanical methods of vegetation removal rather than applying herbicides. Use hand weeding where practical.
- Do not blow or rake leaves into the street or storm drain.
- Consider grass cycling. Grass cycling is the natural recycling of grass by leaving the clippings on the lawn when mowing. Grass clippings decompose quickly and release valuable nutrients back into the lawn.

Green Waste

- Compost leaves, sticks, or other collected vegetation or dispose of as trash. Do not dispose of collected vegetation into streams, gulches, or storm drainage systems. Do not pile grass clippings against the base of trees.
- Reduce the use of high nitrogen fertilizers that produce excess growth requiring more frequent mowing or trimming.
- Avoid putting landscape wastes in and around storm drain inlets by either using bagging equipment or by manually picking up the material (e.g., sweeping).

Stockpiles

- Place temporarily stockpiled material away from watercourses and storm drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.

Planting

- Use mulch or other erosion control measures when soils are exposed to minimize erosion. Mulch is prone to washing away or moving due to outside factors, so avoid placing it near the roadway or gutter area.
- Retain and/or plant selected native vegetation where feasible. Native vegetation in the appropriate microclimate usually requires less maintenance (e.g., irrigation, fertilizer) than planting new vegetation.
- Choose flowers, trees, shrubs, and groundcovers that have low irrigation needs. Most new installations will require water until established.
- Consider alternative landscaping techniques such as xeriscaping.

Integrated Pest Management (IPM) Program

- Prior to treating pest problems, identify, monitor, and assess the pest properly. Personnel should refer to State Department of Agriculture or Oahu Invasive Species Committee (OISC) to learn what is the best treatment.
- Utilize a comprehensive management system that incorporates integrated pest management (IPM) techniques. IPM is a sustainable approach to managing pests that minimizes the use of toxic chemicals and gets rid of pests by methods that pose a lower risk to employees, the public, and the environment. IPM methods equip landscape maintenance staff to design flexible, site-specific pest management plans scaled to the severity of the problems and the level of resources available.
- Methods and types of IPM, include:
    - Using natural "organic" fertilizer alternatives to enrich soils and maintain plant health while reducing plant susceptibility to disease and insect pests.
    - Using biological controls (natural enemies such as parasites and insects) to fight pests.
    - Using store-bought traps, such as species-specific, pheromone-based traps or colored sticky cards.
    - Using physical and mechanical methods such as hoeing, mowing, and handpicking weeds.
    - Removing visible insects by hand (with gloves or tweezers) and placing in soapy water or vegetable oil. Alternatively, insects can be sprayed off the plant with water or in some cases vacuumed off larger plants.
    - Fencing to keep rodents out and netting to keep birds and insects away from leaves and fruit. Mulching to prevent weed growth is not recommended at this time due to the potential transport of the invasive Coconut Rhinoceros Beetle and/or larvae.

A-21 Fire Sprinkler Testing

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Fire sprinkler line flushing may be a source of non-storm water runoff pollution. Standpipe testing is required every 5 years and fire sprinkler testing is required annually. Over time the water in the pipe can contain a buildup of pollutants such as heavy metals (mercury, lead, or copper), chlorination breakdown products, oil (from coating in black iron pipes), anaerobic bacteria (which can cause diseases), corrosion inhibitors, fire suppressants, and more.

Site Preparation

- Ensure the safety for the workers and the public. Install traffic control to direct vehicles and pedestrians away from the area, if needed.
- Install BMP devices at storm drains or inlets to ensure that no pollutants enter the drainage system. The BMP devices may include silt fences, compost filter socks and others as appropriate.

Fire Hydrant Flushing

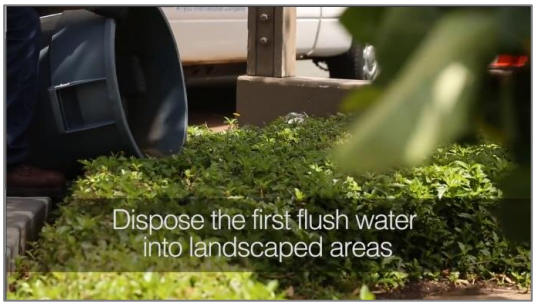
- Attach the apparatuses onto the fire hydrant.
- The water from the fire hydrant is first flushed at street level to remove any possible debris in the hydrant.
- Then, the hydrant connects to the pump which sends water into the standpipe on the street level up to the manifold, which is typically on the roof.
- Note that the water entering the system is usually potable water, though in some areas it may be non-potable reclaimed wastewater.

First Flush of Sprinkler System

- Once the hoses are hooked up correctly, carefully open the connection.
- The standpipe connection at the rooftop level and the inspector test valve are used for the annual standpipe test.

- As the pipes are being filled make sure to have a container ready to collect the initial discharge water (first flush).
- The first flush coming out contains the polluted water from the pipes and must be captured. This water contains heavy metals (mercury or lead), bacteria, and much more. Avoid direct contact with the discharge.
- Continue collecting the water until it is visibly clear coming out of the hose.
- If possible, dispose of the first flush water into landscaped areas because they are natural filtration systems.
- If there are no landscaped areas available, the first flush water must be disposed properly by a licensed liquid waste hauler.
- Do not dispose of this wastewater into storm drains, streets, streams, or the ocean.

Continued Testing



- After the first flush is collected and disposed, the system shall be flow and pressure tested at the requirements for the design criteria in effect at the time of installation or permitting as applicable. This test should only take a couple of minutes.
- Always direct the flow toward the location of drains on the rooftop.
- The water from the flow rating test will evaporate off the rooftop, which is acceptable because the water is clean after the first flush.
- Once the test is completed, close the connection of the rooftop standpipe and fill the standpipe to conduct a one-hour hydrostatic test at the requirements for the design criteria in affect at the time of installation or permitting as applicable.
- After completion of the test, disconnect the discharge hoses at street level.
- Direct the flow of water remaining in the hoses toward landscaped areas or other places where infiltration can take place.
- If no infiltration areas are available, direct the flow towards the street but ensure the storm drain inlets are covered and the public is not affected.

Violations

- Failure to follow the proper procedures and laws can result in fines and/or jail time. If someone knowingly violates the law, that individual can face up to 3 years in jail and/or fines of $5,000-$50,000 per day of the violations. If there are subsequent convictions, the individual or organization can face up to 6 years and/or $100,000 per day of the violations. Even if you are negligent, the violations are 1 year in jail and/or $2,500-$25,000 fine per day. If it is a subsequent conviction, it would be 2 years in jail and $50,000 fine per day.

A-22 Drainage System Maintenance

Storm water drainage facilities on a site convey storm water that may contain pollutants to an offsite conveyance system that collects and transports urban runoff and storm water or conveys directly to streams or the ocean.

TARGETED POLLUTANTS

- Sediment
- Nutrients
- Trash
- Metals
- Bacteria
- Oil and Grease
- Organics

Catch Basins/Inlet Structures

- Inspect drainage facilities regularly. Complete immediate repair of any deterioration threatening structural integrity.
- Clean before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove accumulated sediments and debris.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Prioritize storm drain inlets; clean and repair as needed.
- Keep accurate logs of the number/timing of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes (if necessary) with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer.
- If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.
- Modify storm open channel characteristics to improve channel hydraulics and increase pollutant removals.

Illicit Connections and Discharges

- Any non-municipal and private storm drain system that is connected to the City's MS4 without a license issued to the property owner is considered an illegal drain connection.
- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "No Dumping Drains to Ocean" or similar stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.

Inspections & Maintenance

- Develop and follow a site-specific drainage system maintenance plan that describes maintenance locations, methods, required equipment, water sources, sediment collection areas, disposal requirements, and any other pertinent information.

- Train employees in proper maintenance activities, including record keeping and disposal.
- Contact the City's Storm Water Quality Branch if you plan to conduct flushing of your storm drain system.

Appendix B

Business Category BMP Guide Sheets

B-1 Auto Body Repair

Description

This category includes facilities that conduct auto body repair and painting. Auto body repair products, such as body filler, primers, paints, and sandpaper often contain heavy metals, oil and grease, toxic chemicals, and paints, which are significant sources of storm water pollution.

Industrial and Commercial Activity BMPs

The Industrial and Commercial Activity BMP Fact Sheets are provided by business activities.

BUSINESS ACTIVITY	FACT SHEETS
General BMPs	A-1 Spill Prevention, Control & Cleanup A-2 Waste Handling & Disposal A-3 Housekeeping Practices A-4 Employee Training A-5 Drain Connections, if applicable
Panel Sanding	A-7 Vehicle & Equipment Washing A-8 Vehicle & Equipment Maintenance & Repair A-12 Liquid Container Storage
Spraying Primers and Paints	A-8 Vehicle & Equipment Maintenance & Repair A-9 Vehicle Painting A-12 Liquid Container Storage
Washing Cars	A-7 Vehicle & Equipment Washing
Cleaning Outside Areas	A-17 Parking Area Maintenance A-18 Pressure Washing

B-2 Auto Maintenance

Description

This category includes facilities that conduct general maintenance and repair on vehicles, including general repair shops, radiator repair shops, car dealerships, car washes, and fleet maintenance operations. Auto maintenance and repair on vehicles can contribute pollutants, including toxic hydrocarbons and other organic compounds, oils and greases, nutrients, phosphates, heavy metals, and suspended solids, to storm water runoff.

Industrial and Commercial Activity BMPs

The Industrial and Commercial Activity BMP Fact Sheets are provided by business activities.

BUSINESS ACTIVITY	FACT SHEETS
General BMPs	A-1 Spill Prevention, Control & Cleanup A-2 Waste Handling & Disposal A-3 Housekeeping Practices A-4 Employee Training A-5 Drain Connections, if applicable
Car Repair & Maintenance	A-8 Vehicle & Equipment Maintenance & Repair
Cleaning Engines & Parts, and Flushing Radiators	A-7 Vehicle & Equipment Washing A-8 Vehicle & Equipment Maintenance & Repair
Washing Cars and Other Vehicles	A-7 Vehicle & Equipment Washing
Air/Water Supply Area	A-6 Vehicle & Equipment Fueling
Storage & Waste Management	A-12 Liquid Container Storage
Building & Grounds Maintenance	A-16 Building Repair & Construction A-17 Parking Area Maintenance A-18 Pressure Washing

B-3 Retail Gas Stations

Description

This category includes facilities that provide retail vehicle fueling services, including self-serve facilities as well as those that provide a car washing facility. Pollutants can include heavy metals, hydrocarbons (oil and grease), toxic chemicals, phosphates from detergents, and suspended solids including food waste and trash.

Industrial and Commercial Activity BMPs

The Industrial and Commercial Activity BMP Fact Sheets are provided by business activities.

BUSINESS ACTIVITY	FACT SHEETS
General BMPs	A-1 Spill Prevention, Control & Cleanup A-2 Waste Handling & Disposal A-3 Housekeeping Practices A-4 Employee Training A-5 Drain Connections, if applicable
Fuel Dispensing Areas and Air/Water Supply Area	A-6 Vehicle & Equipment Fueling
Underground Storage Tanks	A-12 Liquid Container Storage
Fuel Loading and Unloading	A-11 Loading/Unloading
Car Washing Facility	A-7 Vehicle & Equipment Washing
Building & Grounds Maintenance	A-16 Building Repair & Construction A-17 Parking Area Maintenance A-18 Pressure Washing A-20 Landscape Maintenance

B-4 Restaurants & Food Industry

Description

This category includes restaurants, institutional cafeterias, grocery stores, bakeries, delicatessens, and any facility requiring a Health Department permit for food preparation. Cleaning of equipment, grease handling and disposal, spills, surface cleaning, grounds maintenance, dumpster and loading dock areas, and parking lots can contribute pollutants, including food wastes, oil and grease and toxic chemicals in cleaning products, disinfectants, and pesticides, to storm water runoff,

Industrial and Commercial Activity BMPs

The Industrial and Commercial Activity BMP Fact Sheets are provided by business activities.

BUSINESS ACTIVITY	FACT SHEETS
General BMPs	A-1 Spill Prevention, Control & Cleanup A-2 Waste Handling & Disposal A-3 Housekeeping Practices A-4 Employee Training A-5 Drain Connections, if applicable
Dumpster & Loading Dock Areas	A-11 Loading/Unloading
Equipment & Outdoor Cleaning	A-13 Equipment & Operations Maintenance
Grease & Material Storage, Recycling & Waste Disposal	A-12 Liquid Container Storage
Landscaping & Grounds Maintenance	A-16 Building Repair & Construction A-17 Parking Area Maintenance A-18 Pressure Washing A-19 Pool, Fountain & Spa Maintenance A-20 Landscape Maintenance

B-5 Lunch Wagons, Food Trucks, Carts & Tents

Description

This category includes lunch wagons, food trucks, carts, tents, and any facility requiring a Health Department permit for food preparation. Cleaning of equipment, grease handling and disposal and spills can contribute pollutants including food wastes, oil and grease and toxic chemicals in cleaning products, disinfectants, and pesticides, to storm water runoff.

Industrial and Commercial Activity BMPs

The Industrial and Commercial Activity BMP Fact Sheets are provided by business activities.

BUSINESS ACTIVITY	FACT SHEETS
General BMPs	A-1 Spill Prevention, Control & Cleanup A-2 Waste Handling & Disposal A-3 Housekeeping Practices A-4 Employee Training
Dumpster & Loading/Unloading Areas	A-11 Loading/Unloading A-12 Liquid Container Storage
Equipment & Outdoor Cleaning	A-7 Vehicle & Equipment Washing A-13 Equipment & Operations Maintenance
Recycling & Disposal including Grease Handling & Disposal	A-12 Liquid Container Storage
Grounds Maintenance	A-17 Parking Area Maintenance A-18 Pressure Washing

B-6 Scrap Metal Recyclers & Towing Yards

Description

This category includes recycling scrap yards and facilities that impound, dismantle, and store and sell vehicles and vehicle parts. Significant sources of pollutants include crushing and scrapping of recyclable materials, draining fluids from vehicles, recovering and recycling parts and vehicle fluids, and areas of bare soils. Pollutants can include mercury, other heavy metals (e.g., aluminum, cadmium, chromium, copper, iron, lead, and zinc), oils and greases (e.g., waste oil, hydraulic fluid, fuels, and parts cleaners), Polycyclic Aromatic Hydrocarbons (PAHs), toxic chemicals (e.g., antifreeze), sediment and trash.

Industrial and Commercial Activity BMPs

The Industrial and Commercial Activity BMP Fact Sheets are provided by business activities.

BUSINESS ACTIVITY	FACT SHEETS
General BMPs	A-1 Spill Prevention, Control & Cleanup A-2 Waste Handling & Disposal A-3 Housekeeping Practices A-4 Employee Training A-5 Drain Connections, if applicable
Draining Fluids from Vehicles	A-7 Vehicle & Equipment Washing A-8 Vehicle & Equipment Maintenance & Repair A-12 Liquid Container Storage
Crushing and Scrapping Vehicle Bodies	A-10 Vehicle & Equipment Staging A-13 Equipment & Operations Maintenance
Storage & Waste Management	A-12 Liquid Container Storage A-14 Storage of Solid Materials & Products
Building & Grounds Maintenance	A-15 Contaminated or Erodible Areas A-16 Building Repair & Construction A-17 Parking Area Maintenance A-18 Pressure Washing

B-7 Building & Property Maintenance

Description

This category includes businesses that provide building and property maintenance services such as landscaping, landscape maintenance, pressure washing, fire sprinkler testing, building repair and construction, and swimming pool and spa cleanings. These activities can contribute pollutants, including heavy metals, oil and grease, pesticides, nutrients, toxic cleaning chemicals and organic compounds, trash, and sediment, to storm water runoff.

Industrial and Commercial Activity BMPs

The Industrial and Commercial Activity BMP Fact Sheets are provided by business activities.

BUSINESS ACTIVITY	FACT SHEETS
General BMPs	A-1 Spill Prevention, Control & Cleanup A-2 Waste Handling & Disposal A-3 Housekeeping Practices A-4 Employee Training A-5 Drain Connections, if applicable
Pressure Washing	A-18 Pressure Washing
Parking Area Maintenance	A-17 Parking Area Maintenance
Building Repair & Construction	A-14 Storage of Solid Materials & Products A-16 Building Repair & Construction
Landscape Design, Installation & Maintenance	**Landscape Maintenance** A-20 Landscape Maintenance **Design & Installation** A-14 Storage of Solid Materials & Products A-15 Contaminated or Erodible Areas A-20 Landscape Maintenance
Pool, Fountain & Spa Maintenance	A-19 Pool, Fountain & Spa Maintenance A-22 Drainage System Maintenance
Fire Sprinkler Testing	A-21 Fire Sprinkler Testing

B-8 Contractor Baseyards

Description

This category includes facilities that provide baseyard storage for vehicles, raw materials, fleet operations, hazardous wastes, shipping containers, utility equipment, storage tanks, construction vehicles and equipment and supplies. Activities at contractor baseyards can contribute pollutants, including toxic hydrocarbons and other organic compounds, oil and grease, nutrients, phosphates, heavy metals, and trash, to storm water runoff.

Industrial and Commercial Activity BMPs

The Industrial and Commercial Activity BMP Fact Sheets are provided by business activities.

BUSINESS ACTIVITY	FACT SHEETS
General BMPs	A-1 Spill Prevention, Control & Cleanup A-2 Waste Handling & Disposal A-3 Housekeeping Practices A-4 Employee Training A-5 Drain Connections, if applicable
Vehicle & Equipment Maintenance	A-8 Vehicle & Equipment Maintenance & Repair
Washing Vehicles & Equipment	A-7 Vehicle & Equipment Washing A-13 Equipment & Operations Maintenance
Material Storage and Waste Handling	A-12 Liquid Container Storage A-14 Storage of Solid Materials & Products
Fueling	A-6 Vehicle & Equipment Fueling A-11 Loading/Unloading A-12 Liquid Container Storage
Building and Grounds Maintenance	A-15 Contaminated or Erodible Areas A-16 Building Repair & Construction A-17 Parking Area Maintenance A-18 Pressure Washing A-20 Landscape Maintenance

B-9 Repair Shops

Description

This category includes facilities that provide repair services for electronics, household items, appliances, bicycles, plumbing, windows, doors, and screens. Activities at repair shops can contribute pollutants, including toxic hydrocarbons and other organic compounds, oil and grease, nutrients, phosphates, heavy metals, and trash, to storm water runoff.

Industrial and Commercial Activity BMPs

The Industrial and Commercial Activity BMP Fact Sheets are provided by business activities.

BUSINESS ACTIVITY	FACT SHEETS
General BMPs	A-1 Spill Prevention, Control & Cleanup A-2 Waste Handling & Disposal A-3 Housekeeping Practices A-4 Employee Training A-5 Drain Connections, if applicable
Sanding	A-7 Vehicle & Equipment Washing A-8 Vehicle & Equipment Maintenance & Repair
Spraying Primers and Paints	A-7 Vehicle & Equipment Washing A-8 Vehicle & Equipment Maintenance & Repair A-11 Loading/Unloading A-12 Liquid Container Storage
Cleaning & Maintaining Equipment	A-7 Vehicle & Equipment Washing A-8 Vehicle & Equipment Maintenance & Repair A-13 Equipment & Operations Maintenance
Property Maintenance	A-17 Parking Area Maintenance A-18 Pressure Washing
Material and Waste Storage	A-12 Liquid Container Storage A-14 Storage of Solid Materials & Products

B-10 Self-Storage

Description

This category includes businesses that provide self-storage units and facilities. Building and property maintenance activities can contribute pollutants, including heavy metals, oil and grease, pesticides, nutrients, toxic cleaning chemicals and organic compounds, trash, and sediment, to storm water runoff.

Industrial and Commercial Activity BMPs

The Industrial and Commercial Activity BMP Fact Sheets are provided by business activities.

BUSINESS ACTIVITY	FACT SHEETS
General BMPs	A-1 Spill Prevention, Control & Cleanup A-2 Waste Handling & Disposal A-3 Housekeeping Practices A-4 Employee Training A-5 Drain Connections, if applicable
Building Storage Units & Loading/Unloading Areas	A-11 Loading/Unloading A-12 Liquid Container Storage
Facility & Parking Area Maintenance	A-17 Parking Area Maintenance A-18 Pressure Washing
Building Repair & Construction	A-14 Storage of Solid Materials & Products A-16 Building Repair & Construction
Landscape Maintenance	A-20 Landscape Maintenance
Fire Sprinkler Testing	A-21 Fire Sprinkler Testing

Note: Because the public is the primary user of self-storage, BMPs must be communicated with customers on proper cleaning procedures and limitations placed on the types of materials that can and cannot be stored.

B-11 Small Animal Care Facilities

Description

This category includes businesses that provide small animal care facilities, including kennels, rescue centers, and veterinary facilities. Facilities typically perform activities like animal washing, feeding, and grazing. Animal urine and feces can contribute pollutants, including coliform bacteria and nutrients. These operations can also produce pollutants such as sediment and trash to storm water runoff.

Industrial and Commercial Activity BMPs

The Industrial and Commercial Activity BMP Fact Sheets are provided by activity or area.

BUSINESS ACTIVITY	FACT SHEETS
General BMPs	A-1 Spill Prevention, Control & Cleanup A-2 Waste Handling & Disposal A-3 Housekeeping Practices A-4 Employee Training A-5 Drain Connections, if applicable
Animal Washing	A-3 Housekeeping Practices
Feeding/Grazing Management	A-12 Liquid Container Storage A-14 Storage of Solid Materials & Products A-15 Contaminated or Erodible Areas A-20 Landscape Maintenance
Urine/Feces and Manure Deposits Waste Management	A-18 Pressure Washing*
Building Maintenance	A-14 Storage of Solid Materials & Products A-15 Contaminated or Erodible Areas A-16 Building Repair & Construction A-18 Pressure Washing*
Landscape Maintenance	A-20 Landscape Maintenance

* *Do not allow any wash water to be discharged to storm drains or to receiving waters without proper treatment. Regularly sweep and clean animal keeping areas to collect and properly dispose of droppings, uneaten food, and other potential storm water pollutants; do not hose down and allow runoff into storm drains or to streams.*

B-12 Wholesalers/Retailers

Description

This category includes businesses that conduct wholesale and retail activities. Operations and property maintenance activities can contribute pollutants, including heavy metals, oil and grease, pesticides, nutrients, toxic cleaning chemicals and organic compounds, trash, and sediment to storm water runoff.

Industrial and Commercial Activity BMPs

The Industrial and Commercial Activity BMP Fact Sheets are provided by business activities.

BUSINESS ACTIVITY	FACT SHEETS
General BMPs	A-1 Spill Prevention, Control & Cleanup A-2 Waste Handling & Disposal A-3 Housekeeping Practices A-4 Employee Training A-5 Drain Connections, if applicable
Loading/Unloading	A-11 Loading/Unloading
Building Storage Areas	A-12 Liquid Container Storage A-14 Storage of Solid Materials & Products
Facility & Parking Area Maintenance	A-17 Parking Area Maintenance A-18 Pressure Washing
Building Repair & Construction	A-14 Storage of Solid Materials & Products A-16 Building Repair & Construction
Landscape Maintenance	A-20 Landscape Maintenance
Fire Sprinkler Testing	A-21 Fire Sprinkler Testing

Appendix C

BMP Plan Forms

Form A **Business Description**

a. **Location** *(use facility address)*

b. **Facility Use & Operations** *(describe what type of activities occur [e.g., repairs, food preparation] and indicate whether activities are inside, under cover outside or outside without cover. List areas where chemicals (including pesticides and fertilizers) are currently applied.)*

c. **Standard Industrial Classification (SIC) Code or North American Industry Classification System (NAICS) Code** *(use these codes from either system to categorize the activity(s) occurring on the site. This website can help you to determine your code(s): https://www.osha.gov/data/sic-search)*

d. **Hours of Operation** *(provide hours of operations by day of the week.)*

Form B **Site Map**

- ☐ **Property Boundary** *(the City's GIS site* (gis.hicentral.com) *may be useful for identification of boundaries.)*
- ☐ **Entrance(s), Streets, and Adjacent Properties** *(indicate the entrance(s) to the property and names of adjacent streets and businesses.)*
- ☐ **Areas with Industrial Activities or Pollutant Sources** - chemical & material storage, manufacturing/processing/recycling, fueling, maintenance, washing, loading/unloading operations, erosion/sediment sources, waste management, etc.
- ☐ **Waste Disposal Areas**
- ☐ **Storm Water Flow Directions** *(show based on site topography, 'flow arrows' that indicate the anticipated direction that a spill would flow if it occurred.)*

If Applicable:

- ☐ **Storm Water Drainage Structures & Nearby Canals, Streams, or Ocean** *(show locations of storm drain structures such as catch basins, or grate/drain inlets.)*
- ☐ **Location of Structural BMPs** *(structural, vegetative, or practices used to treat, prevent, or reduce water pollution. Examples include infiltration basins, porous concrete, and grassed swales or ditches for vegetative BMPs.)*

Site Map

Form C **Pollution Control Strategies**

Include all applicable BMP Activity Sheets in this BMP Plan. Highlight the BMPs in the BMP Activity Sheets that are applicable to the business activities.

Potential Pollutant Activities	Corresponding Activity BMP Fact Sheets
General Operations	A-1 Spill Prevention Control & Clean-ups
	A-2 Waste Handling & Disposal
	A-3 Housekeeping Practices
	A-4 Employee Training

Form D **Spill Response Plan**

SPILL RESPONSE AND CLEAN-UP PLAN	
Company:	Date:
Site Address:	Runoff drains to:

CONTACTS:		
Title	**Name**	**Phone Numbers**
Site Manager		
Business Owner		
Clean-up Contractor		

1. Potential Spill Areas

Location	Hazardous Materials

2. Spill Material/Spill Kit Locations

Additional Information Provide a description of any additional emergency clean-up and disposal procedures not listed above that you will use at your site, or any other special conditions that exist:

3. Spill Clean-Up Procedures

1. Alert the manager/owner of property where the spill has occurred.
2. Obtain personal protective equipment, as appropriate to the hazards. Refer to Safety Data Sheet or other references for information.
3. Stop the source of the spill (upright container, plug leak, etc.).
4. Seal off storm drains with berms or drain covers and stop any spread of the spill.
5. Protect floor drains or other means for environmental release. Spill socks and absorbents may be placed around drains, as needed.
6. Use pads and/or granular sorbent to clean up spilled material. Loose spill-control material should be distributed over the entire spill area, working from the outside, scoop to place materials in an appropriate container.
7. Let pads sit on spill to absorb spilled material.
8. Remove spent pads and/or sorbent and dispose of properly.

If a spill or release cannot be controlled or injuries have occurred due to the release:

1. Evacuate the immediate area and provide care to the injured – Call 911.
2. Be prepared to provide Safety Data Sheet information to the responders if asked.
3. Notify the appropriate agency if release has entered the environment. Refer to the Spill Reporting Table.

4. Spill Reporting Instructions

Notification Checklist	
Spill in any amount	
Facility Supervisor:	Phone:
Discharge in amount exceeding "reportable quantity"* and not affecting a water body or groundwater	
Honolulu Fire Department including HAZMAT: **911**	
State of Hawai'i Department of Health, Hazard Evaluation and Emergency Response Office (DOH HEER)	808-586-4249 808-236-8200 (after business hours)
Honolulu Local Emergency Planning Committee (LEPC)	808-723-8960
Discharge in any amount and affecting (or threatening to affect) a water body	
Honolulu Fire Department including HAZMAT: **911**	
Hawai'i State Emergency Response Commission (HSERC)/ State of Hawai'i Department of Health, Hazard Evaluation and Emergency Response Office (DOH HEER)	808-586-4249 808-236-8200 (after business hours)
National Response Center	1-800-424-8802
Honolulu Local Emergency Planning Committee (LEPC)	808-723-8960
Discharge onto City Street	
City and County of Honolulu, Storm Water Quality Division	808-768-3242

* The State of Hawai'i Department of Health Hazard Evaluation Emergency Response Office website contains a link to the Reportable Quantities List for hazardous substance releases.

To the best of your ability, please be ready with the following information:

- Where is the spill?
- What spilled?
- How much spilled?
- How concentrated is the spilled material?
- Who spilled the material?
- Is anyone cleaning up the spill?
- Are there resource damages (e.g., dead fish or oiled birds)?
- Who is reporting the spill?
- How can we get back to you?

After a spill, assess whether the Spill Response Plan is adequate and areas for improvement.

Form E **Self-Inspections**

Facility Storm Water Self Inspection Checklist

Facility:	
Inspector(s) Name and Title:	
Date and Time of Inspection:	

	Issue/Objective	Yes	No	N/A	Comment
Training					
1.	Has annual training been conducted and documented for all employees?	☐	☐	☐	
Good Housekeeping					
1.	Are loose debris, garbage, and waste regularly removed off facility's grounds?	☐	☐	☐	
2.	Are dumpsters and trash/recycle bins kept covered and inspected regularly for leaks?	☐	☐	☐	
3.	Are work areas and storage areas neat and clean?	☐	☐	☐	
4.	Are washing activities minimized and contained within the facility?	☐	☐	☐	
5.	Are vehicles and equipment inspected daily for leaks?	☐	☐	☐	
6.	Are equipment and vehicles serviced/maintained indoors or under cover?	☐	☐	☐	
7.	Are BMPs (e.g., absorbents, drip pans, drip pads) used under leaking vehicles and equipment to prevent tracking?	☐	☐	☐	
8.	During the last observed rain event, was the runoff leaving the facility discolored or observed to contain some type of contaminants? If so, please describe.	☐	☐	☐	
9.	Were there any other good housekeeping measures not described above that may have been an issue? If so, please describe.				

Issue/Objective		Yes	No	N/A	Comment
Material/Chemical Inventory and Storage					
1.	Are containers/drums properly stored under cover and within secondary containment structures?	☐	☐	☐	
2.	Are potential pollutants, chemical containers, and drums properly labeled and identified?	☐	☐	☐	
3.	Are Safety Data Sheets readily available for all chemicals/products/materials stored onsite? Are Safety Data Sheets located in an accessible location?	☐	☐	☐	
Spill Prevention and Response Plan					
1.	Are parking lots and paved areas visually inspected regularly for spills and leaks?	☐	☐	☐	
2.	Are spills promptly cleaned up using absorbent materials? Has the appropriate action taken place?	☐	☐	☐	
3.	Is the facility equipped with spill kits or are absorbent materials readily available? Are the spill kits well maintained and adequately stocked?	☐	☐	☐	
4.	Are above-ground storage tanks and facilities clean and in good condition?	☐	☐	☐	
5.	Are proper spill prevention control measures in place at the facility?	☐	☐	☐	
Structural BMP Maintenance					
1.	Are structural BMPs being properly maintained?	☐	☐	☐	
Other Inspection Areas (Loading/Unloading)					
		☐	☐	☐	
		☐	☐	☐	

Comments		Corrective Actions
1.		
2.		
3.		
4.		
5.		

Form F **Training Plan/Log**

Business Name:_____

Trainer/Supervisor: _____

Training Topics:	
	Industrial/Commercial BMP Plan Purpose
	Sources of Potential Pollutants that Could Affect Storm Water
	BMPs to Address Pollutant Sources
	Spill Response Plan
	Monthly Self-Inspections

Add additional training topics that are applicable to your business activities above.

I have participated in this training on the Industrial/Commercial BMP Plan which presented information on storm water discharges and what can be done to prevent or minimize contamination of storm water runoff.

Date	Name (print clearly)	Signature