DOCKETED	
Docket Number:	03-AFC-01C
Project Title:	Roseville Energy Park Compliance
TN #:	265833
Document Title:	ANNUAL COMPLIANCE REPORT- 2024 - Part 3
Description:	2024 ACR- Part 3- SWPPP Appendices
Filer:	Anwar Ali
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	8/29/2025 4:21:40 PM
Docketed Date:	8/29/2025

Appendix A

SITE MAPS

Image Citation: Google Earth Pro Imagery, Publication June 2021.

CALIFORNIA

QUADRANGLE LOCATION

N

0 2,000'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 1

SITE LOCATION MAP

SWPPP FIGURES
ROSEVILLE ENERGY PARK
ROSEVILLE, CALIFORNIA

Drawn By: JR	Checked By: SS	Scale: 1" = 2,000'	Date: 5/4/22	File: 82G-CREP-SWPPP_SITELOCMAP

DRAFT

L:\J&A TRIHYDRO COLLABORATION - DOCUMENTS\CITY OF ROSEVILLE ENERGY PARK\STORMWATERPOLLUTIONPREVENTIONPLAN\CADD_COREFILES-BASEMAPS\82G-CREP-SWPPP_SITELOCMAP

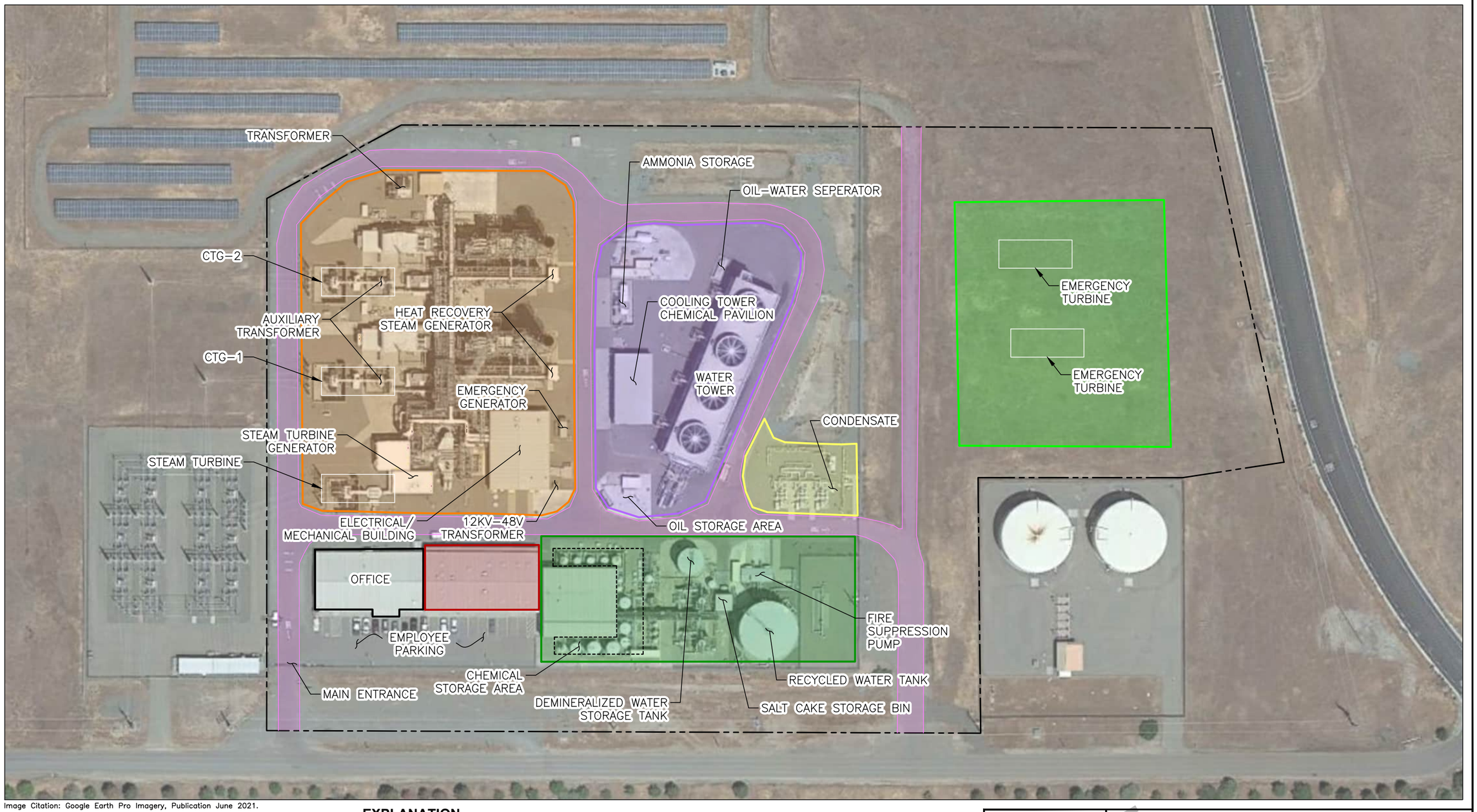


Image Citation: Google Earth Pro Imagery, Publication June 2021.

EXPLANATION

CTG–1	COMBUSTION TURBINE GENERATOR
——— - - ———	EXISTING SITE BOUNDARY
----------	CHEMICAL STORAGE BOUNDARY
	COOLING TOWER AREA
	EMERGENCY TURBINE AREA
	MAINTENANCE SHOP / WAREHOUSE
	NATURAL GAS AREA
	TURBINE AREA
	ZERO LIQUID DISCHARGE AREA
	INTERNAL ROADS

N

0 100'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307.745.7474 (F) 307.745.7729

FIGURE 2

INDUSTRIAL AREA MAP

SWPPP FIGURES
ROSEVILLE ENERGY PARK
ROSEVILLE, CALIFORNIA

Drawn By: JR	Checked By: SS	Scale: 1" = 100'	Date: 5/4/22	File: 82G-CREP-SWPPP_INDAREAMAP

L:\JR&A TRIHYDRO COLLABORATION - DOCUMENTS\CITY OF ROSEVILLE ENERGY PARK\STORMWATERPOLLUTIONPREVENTIONPLAN\CADD\SINGLEFIGURES\82G-CREP-SWPPP_INDAREAMAP

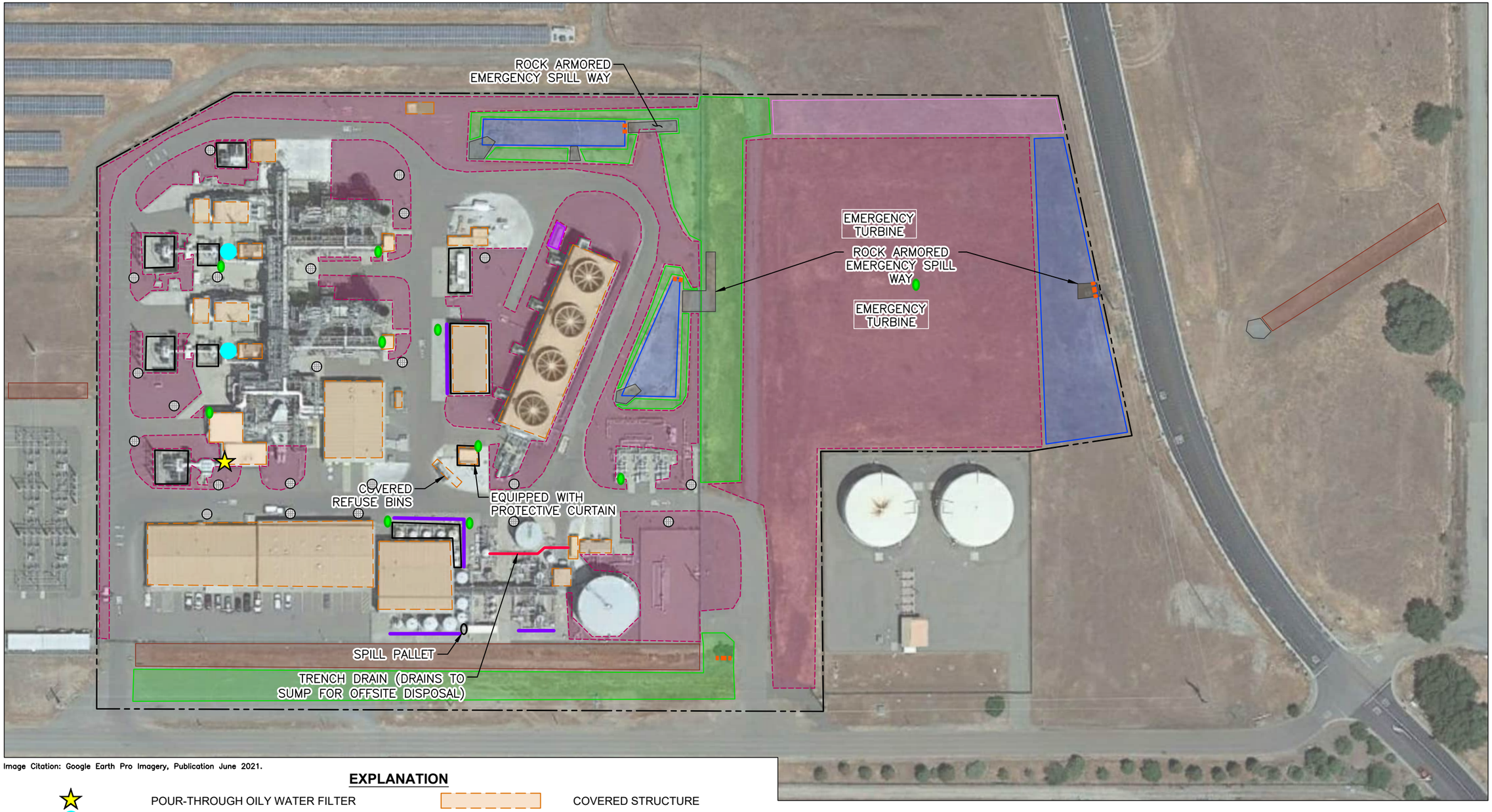


Image Citation: Google Earth Pro Imagery, Publication June 2021.

EXPLANATION

- POUR-THROUGH OILY WATER FILTER
- CONTAINMENT SUMP
- SPILL KIT
- DRAIN INLET FILTERS AND OIL-ONLY DEVICES INSTALLED AT EACH DRAIN INLET
- EXISTING SITE BOUNDARY
- TRENCH DRAIN (DRAINS TO COOLING TOWER)
- HEAVY METAL FILTER SOCK
- SECONDARY CONTAINMENT (PUMPED TO OIL-WATER SEPERATOR)
- COVERED STRUCTURE
- GRAVEL AREA
- NATURAL VEGETATION AREA
- OIL / WATER SEPERATOR
- ROCK ARMORED DRAINAGE AREA
- ROCK DRAINAGE CHANNEL
- STORMWATER POND
- VEGETATED DRAINAGE SWALE WITH CHECK DAMS

N

0 100'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 3

BEST MANAGEMENT PRACTICES PLAN

SWPPP FIGURES
ROSEVILLE ENERGY PARK
ROSEVILLE, CALIFORNIA

Drawn By: JR	Checked By: SS	Scale: 1" = 100'	Date: 12/6/23	File: 82G-CREP-SWPPP_FIG3_BMP-PLAN

J:\GIS\SWPPP--IGP\ROSEVILLEENERGYPARK_COREFILES--BASEMAPS\82G--CREP--SWPPP_FIG3_BMP--PLAN

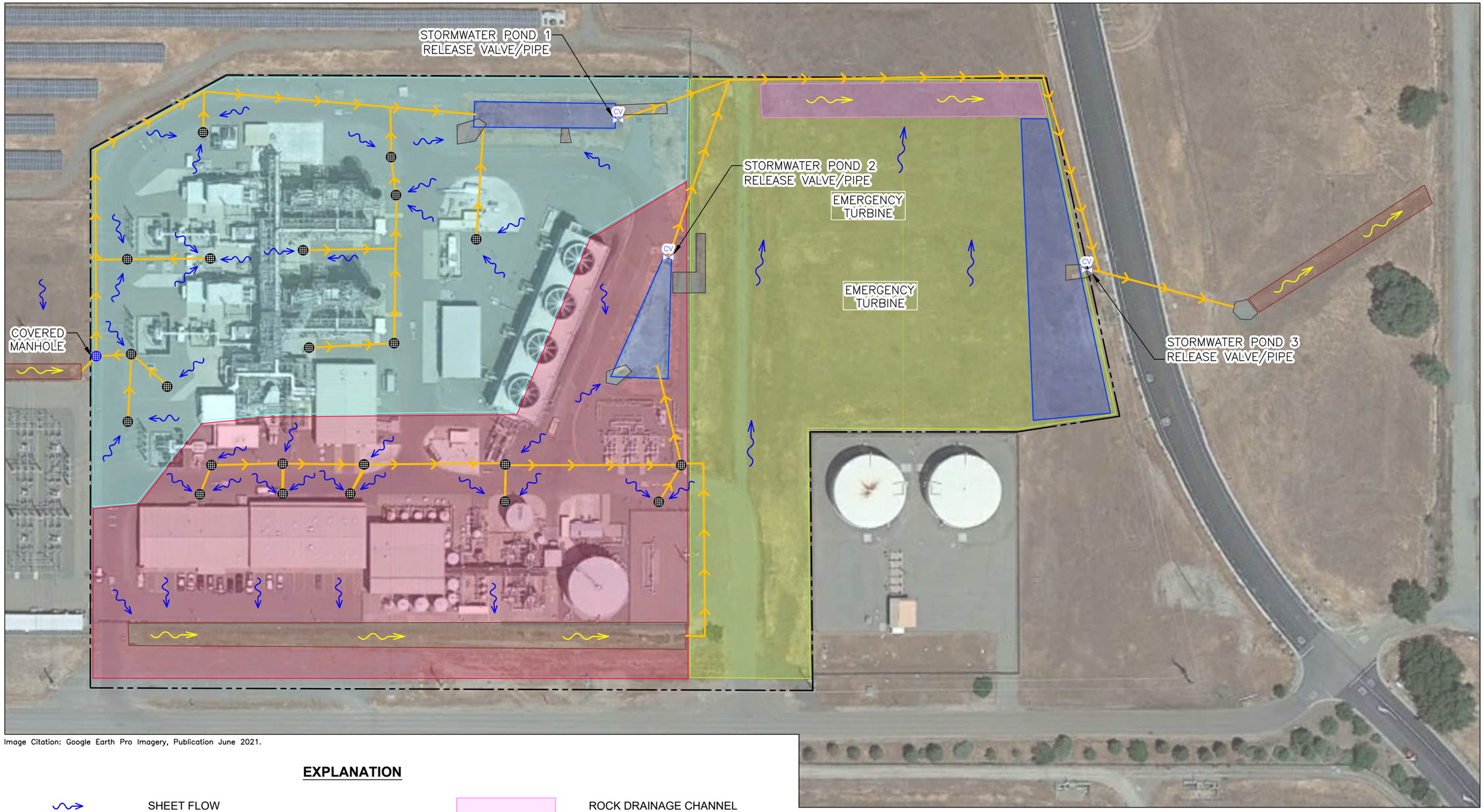


Image Citation: Google Earth Pro Imagery, Publication June 2021.

EXPLANATION

- SHEET FLOW
- CONCENTRATION FLOW
- SW–1 STORMWATER SAMPLE AND DESIGNATION
- DROP INLET
- UNDERGROUND PIPE
- EXISTING SITE BOUNDARY
- STORMWATER POND
- ROCK DRAINAGE CHANNEL
- VEGETATED DRAINAGE SWALE WITH CHECK DAMS
- ROCK ARMORED DRAINAGE
- DRAINAGE AREA 1
- DRAINAGE AREA 2
- DRAINAGE AREA 3

N

0 100'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 4

STORMWATER DRAINAGE MAP

SWPPP FIGURES
ROSEVILLE ENERGY PARK
ROSEVILLE, CALIFORNIA

Drawn By: JR	Checked By: SS	Scale: 1" = 100'	Date: 5/5/22	File: 82G-CREP-SWPPP_DRAINAGEMAP

L:\JR&A TRIHYDRO COLLABORATION - DOCUMENTS\CITY OF ROSEVILLE ENERGY PARK\STORMWATERPOLLUTIONPREVENTIONPLAN\CADD\SINGLEFIGURES\82G-CREP-SWPPP_DRAINAGEMAP

BMP NOTES:

1. PROTECT EXISTING VEGETATION FOR NATURAL EROSION PREVENTION AND SEDIMENT TRAPPING. CONDUCT WORK WITHIN DESIGNATED AREAS. DELINEATE WORK AREAS AND TRAFFIC ROUTES, AS NEEDED. IF EROSION IS IDENTIFIED THEN ADDRESS WITH BY REVEGETATION, GRAVEL/ROCK, MATTING, ETC.

2. STAFF SHALL FOLLOW SPILL PREVENTION AND CONTROL MEASURES WHEN HANDLING, STORING, OR USING HAZARDOUS MATERIALS. SEE SPILL RESPONSE SECTION 3.2.3 IN SWPPP & ONSITE SPCC PLAN FOR FURTHER GUIDANCE.

3. STAFF SHALL CONDUCT ROUTINE MAINTENANCE WHEN STORM EVENTS ARE NOT OCCURRING WHEN POSSIBLE.

4. STAFF WILL IMPLEMENT GOOD HOUSEKEEPING MEASURES IN ACCORDANCE WITH SECTION 3.2.1 OF SWPPP. ALL HAZARDOUS MATERIALS WILL BE KEPT CLOSED WHEN NOT IN USE AND IN ENCLOSED STRUCTURE. CONTAINER(S) OF 55 GAL OR MORE WILL BE PLACED ON SECONDARY CONTAINMENT.

5. COVER ALL TRASH RECEPTICALS AT THE END OF EACH DAY AND DURING RAIN EVENTS.

6. WASHING OF EQUIPMENT AND STRUCTURES SHOULD BE LIMITED AND WASHWATER MUST BE CONTAINED.

SHIPPING & RECEIVING AREAS
TURBINE AREA
EMERGENCY TURBINE AREA
NATURAL GAS AREA
COOLING TOWER AREA
ZERO LIQUID DISCHARGE AREA
MAINTENANCE SHOP & WAREHOUSE

MATERIAL HANDLING & PROCESSING AREA
TURBINE AREA
EMERGENCY TURBINE AREA
NATURAL GAS AREA
COOLING TOWER AREA
ZERO LIQUID DISCHARGE AREA
MAINTENANCE SHOP & WAREHOUSE

INDUSTRIAL STORAGE AREAS
TURBINE AREA
EMERGENCY TURBINE AREA
NATURAL GAS AREA
COOLING TOWER AREA
ZERO LIQUID DISCHARGE AREA
MAINTENANCE SHOP & WAREHOUSE

DUST OR PARTICULATE GENERATING AREAS
INTERNAL ROADS
TURBINE AREA
EMERGENCY TURBINE AREA

EROSION AREAS
INTERNAL ROADS
EMERGENCY TURBINE AREA
AROUND STORMWATER PONDS
WASH AREAS & MATERIAL REUSE AREAS
COOLING TOWER AREA
ZERO LIQUID DISCHARGE AREA

ABOVEGROUND STORAGE TANKS*
TURBINE AREA
EMERGENCY TURBINE AREA
NATURAL GAS AREA
COOLING TOWER AREA
ZERO LIQUID DISCHARGE AREA
MAINTENANCE SHOP & WAREHOUSE
*SEE APPENDIX D FOR A FULL LIST OF TANKS AND ASSOCIATED LOCATIONS

FUELING AREAS
N/A - PERMANENT PIPED FUEL TANKS USED FOR EMERGENCY EQUIPMENT ONLY. NO ONSITE FUELING OF VEHICLES OR EQUIPMENT.

MAINTENANCE AREAS
TURBINE AREA
EMERGENCY TURBINE AREA
NATURAL GAS AREA
COOLING TOWER AREA
ZERO LIQUID DISCHARGE AREA
MAINTENANCE SHOP & WAREHOUSE

AREAS DIRECTLY EXPOSED TO PRECIPITATION
TURBINE AREA
EMERGENCY TURBINE AREA
NATURAL GAS AREA
COOLING TOWER AREA
ZERO LIQUID DISCHARGE AREA
INTERNAL ROADS

WASTE TREATMENT & DISPOSAL AREAS
COOLING TOWER AREA
ZERO LIQUID DISCHARGE AREA

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 5

GENERAL NOTES

SWPPP FIGURES
ROSEVILLE ENERGY PARK
ROSEVILLE, CALIFORNIA

Drawn By: JR	Checked By: SS	Scale: NONE	Date: 5/9/22	File: 82G-CREP-SWPPP_GENNOTES

APPENDIX B

PERMIT REGISTRATION DOCUMENTS

Permit Registration Documents included in this Appendix:

Yes / No	Permit Registration Document
Yes	Notice of Intent
Yes	Certification, in SMARTS
Yes	Additional COI / Correspondence as needed

State Water Resources Control Board

NOTICE OF INTENT

GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH INDUSTRIAL ACTIVITY (WQ ORDER No. 2014-0057-DWQ)
(Excluding Construction Activities)

GAVIN NEWSOM
GOVERNOR

JARED BLUMENFELD
SECRETARY FOR
ENVIRONMENTAL PROTECTION

WDID: 5S31I021340 Status: Active

Operator Information

Type: Other

Name: City of Roseville Electric Utility
Address: 2090 Hilltop Circle
Address 2:
City/State/Zip: Roseville CA 95747
Federal Tax ID:

Contact Name: Julie Manfredi
Title: Electric Compliance Analyst
Phone Number: 916-774-5674
Email Address: jmanfredi@roseville.ca.us

Facility Information

Level:

Contact Name: Julie Manfredi
Title: Electric Compliance Analyst
Site Name: Roseville Energy Park
Address: 5120 Phillip Rd
City/State/Zip: Roseville CA 95747
County: Placer
Latitude: 38.79345 Longitude: -121.37998

Site Phone #: 916-774-5674
Email Address: jmanfredi@roseville.ca.us
Site Size: 12.53 Acres
Industrial Area Exposed to Storm Water: 12.53 Acres
Percent of Site Impervious (Including Rooftops): %

SIC Code Information

1. 4911 Electric Services
2.
3.

Additional Information

Receiving Water: unnamed tributary of Pleasant Grove Creek
Flow: Indirectly
Storm Drain System:
Compliance Group:

RWQCB Jurisdiction: Region 5S - Sacramento
Phone: 916-464-3291
Email: r5s_stormwater@waterboards.ca.gov

Certification

Name: Julie Manfredi
Date: September 27, 2022
Title: Electric Compliance Analyst

December 06, 2023

Julie Manfredi
City of Roseville Electric Utility
2090 Hilltop Circle
Roseville, CA 95747

Facility Info: Roseville Energy Park
5120 Phillip Rd
Roseville, CA 95747
SIC Code(s): 4911

Waste Discharge Identification Number: 5S31I021340

Date Processed: December 14, 2007

RECEIPT OF YOUR NOTICE OF INTENT (NOI)

The State Water Resources Control Board (State Water Board) received and processed the NOI to comply with the terms of the General Permit for Storm Water Discharges Associated with Industrial Activity Order 2014-0057-DWQ.

Waste Discharger Identification (WDID) number 5S31I021340 is assigned to the facility referenced above.

Accordingly, you are required to comply with all applicable permit requirements.

Notice of Termination (NOT) is required to be submitted to the State Water Board should the owner or operator of the facility change or upon closure of the facility. Until an NOT is submitted you will continue and are responsible to pay the annual fee invoiced each October.

If you have any further questions, please contact your local Regional Water Board at 916-464-3291.

Please visit the storm water web page at www.waterboards.ca.gov/water_issues/programs/stormwater/industrial.shtml for storm water related information.

Sincerely,
Storm Water Program
Division of Water Quality

SWPPP Amendment No. 01 – Analysis of Impaired Watershed Constituents

Project Name: CITY OF ROSEVILLE - ROSEVILLE ENERGY PARK

Project Number: **WDID # 5S31I021340**

QSD Certification of the
Storm Water Pollution Prevention Plan Amendment

"This Stormwater Pollution Prevention Plan Amendment(s) were prepared under my direction to meet the requirements of the California's General Permit for Storm Water Discharges Associated with Industrial Activities (General Permit or IGP) Order No. 2014-0057-DWQ (National Pollutant Discharge Elimination System [NPDES] No. CAS000001) issued by the State Water Resources Control Board (State Water Board or SWRCB) and all future amendments. I hereby state that I am a Qualified Industrial SWPPP Practitioner in good standing as of the date signed below."

Mary A. Larsen
Qualified SWPPP Developer (QSD) Signature

August 10, 2018
Date

Mary A. Larsen, President, Stormwater Specialists, Inc. IGP ToR, QISP #065
QSD Name and Title

(916) 230-0370
Telephone Number

LRP or A/S Approval of the
Storm Water Pollution Prevention Plan Amendment

"I certify under a penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Julie Manfredi
Legally Responsible Person (LRP) or Approved Signatory (A/S) Signature

08-14-18
Date

JULIE MANFREDI ELECTRIC COMPLIANCE ANALYST
LRP or A/S Name and Title

916-774-5674
Telephone Number

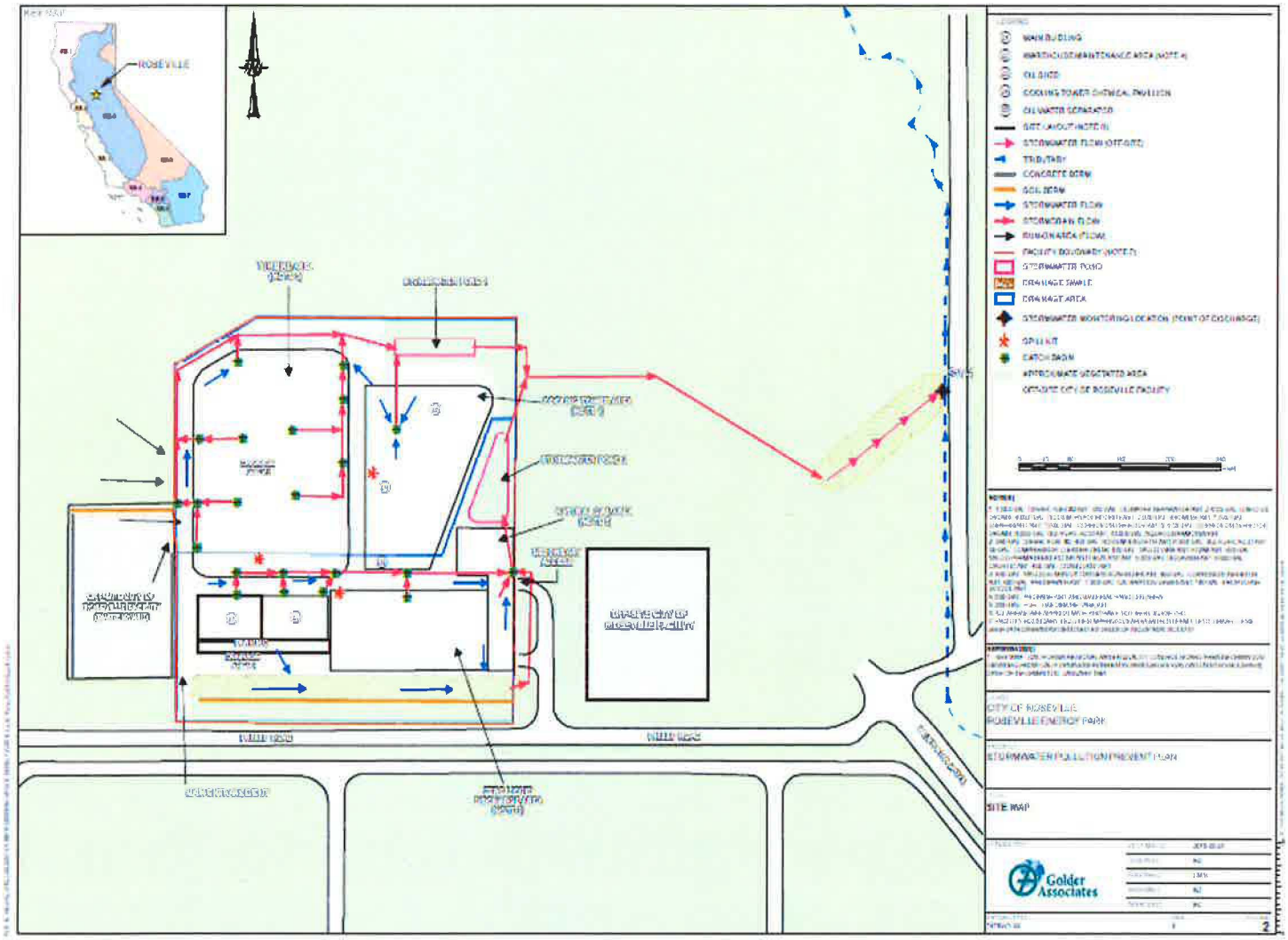
Amendment Log

Project Name: CITY OF ROSEVILLE - ROSEVILLE ENERGY PARK

Project Number: **WDID # 5S31I021340**

Amendment No.	Date	Brief Description of Amendment	Prepared By
01		Roseville Energy Park – Amendment No. 01 – Analysis of facility operations and review of identified pollutants within the Impaired Watershed. Analysis and summary Memo attached. Request to remove additional pollutants from the list of pollutants.	Mary A. Larsen, IGP ToR, QISP #065

City of Roseville – Roseville Energy Park – SWPPP Map



Mary A. Larsen, ToR, QISP, QSD, President
Stormwater Specialists, Inc.
8698 Elk Grove Blvd #224
Elk Grove CA 95624
Phone (916) 230-0370
Mary@stormwaterspecialists.com

City of Roseville - Roseville Energy Park Memo

VIA: ☐ Facsimile ☐ Priority ☐ US Mail ☒ Email

DATE: 8/10/2018

TO: Julie Manifredi, City of Roseville – Roseville Energy Park

FROM: Mary A. Larsen, President, IGP ToR, QISP #065

RE: Roseville Energy Park – Amendment No. 01 -

Dear Julie,

During the completion of Industrial Annual Report 2017-2018 for City of Roseville - Roseville Energy Park, SMARTS had added the following List of Identified Pollutants within the Impaired Watershed: Dissolved Oxygen, Metal Screen and Pyrethoids. The following is our Analysis of the additional parameters identified on SMARTS and any relation to the operations at the City of Roseville – Roseville Energy Park.

It is important to note that these additional identified pollutants are identified in an impaired Watershed and they are not currently listed on the 303(d) list. They may be added to the 303(d) list in 2021.

1) Dissolved Oxygen (DO) - The dissolved oxygen (DO) is oxygen that is dissolved in water. The oxygen dissolves by diffusion from the surrounding air; aeration of water that has tumbled over falls and rapids; and as a waste product of photosynthesis.

Waterboard - Pollutant: Oxygen, Dissolved
Final Listing Decision: List on 303(d) list (TMDL required list)
Last Listing Cycle's Final
Listing Decision: New Decision
Revision Status Revised
Sources: Source Unknown
Expected TMDL Completion Date: 2021
Impairment from Pollutant or Pollution: Pollutant
Conclusion: This pollutant is being considered for placement on the section 303(d) list under section 3.2 of the Listing Policy. Under section 3.2 a single line of evidence is necessary to assess listing status. Two lines of evidence are available in the administrative record to assess this pollutant. Four hundred eighty-one of the samples exceed the water quality objective. Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of placing this water segment-pollutant combination on the section 303(d) list in the Water Quality Limited Segments category.

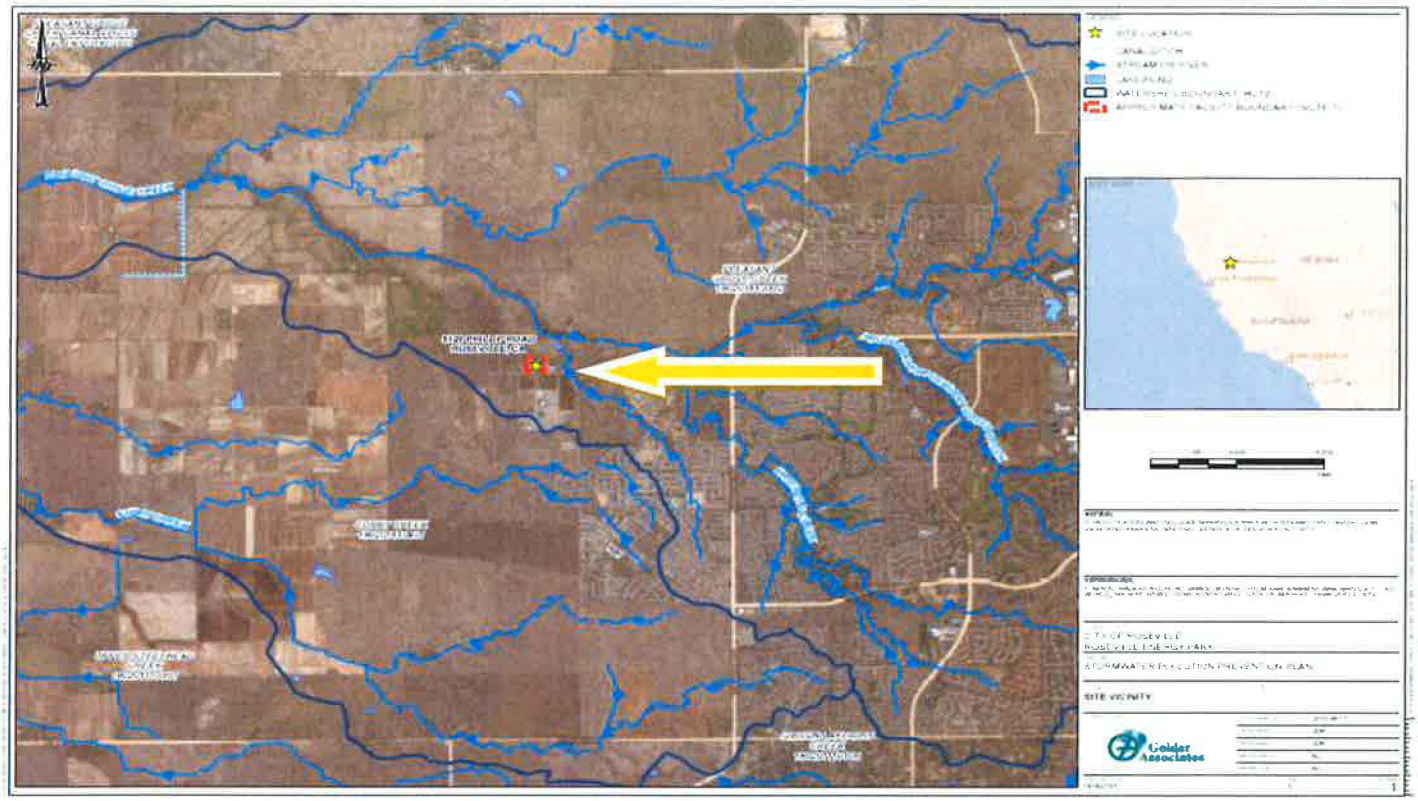
2) Pyrethroid - Pesticides are currently widely used for structural pest control in urban and residential areas, in various consumer use pest control products, and in agriculture 2000s, pyrethroids have been found at levels of concern in surface waters in the Sacramento and San Joaquin River Basins that receive urban storm water and/or agricultural discharges. The main sources of these pyrethroids are discharges from municipal storm water systems (also known as municipal separate storm sewer systems or MS4s) and agricultural lands. Pyrethroids have also been detected in municipal wastewater treatment plant, (also known as publicly owed treatment works or POTW) discharges at levels of concern. Fourteen surface water bodies in the Central Valley have been documented as impaired by pyrethroids, nine of these are impaired due to municipal storm water discharges, while five are due to agricultural discharges.

Pollutant: Pyrethroids
Final Listing Decision: List on 303(d) list (TMDL required list)
Last Listing Cycle's Final
Listing Decision: New Decision
Revision Status Revised
Sources: Urban Runoff/Storm Sewers
Expected TMDL Completion Date: 2021
Impairment from Pollutant or Pollution: Pollutant
Conclusion: This pollutant is being considered for placement on the section 303(d) list under section 3.1 of the Listing Policy. Under section 3.1 a single line of evidence is necessary to assess listing status. Two lines of evidence are available in the administrative record to assess this pollutant. Three of the samples exceed the water quality objective. Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification in favor of placing this water segment-pollutant combination on the section 303(d).

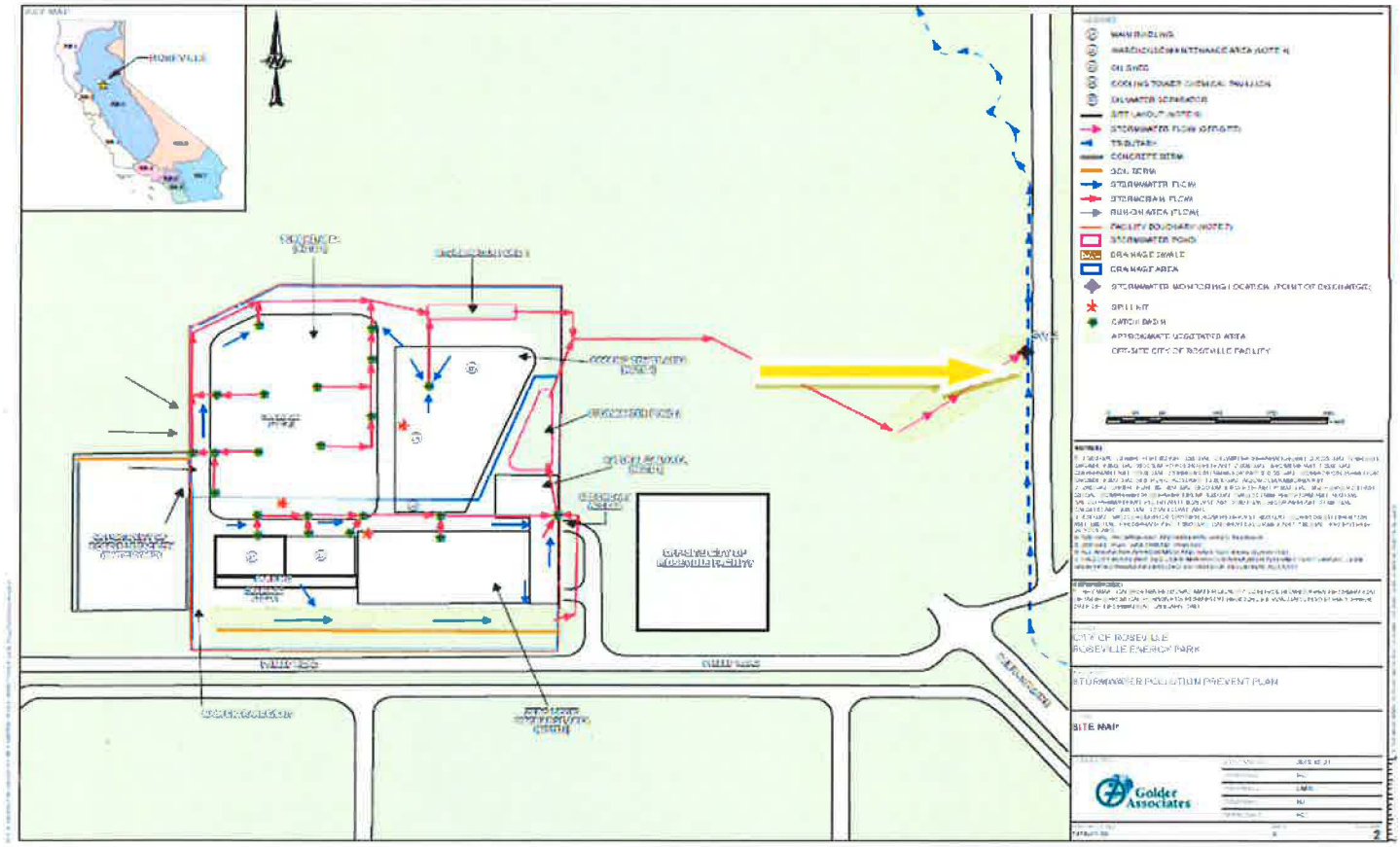
3) Metals Screen: Heavy metals wash from tires, automobile exhausts, road asphalt, fuel combustion, parking dust, and recreational land into urban stormwater runoff and its subsequent discharge into surface and subsurface water sources can create public health and environmental hazards.

The Roseville Energy Park operations are a "closed loop" facility. Any stormwater that is eventually captured in Stormwater Pond #1 or Stormwater Pond #2 only discharges from the site after the ponds are near capacity and during excessive rainy seasons. Once stormwater eventually discharges, it flows through a discharge pipe to outlet several thousand feet away and then travels throw a drainage swale another 1000' plus feet in length before reaching an unnamed tributary to eventually Pleasant Grove Creek. *

*Please see attached Vicinity Map & SWPPP Map.



Roseville Energy Park Vicinity Map discharges indirectly to unnamed tributary to Pleasant Grove Creek



Roseville Energy Park - Industrial Stormwater Map discharges indirectly to unnamed tributary to Pleasant Grove Creek

Analysis & Summary:
Based on the Roseville Energy Park site visit, review of Storm Water Pollution Prevention Plan (SWPPP), research of additional impaired pollutants and the causes, interview and meeting with onsite management and explanation of the "closed loop" operations we firmly state that there is no evidence that the Roseville Energy Park contributes Dissolved Oxygen, Metals or Pyrethoids in any amount that would exceed current or future 303(d) impaired levels for 2021.

We respectfully request the Central Valley Regional Water Quality Control Board (CVRWQCB) to remove the additional identified Pollutants of Dissolved Oxygen, Metals and Pyrethoids form the Roseville Energy Park list of pollutants.

We appreciate the opportunity to work with you and your Roseville Energy Park Team and your proactive commitment to Stormwater Compliance. Please feel free to contact me with any questions or comments. Thank you.

Kind regards,

Mary A. Larsen

Trainer of Record (ToR) – for IGP & CGP Permits
Qualified Industrial SWPPP Practitioner (QISP) #065
Qualified SWPPP Developer (QSD) #024
Certified Professional in Storm Water Quality (CPSWQ)
Certified Professional in Erosion and Sediment Control (CPESC)

Change of Information (COI) - COI Form

COI ID:	89239	**Status of Document:**	Not Submitted	**Submitter:**		**Owner/Operator:**	City of Roseville Electric Utility 2090 Hilltop Circle Roseville CA 95747
COI Type:	Update SWPPP and NOI	**COI Date:**		**WDID:**	5S31I021340	**Site/Facility:**	Roseville Energy Park 5120 Phillip Rd Roseville CA 95747

Change of Information Request(COI) is successfully saved.

Please enter values that are to be updated in **Revised Value column fields** as needed.

Site/Facility Address Details:

Field Names	Current Values	Revised Values
Street Address:	5120 Phillip Rd	
Address Line2:		
Latitude:	38.79345	View Map to select New Latitude & Longitude
Longitude:	-121.37998	Update County/Region
City:	Roseville	All
County:	Placer	Updated through changes to Latitude/Longitude. If changes are made to the Latitude/Longitude, press the 'Update County/Region' button to show the updated County/Region.
Region:	Region 5S - Sacramento	Updated through changes to Latitude/Longitude. If changes are made to the Latitude/Longitude, press the 'Update County/Region' button to show the updated County/Region.

IGP Facility Details:

Field Names	Current Values	**Revised Values**
Total Site Size:	8.9 (●) **Acres** ( ) **Sqft**	12.53 (●) **Acres** ( ) **Sqft**
Total Area of Industrial Activities and Materials Exposed to Storm Water:	8.9 (●) **Acres** ( ) **Sqft**	12.53 (●) **Acres** ( ) **Sqft**

SIC Codes:

Field Names	Current Values	**Revised Values**
Primary SIC Code:	4911	Select
Secondary SIC Code:		Select
Tertiary SIC Code:		Select

Reason for change: SWPPP and NOI was updated to reflect the revised acreage and industrial activities associated with the addition of two mobile combustion turbines to the east of existing operations. *

Save & Continue

Change of Information (COI) - SWPPP

COI ID:	100353	**Status of Document:**	Not Submitted	**Submitter:**		**Owner/Operator:**	City of Roseville Electric Utility 2090 Hilltop Circle Roseville CA 95747
COI Type:	Update SWPPP	**COI Date:**		**WDID:**	5S31I021340	**Site/Facility:**	Roseville Energy Park 5120 Phillip Rd Roseville CA 95747

Change of Information Request(COI) is successfully saved.

SWPPP/Map | Certify/Review | Status History | Back To NOI Summary

Please click on Upload Revised SWPPP/Map to upload new or revised SWPPP/Map components. **Upload Revised SWPPP/Map**

The following is the current new or revised SWPPP/Map components that will be uploaded when certified. Click on the links to view them.

Attachment ID	File Type	File Title	File Description	Document Date	Part No.	Date Attached	Upload By	Delete
No records found.								

Reason For SWPPP/Map Revision:

Updated SWPPP to reflect L1 and L2 exceedances..

*

Save & Continue

APPENDIX C

TRAINING REPORTING FORM EXAMPLE

Trained Team Member Log

Storm Water Management Training Log and Documentation

Project Name: Roseville Energy Park
WDID #: 5S31I021340
Storm Water Management Topic: (check as appropriate)

Minimum BMPs
- ☐ Good Housekeeping
- ☐ Preventative Maintenance
- ☐ Spill & Leak Prevention/Response
- ☐ Erosion &Sediment Controls
- ☐ Material Handling & Waste Management
- ☐ Quality Assurance & Record Keeping
- ☐ Employee Training Program

Advanced BMPs
- ☐ Exposure Minimization BMPs
- ☐ Stormwater Containment/Discharge Reduction BMPs
- ☐ Treatment Control BMPs
- ☐ Other Advanced / Structural BMPs

Specific Training Objective: _____

Location: _____ Date: _____

Instructor: _____ Telephone: _____

Course Length (hours): _____

Attendee Roster (Attach additional forms if necessary)

Name	Company	Phone

APPENDIX D

LIST OF INDUSTRIAL MATERIALS

List of Industrial Materials

Material	Physical Characteristics	Location	Container Type & Containment Type[1]	Estimated Max. Quantity (gal)	Handling Frequency (approx.)	Shipping/ Receiving Frequency (approx.)
Turbine Lubricating Oil	Liquid	Turbine Area – Steam Turbine	1,900-gallon AST / Concrete Containment Basin	1,900 gallons	Daily	Monthly
Lube Oil	Liquid	Turbine Area – Steam Turbine Generator	470-gallon AST-equipment / None	450 gallons	Daily	Monthly
Turbine Lubricating Oil	Liquid	Turbine Area – CTG-1	3,170-gallon AST / Concrete Containment Basin	3,170 gallons	Daily	Monthly
Turbine Lubricating Oil	Liquid	Turbine Area – CTG-2	3,170-gallon AST / Concrete Containment Basin	3,170 gallons	Daily	Monthly
Insulating Oil (Mineral Oil)	Liquid	Turbine Area – Steam Turbine	7,000-gallon AST / Concrete Containment Basin	7,000 gallons	Only if needed	Infrequent (Only if needed)
Insulating Oil (Mineral Oil)	Liquid	Turbine Area – CTG-1	4,540-gallon AST / Concrete Containment Basin	4,540 gallons	Only if needed	Infrequent (Only if needed)
Insulating Oil (Mineral Oil)	Liquid	Turbine Area – CTG-1 Auxiliary Transformer	2,227-gallon AST / Concrete Containment Basin	2,227 gallons	Only if needed	Infrequent (Only if needed)
Insulating Oil (Mineral Oil)	Liquid	Turbine Area – CTG-2	4,540-gallon AST / Concrete Containment Basin	4,540 gallons	Only if needed	Infrequent (Only if needed)
Insulating Oil (Mineral Oil)	Liquid	Turbine Area – CTG-2 Auxiliary Transformer	2,227-gallon AST / Concrete Containment Basin	2,227 gallons	Only if needed	Infrequent (Only if needed)
Insulating Oil (Mineral Oil)	Liquid	Turbine Area – Transformer	7,000-gallon AST / Concrete Containment Basin	7,000 gallons	Only if needed	Infrequent (Only if needed)
Insulating Oil (Mineral Oil)	Liquid	Turbine Area – 12KV-480V Transformer	532-gallon Transformer / NA	532 gallon	Only if needed	Infrequent (Only if needed)
Nalco Elimin-Ox Oxygen Scavenger	Liquid	Turbine Area – Electrical / Mechanical Building	400-gallon AST / secondary containment	400 gallons	Daily	Quarterly

Corrosion Inhibitor	Liquid	Turbine Area – Electrical / Mechanical Building	400-gallon AST / secondary containment	400 gallons	Daily	Quarterly
Trisodium Phosphate	Liquid	Turbine Area – Electrical / Mechanical Building	400-gallon AST / secondary containment	400 gallons	Daily	Quarterly
CCCW Molybdate Treatment Drewgard	Liquid	Turbine Area – Electrical / Mechanical Building	55-gallon drums / Spill Pallet	100 gallons	Daily	Quarterly
Diesel	Liquid	Turbine Area – Emergency Generator	1,500—gallon AST / Double Walled Tank	1,500 gallons	Daily	Monthly
Natural Gas Condensate	Liquid	Natural Gas Area	250-gallon AST / Concrete Containment Basin	350 gallons	Daily	Quarterly
Turbine Lubricating Oil	Liquid	Emergency Turbine Area – North Unit (Serial #726880)	81-gallon AST / Secondary Containment Device	81 gallons	Daily	Monthly
Turbine Lubricating Oil	Liquid	Emergency Turbine Area – South Unit (Serial #7269083)	81-gallon AST / Secondary Containment Device	81 gallons	Daily	Monthly
Transformer Insulating Oil (Mineral Oil)	Liquid	Emergency Turbine Area – North Unit (Serial #726880)	375-gallon AST/ Secondary Containment Device	375 gallons	Only if needed	Infrequent (Only if needed)
Transformer Insulating Oil (Mineral Oil)	Liquid	Emergency Turbine Area – South Unit (Serial #7269083)	375-gallon AST/ Secondary Containment Device	375 gallons	Daily	Monthly
Ammonia	Liquid	Emergency Turbine Area – North Unit (Serial #726880)	300-gal Totes/ Secondary Containment Device	600 gallons	Daily	Monthly
Ammonia	Liquid	Emergency Turbine Area – South Unit (Serial #7269083)	300-gal Totes/ Secondary Containment Device	600 gallons	Only if needed	Infrequent (Only if needed)
Generator Lube Oil	Liquid	Emergency Turbine Area – North Unit (Serial #726880)	150-gallon AST/ Secondary Containment Device	150 gallons	Only if needed	Infrequent (Only if needed)

Generator Lube Oil	Liquid	Emergency Turbine Area – South Unit (Serial #7269083)	150-gallon AST/ Secondary Containment Device	150 gallons	Only if needed	Infrequent (Only if needed)
ZOK 27 Cleaning Solution	Liquid	Emergency Turbine Area – South Unit (Serial #7269083)	55-gallon drum / Spill Pallet	55 gallons	Daily	Monthly
ZOK 27 Cleaning Solution	Liquid	Emergency Turbine Area – North Unit (Serial #726880)	55-gallon drum / Spill Pallet	55 gallons	Daily	Monthly
Dispersant	Liquid	Cooling Tower Area – Cooling Tower	275-gallon AST / Secondary Containment device	275 gallons	Daily	Weekly
Used Oil	Liquid	Cooling Tower Area – Oil-Water Separator	350-gallon AST integrated within oil-water separator	350 gallons	Daily	Quarterly
Ammonium Hydroxide	Liquid	Cooling Tower Area – Ammonia Storage & Unloading Area	10,000-gallon AST / Concrete Containment Basin	9,000 gallons	Daily	Monthly
Sulfuric Acid	Liquid	Cooling Tower Area – Cooling Tower Chemical Pavilion	6,000-gallon AST / Concrete Containment Basin	6,000 gallons	Daily	Monthly
Sodium Hypochlorite	Liquid	Cooling Tower Area – Cooling Tower Chemical Pavilion	8,000-gallon AST / Concrete Containment Basin	8,000 gallons	Daily	Monthly
Corrosion Inhibitor	Liquid	Cooling Tower Area – Cooling Tower Chemical Pavilion	400-gallon AST / Concrete Containment Basin	400 gallons	Daily	Monthly
Corrosion Inhibitor	Liquid	Cooling Tower Area – Cooling Tower Chemical Pavilion	55-gallon drums to 200-gallon totes / Containment Drain &/or Basin	500 gallons	Daily	Monthly
Antifreeze	Liquid	Cooling Tower – Closed Cooling Water System	2 x 400 gallon closed Equipment	800 gallons	Daily	Monthly
Hydraulic Oil	Liquid	Cooling Tower – Drum Storage Area	55-gallon drums	250 gallons	Daily	Monthly

Used Oil	Liquid	Cooling Tower – Drum Storage Area	55-gallon Drum / spill pallet	110 gallons	Daily	Monthly
Salt Cakes (Non-RCRA HazWaste)	Solid	Zero Liquid Discharge Area – Salt Cake Storage Bin	20-40 yard Roll Off Bin	20-40 yards	Daily	Quarterly
Diesel Fuel	Liquid	Zero Liquid Discharge Area – Fire Suppression Pump	290-gallon dual walled AST	290 gallons	Daily	Monthly
Sodium Bisulfite	Liquid	Zero Liquid Discharge Area – Chemical Storage Area	400-gallon tote / Concrete Containment Basin	400 gallons	Daily	Monthly
Sodium Bisulfate	Liquid	Zero Liquid Discharge Area – Chemical Storage Area	200-gallon totes / Containment Drain	400 gallons	Daily	Monthly
Sulfuric Acid	Liquid	Zero Liquid Discharge Area – Chemical Storage Area	6,000-gallon AST / Concrete Containment Basin	6,000 gallons	Daily	Monthly
Anti-Foam	Liquid	Zero Liquid Discharge Area – Chemical Storage Area	400-gallon tote / Concrete Containment Basin	400 gallons	Daily	Monthly
Anti-Foam	Liquid	Zero Liquid Discharge Area – Chemical Storage Area	200-gallon totes / Containment Drain	3,200 gallons	Daily	Monthly
Anti-Scalant	Liquid	Zero Liquid Discharge Area – Chemical Storage Area	400-gallon tote / Concrete Containment Basin	400 gallons	Daily	Monthly
Anti-Scalant	Liquid	Zero Liquid Discharge Area – Chemical Storage Area	200-gallon totes / Containment Drain	800 gallons	Daily	Monthly
Sodium Hydroxide Solid	Liquid	Zero Liquid Discharge Area – Chemical Storage Area	3,000-gallon AST / Concrete Containment Basin	3,000 gallons	Daily	Monthly
Coagulant	Liquid	Zero Liquid Discharge Area – Chemical Storage Area	400-gallon tote / Concrete Containment Basin	400 gallons	Daily	Monthly

Coagulant	Liquid	Zero Liquid Discharge Area – Chemical Storage Area	200-gallon totes / Containment Drain	800 gallons	Daily	Monthly
Contect 6000 Compressor Cleaner	Liquid	Zero Liquid Discharge Area – Chemical Storage Area	55-gallon Drum / Containment Drain	110 gallons	Daily	Monthly
Soda Ash 100%	Solid	Zero Liquid Discharge Area – Chemical Storage Area	3,000 pound bag	3,000 pounds	Daily	Monthly
Various aerosols-paints, brake cleaner, oils, etc.	Liquid / Aerosol / Solid	Maintenance Shop / Warehouse	<5 gal.	<50 gal	Daily	Monthly

Notes:

1) AST = Aboveground Storage Tank
2) Transformer is owned and maintained by PGE. Gallons were unable to be obtained and are estimated.
3) The Water Treatment Plant also includes 3 empty tanks (T-30, T-4, and clarifier) which are no longer in use.
4) Gases are not in this table due to the nature of gas and no potential stormwater contamination is anticipated.

APPENDIX E

SWPPP AMENDMENT CERTIFICATIONS

SWPPP Preparation / Amendment Date	SWPPP Revision 5 / December 6, 2023
Project Name:	Roseville Energy Park
WDID Number:	5S31I021340

CERTIFICATION, PREPARATION AND REVIEW

This Storm Water Pollution Prevention Plan and all attachments were prepared by a Qualified Industrial Storm Water Practitioner (QISP) to meet the requirements of the Industrial General Permit (General Permit), Order NPDES No. CAS000001, as adopted by the California State Water Resources Control Board (SWRCB), Water Quality Order (WQO) No. 2014-0057-DWQ.

QISP / PE Signature	12/06/2023
	Date
Sharon R. Simpson	#0349
QISP Name	QISP Certificate Number
Sr. Stormwater Professional / Trihydro	916-437-9032
Title and Affiliation	Telephone
9083 Foothills Boulevard, Suite 370 Roseville, California 95747	ssimpson@trihydro.com
Address	Email

APPENDIX F

EXAMPLE OBSERVATION FORMS & CHAIN OF CUSTODY (COC)

MONTHLY OBSERVATION FORM

Note: Perfom Each Month (year round) When It Is Not Raining

Roseville Energy Park

Date of Observation: _____ **Name of Observer:** _____

Time of Observation: _____ **Title of Observer:** _____

Signature: _____

Authorized & Unauthorized Non-Stormwater Discharge Observations			
All Drainage Areas Included In This Observation	Were any indications of **authorized** non-stormwater discharges observed?	☐ Yes	☐ No
	Were any active **authorized** non-stormwater discharges observed?	☐ Yes	☐ No
	If yes, describe source and location:		
	Describe pollutants (if any):		
	Were any indications of **unauthorized** non-stormwater discharges observed?	☐ Yes	☐ No
	Were any active **unauthorized** non-stormwater discharged observed?	☐ Yes	☐ No
	If yes, describe source and location:		
	Describe pollutants at source (if still discharging):		
	Describe pollutants at discharge location (if still discharging):		
	List date that unauthorized non-stormwater discharge was stopped :		
	Describe corrective actions to eliminate unauthorized non-stormwater discharge:		
	Describe corrective actions taken to clean impacted drainage areas:		

Industrial Activity Areas			
Industrial Activity Area;	**Turbine Area**		
Are the activities described in SWPPP accurate?		☐ Yes	☐ No
If No, Describe Corrective Action:			
Is good housekeeping minimum BMPs being followed (proper dut control, litter control, material exposure minimized in accordance with SWPPP, etc.)?		☐ Yes	☐ No
If No, Describe Corrective Action:			
Is equipment and area being maintained in accordance with SWPPP?		☐ Yes	☐ No
If No, Describe Corrective Action:			
No signs of any spills/leaks observed at the time of inspection?		☐ Yes	☐ No
If No, Describe Corrective Action:			
Industrial materials are being handled as described in SWPPP (Hazmat containers closed and covered when not in use, run-on minimized, containment, etc.)?		☐ Yes	☐ No
If No, Describe Corrective Action:			
No signs of erosion or rills?		☐ Yes	☐ No
If No, Describe Corrective Action:			

Industrial Activity Area;	**Natural Gas Area**	
Are the activities described in SWPPP accurate?		☐ Yes ☐ No
If No, Describe Corrective Action:		
Is good housekeeping minimum BMPs being followed (proper dut control, litter control, material exposure minimized in accordance with SWPPP, etc.)?		☐ Yes ☐ No
If No, Describe Corrective Action:		
Is equipment and area being maintained in accordance with SWPPP?		☐ Yes ☐ No
If No, Describe Corrective Action:		
No signs of any spills/leaks observed at the time of inspection?		☐ Yes ☐ No
If No, Describe Corrective Action:		
Industrial materials are being handled as described in SWPPP (Hazmat containers closed and covered when not in use, run-on minimized, containment, etc.)?		☐ Yes ☐ No
If No, Describe Corrective Action:		
No signs of erosion or rills?		☐ Yes ☐ No
If No, Describe Corrective Action:		
Industrial Activity Area;	**Emergency Turbine Area**	
Are the activities described in SWPPP accurate?		☐ Yes ☐ No
If No, Describe Corrective Action:		
Is good housekeeping minimum BMPs being followed (proper dut control, litter control, material exposure minimized in accordance with SWPPP, etc.)?		☐ Yes ☐ No
If No, Describe Corrective Action:		
Is equipment and area being maintained in accordance with SWPPP?		☐ Yes ☐ No
If No, Describe Corrective Action:		
No signs of any spills/leaks observed at the time of inspection?		☐ Yes ☐ No
If No, Describe Corrective Action:		
Industrial materials are being handled as described in SWPPP (Hazmat containers closed and covered when not in use, run-on minimized, containment, etc.)?		☐ Yes ☐ No
If No, Describe Corrective Action:		
No signs of erosion or rills?		☐ Yes ☐ No
If No, Describe Corrective Action:		
Industrial Activity Area;	**Cooling Tower Area**	
Are the activities described in SWPPP accurate?		☐ Yes ☐ No
If No, Describe Corrective Action:		
Is good housekeeping minimum BMPs being followed (proper dut control, litter control, material exposure minimized in accordance with SWPPP, etc.)?		☐ Yes ☐ No
If No, Describe Corrective Action:		
Is equipment and area being maintained in accordance with SWPPP?		☐ Yes ☐ No
If No, Describe Corrective Action:		
No signs of any spills/leaks observed at the time of inspection?		☐ Yes ☐ No
If No, Describe Corrective Action:		
Industrial materials are being handled as described in SWPPP (Hazmat containers closed and covered when not in use, run-on minimized, containment, etc.)?		☐ Yes ☐ No
If No, Describe Corrective Action:		
No signs of erosion or rills?		☐ Yes ☐ No
If No, Describe Corrective Action:		

Industrial Activity Area;	**Zero Liquid Discharge Area**		
Are the activities described in SWPPP accurate?		☐ Yes	☐ No
If No, Describe Corrective Action:			
Is good housekeeping minimum BMPs being followed (proper dut control, litter control, material exposure minimized in accordance with SWPPP, etc.)?		☐ Yes	☐ No
If No, Describe Corrective Action:			
Is equipment and area being maintained in accordance with SWPPP?		☐ Yes	☐ No
If No, Describe Corrective Action:			
No signs of any spills/leaks observed at the time of inspection?		☐ Yes	☐ No
If No, Describe Corrective Action:			
Industrial materials are being handled as described in SWPPP (Hazmat containers closed and covered when not in use, run-on minimized, containment, etc.)?		☐ Yes	☐ No
If No, Describe Corrective Action:			
No signs of erosion or rills?		☐ Yes	☐ No
If No, Describe Corrective Action:			
Industrial Activity Area;	**Internal Roads**		
Are the activities described in SWPPP accurate?		☐ Yes	☐ No
If No, Describe Corrective Action:			
Is good housekeeping minimum BMPs being followed (proper dut control, litter control, material exposure minimized in accordance with		☐ Yes	☐ No
If No, Describe Corrective Action:			
Is equipment and area being maintained in accordance with SWPPP?		☐ Yes	☐ No
If No, Describe Corrective Action:			
No signs of any spills/leaks observed at the time of inspection?		☐ Yes	☐ No
If No, Describe Corrective Action:			
Industrial materials are being handled as described in SWPPP (Hazmat containers closed and covered when not in use, run-on minimized,		☐ Yes	☐ No
If No, Describe Corrective Action:			
No signs of erosion or rills?		☐ Yes	☐ No
If No, Describe Corrective Action:			
Industrial Activity Area;	**Maintenance Shop & Warehouse**		
Are the activities described in SWPPP accurate?		☐ Yes	☐ No
If No, Describe Corrective Action:			
Is good housekeeping minimum BMPs being followed (proper dut control, litter control, material exposure minimized in accordance with		☐ Yes	☐ No
If No, Describe Corrective Action:			
Is equipment and area being maintained in accordance with SWPPP?		☐ Yes	☐ No
If No, Describe Corrective Action:			
No signs of any spills/leaks observed at the time of inspection?		☐ Yes	☐ No
If No, Describe Corrective Action:			
Industrial materials are being handled as described in SWPPP (Hazmat containers closed and covered when not in use, run-on minimized,		☐ Yes	☐ No
If No, Describe Corrective Action:			
No signs of erosion or rills?		☐ Yes	☐ No
If No, Describe Corrective Action:			

Advanced and Structural BMPs			
BMP Observed	**Visual Observations & Status of Storm Water Best Management Practices (BMP)**		
Wattles / Ertec Guards	**Are BMPs functioning/effective?** **Circle one** YES NO	**Do BMPs need attention?** MAINTENANCE (Ex: debris build-up)	**Circle one or more below** REPLACE REPAIR REVIEW NEW BMP OPTIONS
	Actions taken or scheduled:	☐ Removed sediment build-up ☐ Removed debris in area ☐ Other maintenance ☐ Repaired ☐ Scheduled maintence of drain filters or vault sytem ☐ Add new BMP(s) (If new BMP added Management to revise SWPPP)	
	Date Completed:	Additional notes (Ex: schedule of pending items, ordering materials):	

BMP Observed	Visual Observations & Status of Storm Water Best Management Practices (BMP)		
Rock Drainage Channel	**Are BMPs functioning/effective?** **Circle one** YES NO	**Do BMPs need attention?** MAINTENANCE (Ex: debris build-up)	**Circle one or more below** REPLACE REPAIR REVIEW NEW BMP OPTIONS
	Actions taken or scheduled:	☐ Removed sediment build-up ☐ Removed debris in area ☐ Other maintenance ☐ Repaired ☐ Scheduled maintence of drain filters or vault sytem ☐ Add new BMP(s) (If new BMP added Management to revise SWPPP)	
	Date Completed:	Additional notes (Ex: schedule of pending items, ordering materials):	

BMP Observed	Visual Observations & Status of Storm Water Best Management Practices (BMP)		
Stormwater Pond & Rock Armoring	**Are BMPs functioning/effective?** **Circle one** YES NO	**Do BMPs need attention?** MAINTENANCE (Ex: debris build-up)	**Circle one or more below** REPLACE REPAIR REVIEW NEW BMP OPTIONS
	Actions taken or scheduled:	☐ Removed sediment build-up ☐ Removed debris in area ☐ Other maintenance ☐ Repaired ☐ Scheduled maintence of drain filters or vault sytem ☐ Add new BMP(s) (If new BMP added Management to revise SWPPP)	
	Date Completed:	Additional notes (Ex: schedule of pending items, ordering materials):	

BMP Observed	Visual Observations & Status of Storm Water Best Management Practices (BMP)		
Vegetated Drainage Swale & Check Damns	**Are BMPs functioning/effective?** **Circle one** YES NO	**Do BMPs need attention?** MAINTENANCE (Ex: debris build-up)	**Circle one or more below** REPLACE REPAIR REVIEW NEW BMP OPTIONS
	Actions taken or scheduled:	☐ Removed sediment build-up ☐ Removed debris in area ☐ Other maintenance ☐ Repaired ☐ Scheduled maintence of drain filters or vault sytem ☐ Add new BMP(s) (If new BMP added Management to revise SWPPP)	
	Date Completed:	Additional notes (Ex: schedule of pending items, ordering materials):	

BMP Observed	Visual Observations & Status of Storm Water Best Management Practices (BMP)		
Stabilization (pavement / gravel / vegetation)	**Are BMPs functioning/effective?** **Circle one** YES NO	**Do BMPs need attention?** MAINTENANCE (Ex: debris build-up)	**Circle one or more below** REPLACE REPAIR REVIEW NEW BMP OPTIONS
	Actions taken or scheduled:	☐ Removed sediment build-up ☐ Removed debris in area ☐ Other maintenance ☐ Repaired ☐ Scheduled maintence of drain filters or vault sytem ☐ Add new BMP(s) (If new BMP added Management to revise SWPPP)	
	Date Completed:	Additional notes (Ex: schedule of pending items, ordering materials):	

BMP Observed	Visual Observations & Status of Storm Water Best Management Practices (BMP)		
Oil-Water Separator / Containment Drains	**Are BMPs functioning/effective?** **Circle one** YES NO	**Do BMPs need attention?** MAINTENANCE (Ex: debris build-up)	**Circle one or more below** REPLACE REPAIR REVIEW NEW BMP OPTIONS
	Actions taken or scheduled:	☐ Removed sediment build-up ☐ Removed debris in area ☐ Other maintenance ☐ Repaired ☐ Scheduled maintence of drain filters or vault sytem ☐ Add new BMP(s) (If new BMP added Management to revise SWPPP)	
	Date Completed:	Additional notes (Ex: schedule of pending items, ordering materials):	

BMP Observed	Visual Observations & Status of Storm Water Best Management Practices (BMP)		
Overhead Cover / Protective Curtain	**Are BMPs functioning/effective?** **Circle one** YES NO	**Do BMPs need attention?** MAINTENANCE (Ex: debris build-up)	**Circle one or more below** REPLACE REPAIR REVIEW NEW BMP OPTIONS
	Actions taken or scheduled:	☐ Removed sediment build-up ☐ Removed debris in area ☐ Other maintenance ☐ Repaired ☐ Scheduled maintence of drain filters or vault sytem ☐ Add new BMP(s) (If new BMP added Management to revise SWPPP)	
	Date Completed:	Additional notes (Ex: schedule of pending items, ordering materials):	

BMP Observed	Visual Observations & Status of Storm Water Best Management Practices (BMP)		
Drain Inlet Filter	**Are BMPs functioning/effective?** **Circle one** YES NO	**Do BMPs need attention?** MAINTENANCE (Ex: debris build-up)	**Circle one or more below** REPLACE REPAIR REVIEW NEW BMP OPTIONS
	Actions taken or scheduled:	☐ Removed sediment build-up ☐ Removed debris in area ☐ Other maintenance ☐ Repaired ☐ Scheduled maintence of drain filters or vault sytem ☐ Add new BMP(s) (If new BMP added Management to revise SWPPP)	
	Date Completed:	Additional notes (Ex: schedule of pending items, ordering materials):	

BMP Observed	Visual Observations & Status of Storm Water Best Management Practices (BMP)	
Pour-Through Oily Water Filter and Oil-only Absorbent Pillow	**Are BMPs functioning/effective?** **Circle one** YES NO	**Do BMPs need attention?** **Circle one or more below** MAINTENANCE (Ex: debris build-up) REPLACE REPAIR REVIEW NEW BMP OPTIONS
	Actions taken or scheduled:	☐ Removed sediment build-up ☐ Removed debris in area ☐ Other maintenance ☐ Repaired ☐ Scheduled maintence of drain filters or vault sytem ☐ Add new BMP(s) (If new BMP added Management to revise SWPPP)
	Date Completed:	Additional notes (Ex: schedule of pending items, ordering materials):

BMP Observed	Visual Observations & Status of Storm Water Best Management Practices (BMP)	
Heavy Metal Filter Sock	**Are BMPs functioning/effective?** **Circle one** YES NO	**Do BMPs need attention?** **Circle one or more below** MAINTENANCE (Ex: debris build-up) REPLACE REPAIR REVIEW NEW BMP OPTIONS
	Actions taken or scheduled:	☐ Removed sediment build-up ☐ Removed debris in area ☐ Other maintenance ☐ Repaired ☐ Scheduled maintence of drain filters or vault sytem ☐ Add new BMP(s) (If new BMP added Management to revise SWPPP)
	Date Completed:	Additional notes (Ex: schedule of pending items, ordering materials):

BMP Observed	Visual Observations & Status of Storm Water Best Management Practices (BMP)	
Spill Kit	**Are BMPs functioning/effective?** **Circle one** YES NO	**Do BMPs need attention?** **Circle one or more below** MAINTENANCE (Ex: debris build-up) REPLACE REPAIR REVIEW NEW BMP OPTIONS
	Actions taken or scheduled:	☐ Removed sediment build-up ☐ Removed debris in area ☐ Other maintenance ☐ Repaired ☐ Scheduled maintence of drain filters or vault sytem ☐ Add new BMP(s) (If new BMP added Management to revise SWPPP)
	Date Completed:	Additional notes (Ex: schedule of pending items, ordering materials):

BMP Observed	Visual Observations & Status of Storm Water Best Management Practices (BMP)	
Secondary Containment	**Are BMPs functioning/effective?** **Circle one** YES NO	**Do BMPs need attention?** **Circle one or more below** MAINTENANCE (Ex: debris build-up) REPLACE REPAIR REVIEW NEW BMP OPTIONS
	Actions taken or scheduled:	☐ Removed sediment build-up ☐ Removed debris in area ☐ Other maintenance ☐ Repaired ☐ Scheduled maintence of drain filters or vault sytem ☐ Add new BMP(s) (If new BMP added Management to revise SWPPP)
	Date Completed:	Additional notes (Ex: schedule of pending items, ordering materials):

Site Name: Roseville Energy Park

Date & Time Observed: _____

Name of Sampler / Observer: _____

Signature:

Sampling Log		
Sampling Point Name:		
Was there discharge?	☐ Yes	☐ No
Estimated date & time discharge began:		
Time of sample/observation:		
Was storm preceded by 48 hours without discharge?	☐ Yes	☐ No
Was sample collected within 4 hours of discharge or 4 hours from the start of Facility operations (if discharge started within the previous 12-hours)?	☐ Yes	☐ No
If no to any above questions, explain:		
Onsite pH taken with (circle one): Strip Meter pH results*: *If Meter Used, Date & Time Calibrated:		
Are BMPs functioning? If no, explain:	☐ Yes	☐ No

Samplin Observations		
Floating Materials	☐ Yes	☐ No
Describe Material		
source Material		
Suspended Material	☐ Yes	☐ No
Describe Material		
source Material		
Odor	☐ Yes	☐ No
Describe Material		
source Material		
Sheen	☐ Yes	☐ No
Describe Material		
source Material		
Discoloration	☐ Yes	☐ No
Describe Material		
source Material		
Cloudiness	☐ Yes	☐ No
Describe Material		
source Material		

NSWD Observations		
Were any authorized non-stormwater discharges observed?	☐ Yes	☐ No
Were any unauthorized non-stormwater discharges observed?	☐ Yes	☐ No
If yes to either, identify source		

2022-2023 Seasonal Rain Log								
Day of Week	Date	Rainfall (in)	Event Total	Turbidity SW-1 (Pond 1)	Turbidity SW-2 (Pond 2)	Turbidity SW-3 (Pond 3)	Sample Taken	If not Why*?

Qualifying Event: Discharge was preceded by 48 hours o no discharge. Sample must be taken in 4 hours of dicharge during operating hours or 4 hours from the start of Facility operations (if dicharge started within the previous 12 hours).

*Example of why sample not taken; Not a qualifying event, Sampling completed for season, No discharge during business hours, site closed.

CHAIN OF CUSTODY

DATE: _____

PAGE: 1 OF 1

LABORATORY :	ACZ Laboratories, Inc.				
ADDRESS:	2773 Downhill Drive				
CITY:	Steamboat Springs	STATE: CO	ZIP CODE: 80487		
TEL:	800-334-5493	FAX:			
LAB CONTACT:		E-MAIL:			

PROJECT NAME / NUMBER / TASK: Roseville Energy Park	WORK AUTHORIZATION NO.:
PROJECT CONTACT:	PROJECT CONTACT E-MAIL:
ADDITIONAL E-MAIL CONTACTS:	

TURNAROUND TIME:

☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☐ 10 DAYS ☒ Standard ☐ Other_____

☐ COELT EDF GLOBAL ID:

Samplers (Please Print):

☐ Short-Hold Analyses Requested - Lab Called: / / @ :

Laboratory Contact Called:

Special Instructions:

Temperature Upon Receipt

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION / DESCRIPTION	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Preserved	Unpreserved	Field Filtered	MS/MSD	**Hold Pending Further Instructions**	Total Suspended Solids (SM 2540 D)	Oil & Grease (EPA 1664A (HEM))	Iron (EPA 200.7)											
	SW-Pond 1	SW-Pond 1			W	3	x	x				X	X	X											
	SW-Pond 2	SW-Pond 2			W	3	x	x				X	X	X											
	SW-Pond 3	SW-Pond 3			W	3	x	x				X	X	X											

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

APPENDIX G

BMP FACT SHEETS & ASSOCIATRED CALCULATIONS

Structural & Advanced BMP Informational Sheets

PIG Oily Water Drum Filter

General Instructions

Pour-through filters make it easy to separate non-emulsified oil from water. This unit separates oil from water through gravity filtration.

1. Remove the lid from your PIG Oily Water Drum Filter
2. Position the outflow port at the bottom of the filter over a drain. Or, connect a hose to the outflow port to channel effluent to another location.
3. With all six pillows and the diffuser inside the unit as shown, slowly pour oily water into your PIG Oily Water Drum Filter.

   Note: For best results, pillows should be stacked in alternating positions as shown at right.
4. The liquid will pass through the oil-only pillows and out through the port in the bottom of the unit.
5. Effluent water should be tested periodically to ensure compliance with water quality standards.
6. Pillows are easy to change and can be replaced separately as each pillow becomes saturated. A Replacement Filter Kit (FLT525) containing six pillows and a diffuser is available separately.

Note: Optional Carbon Filtering Pillows (FLT612) can be added under the bottom layer of oil-only pillows to polish effluent and help remove trace amounts of organics and hydrocarbons.

Specifications

Flow rate: Up to 8 gallons per minute.
Absorbency: Pillows absorb up to 33 gallons of oil-based liquid.
Outflow port size: ¾" NPT.

Disposal Notice: Used absorbents can be considered hazardous and must be disposed of in compliance with local, state and federal regulations. For information on disposal options, call New Pig.

New Pig
One Pork Avenue
Tipton, PA 16684-0304

newpig.com
North America: **1-800-468-4647**
Europe: **+31 (0)76 596 92 50**
China: **+86-21-400 921 5178**
UK: **0800 919 900**
Outside North America: **+1-814-684-0101**




PIG® Skimmer Oil-Only Absorbent Pillow

PIL203 Absorbs Oils; Fuels; Oil-Based Liquids (Not Water),Each absorbs up to 1 gal.,10 pillows per box

When the situation calls for more than a mat, our high-capacity pillows deliver the absorbency you need for oils and fuels but not water.

- Pillow has large surface area, high capacity and fast-wicking filler to quickly soak up oils
- Tough, chemical-resistant polypropylene skin and filler absorb oils but repel water-based liquids
- Polypropylene skin resists chemicals and tearing; reduces dust and holds in liquid, even when saturated
- Ideal for skimming oil off of acid baths or for use in other acidic environments
- Floats to clean up spills on water confined by booms or socks
- Skin is UV resistant up to 12 months; meets ANSI and MIL-SPEC standards for static decay
- Absorbs and retains oils and oil-based liquids - including lubricants, fuels and cleaning agents - without taking in a drop of water
- Bright white color makes pillow easier to see in outdoor environments, draws attention to machine leaks and clearly shows saturation level
- Can be incinerated after use to reduce waste or for fuels blending

Specifications

Absorbency Range	10 - 19.9 gal.
Dimensions	16" W x 17" L x 1" H
Recycled Content	98% Pre-Consumer Recycled Polypropylene Filler
Absorbency	Up to 10 gal. per box
Absorbency per	Up to 1 gal. per pillow
Brand	PIG
Color	White
Fluid Absorbed	Oils; Fuels; Oil-Based Liquids (Not Water)

UV Resistant	Yes
Sold as	10 pillows per box
Weight	11.8 lbs.
NSN (National Stock Number)	7930-01-436-8316
# per Pallet	24
Composition	Polypropylene
UNSPSC	47131908
Pigalog® Page Number	Page 59

Metric Equivalent

Absorbency per	Up to 3.8 L per pillow
Absorbency	Up to 37.9 L per box
Weight	5.4 kg
Dimensions	41cm W x 43cm L x 2.5cm H

Technical Information

Certifications, Approvals and Ratings

ANSI/ESD STM11.11,MIL-STD-3010C

Technical Documents

UV-Resistance Comparison Testing of Spunbond and Meltblown

Technical Data Sheet for PIG® Oil Only Absorbents

40 CFR 112.7

40 CFR 122.26

New Pig
World's best stuff for leaks, drips and spills.

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1-855-493-4647 • Fax: 1-800-621-7447• newpig.com • hothogs@newpig.com






PIG® Stormwater Heavy Metal Filter Sock

FLT718 For Heavy Metals; Oil; Sediment; Debris,5" x 10',Max Flow Rate 4.2 gal./Minute

Remove metals, oils and large amounts of sediment at any point along the stormwater runoff path with this economical sock designed for use on rough, uneven or exposed-soil surfaces.

- Filter substantial sediment from stormwater runoff to protect your stormwater drainage system; also catches oils and metals.
- Works great anywhere stormwater flows, whether at the source, the drain or in between.
- Metal filter sock captures copper, lead, zinc, chromium, cadmium and more.
- Filters 92.4% of total suspended solids (TSS).
- Strong outer skin is effective near light construction, in salvage yards and more.
- Sock stays firmly in place under its own weight, even on broken asphalt and dirt thanks to conforming internal material.
- For sloped areas, can be staked down.
- Easily bend the flexible 5-in. x 10-ft. sock around drains and conveniently move when needed.
- Recycled inner material (parboiled, oven-dried rice hull) never grows mold; won't release harmful compounds like rubber alternatives.
- Count on the 4.2 GPM/Linear Foot constant-flow filtration to resist water backup.

Autoship Eligible

Specifications

Style	Around the Drain
Use With	Storm Drains, Culverts, and Ditches
Dimensions	ext. dia. 5" x 10' L
Recycled Content	25% Pre-Consumer Recycled Rice Hulls
Brand	PIG
Drain Shape	Round; Square; Rectangular
Color	Black
Max Flow Rate	4.2 gal./Minute
Substance Filtered	Heavy Metals; Oil; Sediment; Debris

UV Resistant	Yes
Sold as	1 each
Weight	26 lbs.
# per Pallet	25
Composition	Skin: Polyester Filler: Parboiled Rice Husk Filler: Activated Carbon Filler: Zeolite
UNSPSC	47101514
Pigalog® Page Number	Page 175

Metric Equivalent

Weight	11.8 kg
Dimensions	ext. dia. 13cm x 3m L

Technical Information

Technical Documents

Why is there no SDS?

40 CFR 122.26

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SWPPP Binder Insert
Perimeter Protection

ERTEC S-Fence™ (SF)
(Perimeter Sediment Control - alternative to silt fence)

Definition
A temporary sediment barrier made of high density polyethylene (HDPE) containing an integrated filter. During construction, the device is placed along job site perimeters or at the base of slopes where soil is disturbed. (Installation guidelines are available at www.ertecsystems.com). S-Fence resolves several issues associated with silt fence: it will not deteriorate or blow down, can be removed with minimal disturbance to landscaping, stores and transports compactly, can last four plus years, reusable, allows water to flow off-site with high sediment retention, is ZERO waste (made from recycled materials, reusable and can be recycled at the end of life).

Purpose
S-Fence intercepts and filters sediment laden water and significantly reduces the sediment and associated pollutants that would otherwise leave the job site and reach the storm water system. The system reduces the velocity of water and allows it to flow-through, discouraging end-around flows, under and overflow. The system filters certain sized smaller particles in suspension, captures a high percentage of total solids and prevents them from flowing through the barrier and into the street. The filter develops a filter cake which in turn filters smaller and smaller particles over time.

Conditions Where the Practice Applies
S-Fence is recommended wherever silt fence is used including at the base of stabilized slopes. 10" S-Fence provides enough freeboard for 98% of site perimeters. Use 14" S-Fence on job perimeters where more concentrated flows may occur, or for higher risk perimeters. 20" S-Fence is also available. The product should be installed in a 3 to 4 inch slot (trench) (SF10, SF14) and 4-5" trench (SF20). If inserted to 4", stakes may not be necessary with the 10" S-Fence. Always stake the 14" & 20" S-Fence. Do not use S-Fence in areas exposed to vehicular traffic (refer to ERTEC Perimeter Guard for cross traffic applications).

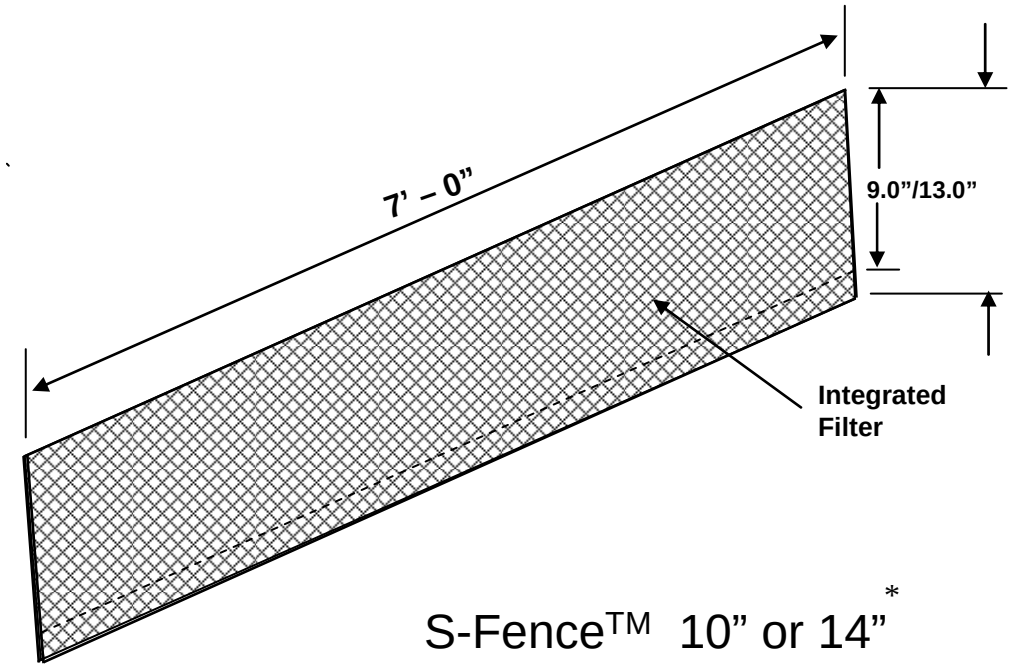
Design Criteria
- Filter Material or outer Jacket: Use ERTEC's HDPE Product. For detailed product characteristics contact ERTEC Environmental Systems, LLC. @ (866) 521-0724 or www.ertecsystems.com. The unit weight of the system is 0.30 lbs per foot (10" S-Fence) and 0.42 lbs/ft (14" S-Fence), 0.62 lbs/ft (20" S-Fence). Each segment is 6'8" usable feet in length (recommended overlap is 4").
- For installation procedures, follow the instructions on the attached two drawings. The last in-line SF should be bent and dog-legged upslope to ensure sediment containment.

Maintenance
Repair or replace split or torn SF. Inspect SF when rain is forecast. Perform maintenance as needed or as required. Inspect SF following rainfall events and at least daily during prolonged rainfall. Maintain SF to provide an adequate sediment holding capacity. Sediment shall be removed when the sediment accumulation reaches 50% of the barrier height. Removed sediment shall be incorporated in the project at designated locations or disposed of outside the project or the road right-of-way in conformance with requirements. Remove the SF after the site has been stabilized. SF is highly reusable. The product is recyclable at the end of life as HDPE.

SWPPP Binder Insert
Perimeter Protection

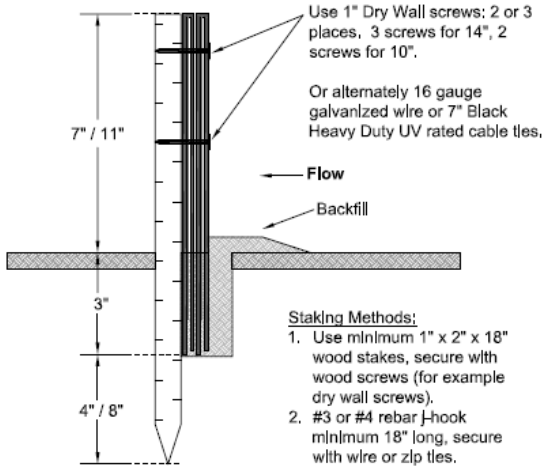
Installation Details - ERTEC S-Fence™

ERTEC S-Fence™ – Perimeter Protection – alternative to silt fence



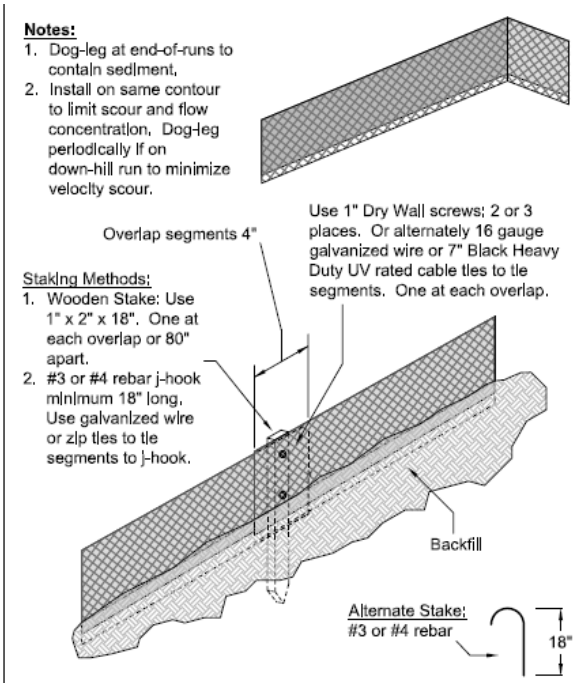
S-Fence™ 10" or 14" *

S-Fence™ 20" not shown here.



Notes:

1. Cut trench 1½" to 2" wide, 3" to 4" deep.
2. Install in slot against downstream side of trench wall, backfill the trench to grade level.
3. Overlap segments by at least 4", Install stakes on downstream side of segment overlaps.
4. Use 1" Dry Wall screws; 2 or 3 places. Or alternately 16 gauge galvanized wire or 7" Black Heavy Duty UV staple cable ties (zip ties) to tie segments together.



*** For SF20 obtain Install Guidelines available at www.ertecsystems.com or call 866-521-0724.**

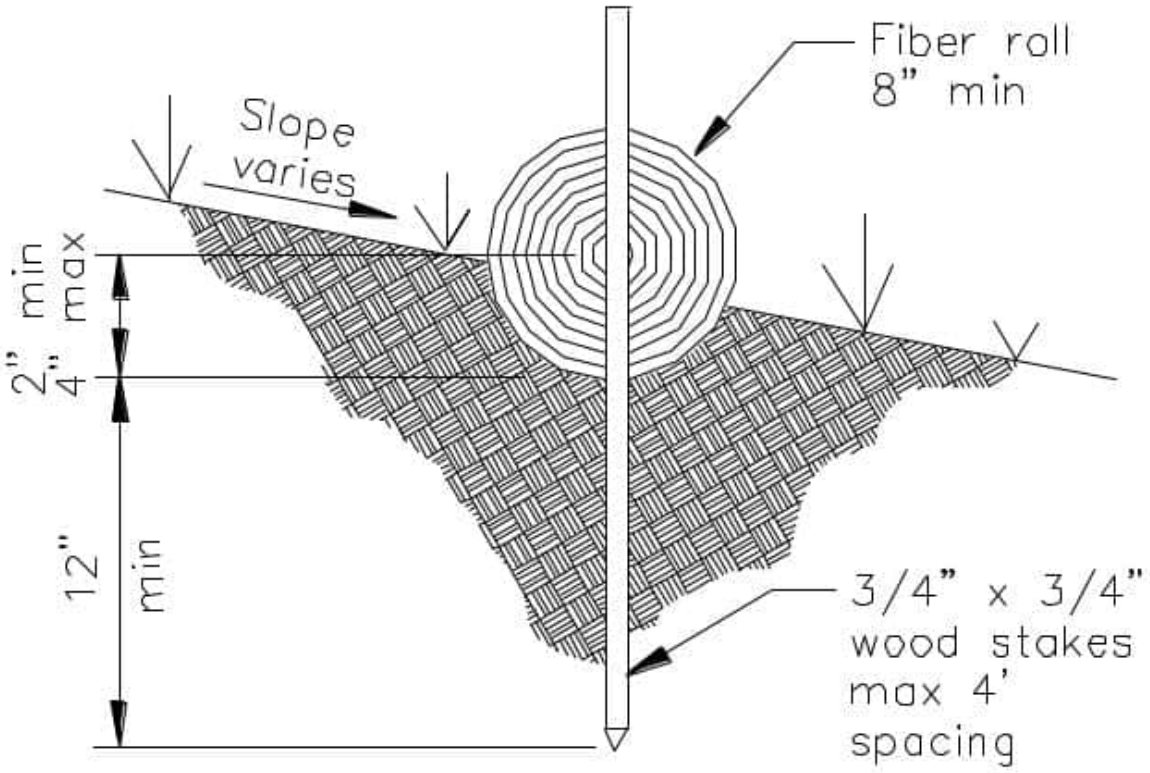
S-Fence™

ERTEC Environmental Systems

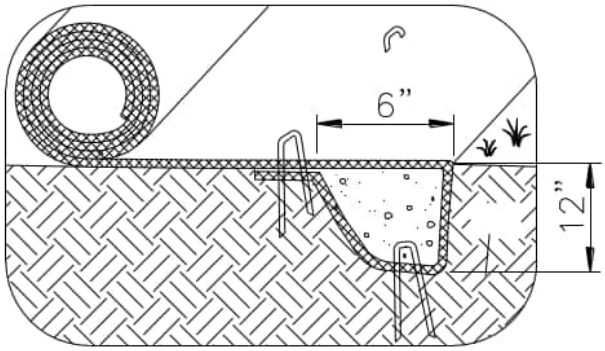
www.ertecsystems.com
Toll Free: 866-521-0724

 (866) 521-0724 www.ertecsystems.com

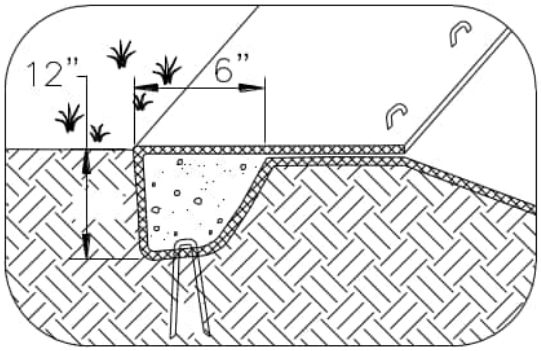
Fiber Roll Installation Diagram



Geotextile / Matting Installation Diagram



INITIAL CHANNEL ANCHOR TRENCH
NTS



TERMINAL SLOPE AND CHANNEL
ANCHOR TRENCH
NTS

Drain Inlet Insert MP-52

General Description

Drain inlet inserts, also known as catch basin, drop inlet or curb inlet inserts, are used to remove pollutants at the point of entry to the storm drain system. There are a multitude of inserts of various shapes and configurations including baffles, baskets, boxes, fabrics, sorbent media, screens, and skimmers. The effectiveness of drain inlet inserts depends on their design, application, loading, and frequency of maintenance to remove accumulated sediment, trash, and debris.

Inspection/Maintenance Considerations

Routine inspection and maintenance is necessary to maintain functionality of drain inlet inserts and to prevent re-suspension and discharge of accumulated pollutants. Maintenance activities vary depending on the type of drain inlet insert being implemented; refer to the manufacturer's recommendations for more information.

Advanced BMPs Covered

Maintenance Concerns

- *Sediment, Trash, and Debris Accumulations*
- *Pollutant Re-suspension and Discharge*

Targeted Constituents*	
Sediment	✓
Nutrients	✓
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

**Removal Effectiveness varies for different manufacturer designs. See New Development and Redevelopment Handbook-Section 5 for more information.*

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Inspection Activities	Suggested Frequency
☐ Verify that stormwater enters the unit and does not leak around the perimeter.	After construction.
☐ Inspect for sediment, trash, and debris buildup and proper functioning.	At the beginning of the wet season and after significant storms
Maintenance Activities	**Suggested Frequency**
☐ Remove accumulated sediment, trash, and debris. ☐ Replace sorbent media.	At the beginning of the wet season and as necessary

References

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Ventura Countywide Stormwater Quality Management Program. *Technical Guidance Manual for Stormwater Quality Control Measures*, May, 2010. http://www.vcstormwater.org/documents/workproducts/technicalguidancemanual/201orevisions/Ventura%20Technical%20Guidance%20Document_5-6-10.pdf.

Infiltration Trench TC-10

General Description

An infiltration trench is a gravel-filled trench that receives stormwater runoff. Runoff is stored in the void space between the stones and infiltrates through the bottom and sides of the trench into the soil matrix. Infiltration trenches promote stormwater infiltration, reduce discharge of stormwater to receiving waters and provide pollutant removal. Pretreatment using buffer strips, swales, or detention basins is important for limiting amounts of sediment, oil & grease, and trash and debris entering the trench which can clog and render the trench ineffective.

Inspection/Maintenance Considerations

Frequency of clogging is dependent on effectiveness of pretreatment, such as vegetated buffer strips (see TC-31), vegetated swales (see TC-30), and detention basins (see TC-22) at removing sediments. Generally, clogging is occurring if the trench shows signs of long surface ponding. Clogging often occurs within the surface layer and removing and replacing the top 2-3 inches of the surface media may improve performance. If the clogging is subsurface, as determined by observing an inspection well, then completely removing the media and rehabbing the trench is needed. Clogged infiltration trenches with surface standing water can become a nuisance due to mosquito breeding. Maintenance efforts associated with infiltration trenches should include frequent inspections to ensure that water infiltrates into the subsurface completely at a recommended infiltration rate of 96 hours or less to prevent creating mosquito and other vector habitats.

Advanced BMPs Covered

Maintenance Concerns

- *Accumulation of metals*
- *Clogged soil or outlet structures*
- *Vegetation/landscape maintenance*

Targeted Constituents

Sediment	■*
Nutrients	■
Trash	■*
Metals	■
Bacteria	■
Oil and Grease	■*
Organics	■

Legend ***(Removal Effectiveness)***

● Low ■ High ▲ Medium
* Requires Pretreatment

Note: The removal effectiveness ratings shown in the table are for properly designed, sited, and maintained BMPs; some configurations will have variations in pollutant effectiveness.

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Infiltration Trench TC-10

Inspection Activities	Suggested Frequency
☐ Inspect after major storms for the first few months to ensure proper functioning. Drain times should be observed to confirm that the designed drain time has been achieved. ☐ Inspect for upslope or adjacent contributing sediment sources and ensure that pretreatment systems are in place.	After construction and semi-annually (beginning and end of rainy season)
☐ Inspect facility for signs of wetness or damage to structures, signs of petroleum hydrocarbon contamination, standing water, trash and debris, sediment accumulation, slope stability, standing water, and material buildup. ☐ Check for standing water or, if available, check observation wells following 3 days of dry weather to ensure proper drain time. ☐ Inspect pretreatment devices and diversion structures for damage, sediment buildup, and structural damage.	Semi-annual and after major storm events
☐ Trenches with filter fabric should be inspected for sediment deposits by removing a small section of the top layer. If inspection indicates that the trench is partially or completely clogged, it should be restored to its design condition.	Annual
Maintenance Activities	**Suggested Frequency**
☐ Repair undercut and eroded areas at inflow and outflow structures. ☐ Remove sediment, debris, and oil/grease from pretreatment devices, forebays, inlet/outlet structures, overflow spillway, and trenches as necessary.	Standard maintenance (as needed)
☐ Remove trash, debris, grass clippings, trees, and other large vegetation from the trench perimeter and dispose of properly. ☐ Mow and trim vegetation to prevent establishment of woody vegetation, and for aesthetic and vector reasons.	Semi-annual, more often as needed
☐ Remove accumulated sediment from the surface of the trench. Replace first layer of aggregate and filter fabric if clogging appears only to be at the surface. ☐ Clean trench when loss of infiltrative capacity is observed. If drawdown time is observed to have increased significantly over the design drawdown time, removal of sediment may be necessary. This is an expensive maintenance activity and the need for it can be minimized through prevention of upstream erosion.	Annual
☐ Monitor ongoing effectiveness and determine if another BMP type or additional pretreatment could improve long-term performance. A qualified designer with knowledge of local soils and BMP design should be consulted in order to make this determination.	Every 5 years

☐ Total rehabilitation of the trench should be conducted to maintain storage capacity within 2/3 of the design treatment volume and 96-hour exfiltration rate limit. ☐ Rehabilitation of the trench should be performed under the direction of a qualified designer with knowledge of local soils and BMP design. General steps for trench rehabilitation include: ✓ Trench walls should be excavated to expose clean soil. ✓ All of the stone aggregate must be removed. Filter fabric may need to be removed from the sides and bottom ✓ Accumulated sediment should be stripped from the trench bottom. At this point the bottom may be scarified or tilled to help induce infiltration. New fabric and clean stone aggregate should be refilled.	Upon reaching target thresholds

Most of the maintenance should be concentrated on the pretreatment practices, such as buffer strips and swales upstream of the trench to limit the amount of sediment that reaches the infiltration trench. Regular inspection should determine if the sediment removal structures require routine maintenance. Infiltration trenches should not be put into operation until the upstream tributary area is stabilized.

Additional Information

Infiltration practices have historically had a high rate of failure compared to other stormwater management practices. One study conducted in Prince George's County, Maryland (Galli, 1992), revealed that less than half of the infiltration trenches investigated (of about 50) were still functioning properly, and less than one-third still functioned properly after 5 years. Many of these practices, however, did not incorporate advanced pretreatment. By carefully selecting the location and improving the design features of infiltration practices, their performance should improve.

It is absolutely critical that settleable particles and floatable materials be removed from runoff water before it enters the infiltration trench. The trench will clog and become nonfunctional if excessive particulate matter is allowed to enter the trench.

Special considerations are required for infiltration trenches to be effective in cold climates – refer to the Stormwater Managers Resource Center for more information.

References

California Department of Transportation. *Treatment BMP Technology Report (CTSW-RT-09-239.06),* 2010. Available online at: http://www.dot.ca.gov/hq/env/stormwater/pdf/CTSW-RT-09-239-06.pdf.

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Galli, J., 1992. *Analysis of Urban BMP Performance and Longevity in Prince George's County, Maryland.* Metropolitan Washington Council of Governments, Washington, D.C.

Minnesota Pollution Control Agency. Operation and Maintenance of Infiltration Trench, 2013. Available online at: http://stormwater.pca.state.mn.us/index.php/Operation_and_maintenance_of_Infiltration_trench.

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Watershed Management Institute, Inc. *Operation, Maintenance, and Management of Stormwater Management Systems.* August, 1997. Available online at: http://www.stormwater.ucf.edu/research/stormwaterOMM/stormwateromm.pdf.

Wet Pond TC-20

General Description

Wet ponds (a.k.a. stormwater ponds, retention ponds, extended detention wet ponds) are constructed basins that have a permanent pool of water throughout the year (or at least throughout the wet season). The primary pollutant removal mechanism is settling while stormwater is retained in the wet pool. The basin supports plant species that provide pollutant removal by biological processes. This vegetation may also help reduce erosion of side slopes and trap sediments. Wet ponds differ from constructed wetlands primarily in having a greater average depth.

Wet ponds are an effective BMP in locations that have near-continuous inflows. While there are several different versions of the wet pond design, the most common modification is the extended detention wet pond, where storage is provided above the permanent pool in order to detain stormwater runoff and promote settling.

Inspection/Maintenance Considerations

In order to maintain the pond's design capacity, sediment must be removed occasionally and adequate resources must be committed to properly maintain peripheral aquatic vegetation, control vector production, and to maintain effective pool volume. Wet ponds can become a nuisance due to mosquito and midge breeding unless carefully designed and maintained. A proactive and routine preventative maintenance plan (which can vary according to location) is crucial to minimizing vector habitat. A vegetated buffer should be preserved around the pond to protect the banks from erosion and provide some pollutant removal before runoff enters the pond by overland flow.

Advanced BMPs Covered

Maintenance Concerns

- *Vegetation/Landscape Maintenance*
- *Endangered Species Habitat Creation*
- *Sediment and Trash Removal*
- *Bank Erosion*
- *Clogging of the Outlet*
- *Invasive/exotic Plant Species*
- *Vector Control*

Targeted Constituents

Sediment	■*
Nutrients	▲
Trash	■*
Metals	■
Bacteria	■
Oil and Grease	■*
Organics	■

Legend (Removal Effectiveness)

● Low ▲ Medium ■ High

* Requires Pretreatment

Note: The removal effectiveness ratings shown in the table are for properly designed, sited, and maintained BMPs; some configurations will have variations in pollutant effectiveness.

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Inspection Activities	Suggested Frequency
☐ Inspect after several storm events to confirm that the drainage system functions and bank stability and vegetation growth are sufficient.	Post construction
☐ Inspect for invasive vegetation, trash and debris, clogging of inlet/outlet structures, excessive erosion, sediment buildup in basin or outlet, cracking or settling of the dam, bank stability, tree growth on dam or embankment, vigor and density of the grass turf on the basin side slopes and floor, differential settlement, leakage, subsidence, damage to the emergency spillway, mechanical component condition, and graffiti.	Semi-annual, after significant storms, or more frequent as needed
☐ Inspect condition of inlet and outlet structures, pipes, sediment forebays, basin, and upstream and downstream channel conditions. Monitor drain times, and check for algal growth, signs of pollution such as oil sheens, discolored water, or unpleasant odors, and signs of flooding. ☐ During inspections, note changes to the wet pond or the contributing watershed as these may affect basin performance.	Annual inspection
Maintenance Activities	**Suggested Frequency**
☐ Where permitted by the Department of Fish and Wildlife or other agency regulations, stock wet ponds regularly with mosquito fish (*Gambusia* spp.) to enhance natural mosquito and midge control and regularly maintain emergent and shoreline vegetation to provide access for vector inspectors and facilitate vector control if needed.	Post construction
☐ Coordinate with the local mosquito and vector control agency to control mosquitos and midges, if necessary. ☐ Remove sediment from outlet structure. Dispose of properly. ☐ Remove accumulated trash and debris in the basin, inlet/outlet structures, side slopes, and collection system as required. ☐ Repair undercut areas and erosion to banks and basin.	Semi-annual, after significant storm events
☐ Maintain protected vegetated buffer around pond. Maintain vegetation in and around basin to prevent any erosion or aesthetic problems. Minimize use of fertilizers and pesticides. Reseed if necessary. ☐ Manage and harvest wetland plants. ☐ Perform structural repair or replacement, as needed.	Annual maintenance (if needed)
☐ Remove sediment from the forebay and regrade when the accumulated sediment volume exceeds 10-20% of the forebay volume. Clean in early spring so vegetation damaged during cleaning has time to re-establish.	5- to 7-year maintenance
☐ Remove sediment when the permanent pool volume has become reduced significantly (sediment accumulation exceeds 25% of design depth), resuspension is observed, or the pond becomes eutrophic.	>5 year maintenance

Additional Information

In most cases, surface sediment removed from a wet pond during periodic maintenance to restore capacity does not contain toxic materials (e/g metals, oil and grease, or organics) at levels posing a hazardous concern. Studies to date indicate that pond sediments are generally below toxicity limits and can be safely landfilled or disposed onsite. Onsite sediment disposal is always preferable (if local authorities permit) as long

as the sediments are deposited away from the perimeter to prevent their reentry into the basin. Sediments should be tested for toxic materials in compliance with current landfill disposal requirements. Sediments containing high levels of pollutants should be disposed of properly.

Light equipment, which will not compact the underlying soil, should be used to remove the top layer of sediment. The remaining soil should be tilled and revegetated as soon as possible.

Wet ponds require a regular source of base flow if water levels are to be maintained. If base flow is insufficient during summer months, supplemental water may be necessary to maintain water levels.

Special considerations are required for wet ponds to be effective in cold climates – refer to the Stormwater Managers Resource Center for more information.

References

California Department of Transportation. *Treatment BMP Technology Report (CTSW-RT-09-239.06),* 2010. Available online at: http://www.dot.ca.gov/hq/env/stormwater/pdf/CTSW-RT-09-239-06.pdf.

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Water Quality Inlet TC-50

General Description

Water quality inlets (WQIs), also typically called trapping catch basins, oil/grit separators or oil/water separators, consist of one or more chambers that promote sedimentation of coarse materials and separation of free oil (as opposed to emulsified or dissolved oil) from stormwater. Some WQIs also contain screens to help retain larger or floating debris, and many of the newer designs also include a coalescing unit that helps promote oil/water separation.

These devices are appropriate for capturing hydrocarbon spills, but provide very marginal sediment removal and are not very effective for treatment of stormwater runoff. WQIs typically capture only the first portion of runoff for treatment and are generally used for pretreatment before discharging to other best management practices (BMPs).

Inspection/Maintenance Considerations

High sediment loads can interfere with the ability of the WQI to effectively separate oil and grease from the runoff. During periods of high flow, sediment can be re-suspended and released from the WQI into surface waters if this in the only BMP on site prior to discharge. Maintenance of WQIs can be easily neglected because they are underground. Establishment of a maintenance schedule is helpful for ensuring proper maintenance occurs. The required maintenance effort will be site-specific due to variations in sediment and hydrocarbon loading. Since WQI residuals contain hydrocarbon by-products, they may require disposal as hazardous waste. Many WQI owners coordinate with waste haulers to collect and dispose of these residuals.

Advanced BMPs Covered

Maintenance Concerns

- *High Sediment Loads*
- *Hazardous Waste*
- *Vector Control*
- *Pollutant Release*

Targeted Constituents

Sediment	●
Nutrients	●
Trash	▲
Metals	●
Bacteria	●
Oil and Grease	▲
Organics	●

Legend (Removal Effectiveness)

● Low ▲ Medium ■ High

✱ Requires Pretreatment

Note: The removal effectiveness ratings shown in the table are for properly designed, sited, and maintained BMPs; some configurations will have variations in pollutant effectiveness.

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Water Quality Inlet TC-50

Inspection Activities	Suggested Frequency
☐ Inspect regularly to determine if maintenance is required.	Monthly during the wet season, or after significant rain events
☐ Contact the local mosquito and vector control agency if mosquito breeding is observed or suspected.	As needed

Maintenance Activities	Suggested Frequency
☐ Clean out and dispose of accumulated oil, grease, and sediments. Remove accumulated trash and debris. The clean out and disposal techniques should be environmentally acceptable and in accordance with local regulations.	Annual, before the wet season, or more frequent as needed

Additional Information

Water quality inlets are most effective for drainage areas of 1 acre or less. They are often used in industrial applications such as airport runways, equipment washdown areas, and gas station parking lots. WQIs can be situated at the ground surface or underground, and they are available as pre-manufactured or cast-in-place units, typically constructed with reinforced concrete. They should be water-tight to prevent possible groundwater contamination, and should be sited such that vactor trucks can easily access and remove sediment and pollutants.

Since WQIs can be relatively deep, they may be designated as confined spaces. Caution should be exercised to comply with confined space entry safety regulations if it is required.

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Minimum BMP Informational Sheets

Outdoor Equipment Operations SC-32

Description

Outside process equipment operations and maintenance can contaminate stormwater runoff. Activities, such as grinding, painting, coating, sanding, degreasing or parts cleaning, landfills and waste piles, and solid waste treatment and disposal are examples of process operations that can lead to contamination of stormwater runoff. The targeted constituents will vary for each site depending on the operation being performed.

Approach

Implement source control BMPs to limit exposure of outdoor equipment to direct precipitation and stormwater run-on. Refer to SC-22 Vehicle and Equipment Repair for additional information.

General Pollution Prevention Protocols

- ☐ Perform the activity during dry periods whenever possible.
- ☐ Install secondary containment measures where leaks and spills may occur.
- ☐ Use non-toxic chemicals for maintenance and minimize or eliminate the use of solvents.
- ☐ Connect process equipment area to public sanitary sewer or facility wastewater treatment system when possible. Some jurisdictions require that secondary containment areas be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

Good Housekeeping

- ☐ Manage materials and waste properly (see Material Handling and Waste Management) to reduce adverse impacts on stormwater quality.

Objectives
■ *Cover*
■ *Contain*
■ *Educate*
■ *Reduce/Minimize*

Targeted Constituents	
Sediment	✓
Nutrients	✓
Trash	✓
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

Minimum BMPs Covered	
Good Housekeeping	✓
Preventative Maintenance	✓
Spill and Leak Prevention and Response	✓
Material Handling & Waste Management	✓
Erosion and Sediment Controls	
Employee Training Program	✓
Quality Assurance Record Keeping	✓

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Outdoor Equipment Operations SC-32

- ☐ Cover the work area with a permanent roof if possible.
- ☐ Use drop cloths for sanding and painting operations.
- ☐ Use a vacuum for fine particle clean-up in pavement cracks and crevices.
- ☐ Minimize contact of stormwater with outside process equipment operations through berming and drainage routing (run-on prevention).
- ☐ "Spot clean" leaks and drips routinely. Leaks are not cleaned up until the absorbent is picked up and disposed of properly.
- ☐ Paint signs on storm drain inlets to indicate that they are not to receive liquid or solid wastes.
- ☐ Use roll down or permanent walls when windy/breezy to prevent wind transport of particulates/pollutants.

Preventative Maintenance

- ☐ Design outdoor equipment areas to prevent stormwater runoff and spills. Use a perimeter drain or slope pavement inward with drainage to sump.
- ☐ Dry clean the work area regularly. Do not wash outdoor equipment with water if there is a direct connection to the storm drain.
- ☐ Pave area with concrete rather than asphalt.
- ☐ Inspect outdoor equipment regularly for leaks or spills. Also check for structural failure, spills and overfills due to operator error, and/or failure of piping system.
- ☐ Inspect and clean, if necessary, storm drain inlets and catch basins within the outdoor equipment area before October 1 each year.

Spill Response and Prevention Procedures

- ☐ Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- ☐ Have employees trained in emergency spill cleanup procedures present when dangerous waste, liquid chemicals, or other wastes are delivered.
- ☐ Place a stockpile of spill cleanup materials where it will be readily accessible.
- ☐ Prevent operator errors by using engineering safe guards and thus reducing accidental releases of pollutant.

Material Handling and Waste Management

- ☐ Do not pour liquid wastes into floor drains, sinks, outdoor storm drain inlets, or other storm drain or sewer connections.
- ☐ Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separate.
- ☐ Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.
- ☐ Minimize the possibility of stormwater pollution from outside waste receptacles by doing at least one of the following:
  - ✓ Use only watertight waste receptacle(s) and keep the lid(s) closed.
  - ✓ Grade and pave the waste receptacle area to prevent run-on of stormwater.
  - ✓ Install a roof over the waste receptacle area.

Employee Training Program

- ☐ Educate employees about pollution prevention measures and goals.
- ☐ Train employees on proper equipment operation and maintenance procedures.
- ☐ Train all employees upon hiring and annually thereafter on proper methods for handling and disposing of waste. Ensure that all employees understand stormwater discharge prohibitions, wastewater discharge requirements, and these best management practices.
- ☐ Use a training log or similar method to document training.
- ☐ Ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.

Quality Assurance and Record Keeping

- ☐ Keep accurate maintenance logs that document minimum BMP activities performed for outdoor equipment, types and quantities of materials removed and disposed of, and any improvement actions.
- ☐ Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- ☐ Establish procedures to complete logs and file them in the central office.

Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended "work-arounds."

- Providing cover over outdoor equipment may be impractical or cost-prohibitive.
  - ✓ Operate outdoor equipment only during periods of dry weather.
- Regular operations and time limitations may require outdoor activities during wet weather.
  - ✓ Designate specific areas for outdoor activities.
  - ✓ Allow time for work area clean-up after each shift.
  - ✓ Require employees to understand and follow preventive maintenance and spill and leak prevention BMPs.
  - ✓ Design and install secondary containment and good housekeeping BMPs for outdoor equipment area.
- Storage sheds often must meet building and fire code requirements.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- Many facilities will already have indoor covered areas where vehicle and equipment repairs take place and will require no additional capital expenditures.
- If outdoor activities are required, construction of berms or other means to retain spills and leaks may require appropriate constructed systems for containment. These containment areas may require significant new capital investment.
- Capital investments will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

Maintenance

- Most of the operations and maintenance activities associated with implementing this BMP are integrally linked to routine operations as previously described. Therefore additional O&M is not required.
- For facilities responsible for pre-treating their wastewater prior to discharging, the proper functioning of structural treatment system is an important maintenance consideration.
- Routine cleanout of oil and grease is required for the 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 on a regular basis to keep the device working efficiently.

References and Resources

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Outdoor Storage of Raw Materials SC-33

Description

Stockpiles of raw materials, by-products, and finished products exposed to rain and/or runoff can pollute stormwater. Stormwater can become contaminated when materials wash off or dissolve into water due to improper storage and containment. To prevent or reduce the discharge of pollutants to stormwater from raw material delivery and storage, pollution prevention and source control measures must be implemented, such as minimizing the storage of hazardous materials on-site, enclosing or covering materials, storing materials in a designated area, installing secondary containment, conducting regular inspections, preventing stormwater run-on and runoff, and training employees and subcontractors. This fact sheet focuses on source control BMPs for stockpiles of solid materials; if the raw material, by-product, or product is a liquid, more information for outside storage of liquids can be found under SC-31 Outdoor Liquid Container Storage.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols

- ☐ Emphasize employee education for successful BMP implementation.
- ☐ Store materials that could contaminate stormwater inside or under permanent cover. If this is not feasible, then all outside storage areas should be covered with a roof and bermed or enclosed to prevent stormwater contact.
- ☐ Elevate and tarp solid materials such as beams, metal, etc.
- ☐ Minimize the inventory of raw materials kept outside.

Objectives	
■ *Cover*	
■ *Contain*	
■ *Educate*	
■ *Reduce/Minimize*	
Targeted Constituents	
Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓
Minimum BMPs Covered	
Good Housekeeping	✓
Preventative Maintenance	✓
Spill and Leak Prevention and Response	✓
Material Handling & Waste Management	
Erosion and Sediment Controls	✓
Employee Training Program	✓
Quality Assurance Record Keeping	✓

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- ☐ Keep an accurate, up-to-date inventory of the materials delivered and stored on-site.
- ☐ Stormwater 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.

Good Housekeeping

- ☐ If raw materials cannot all be stored inside or under permanent cover, prevent exposure to direct precipitation and stormwater 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 (Applicable to small stockpiles only).
- ☐ Implement erosion control practices at the perimeter of the facilty site and at any catch basins to prevent erosion of the stockpiled material off-site, if the stockpiles are so large that they cannot feasibly be covered and contained.
- ☐ Minimize stormwater run-on by enclosing the area or building a berm around it.
- ☐ Keep storage areas clean and dry.
- ☐ Slope paved areas in a manner that minimizes pooling of water on the site, particularly with materials that may leach pollutants into stormwater and/or groundwater, such as compost, logs, and wood chips. A minimum slope of 1.5% is recommended.
- ☐ Secure drums stored in an area where unauthorized persons may not gain access to prevent accidental spillage, pilferage, or any unauthorized use.
- ☐ Install curbing or berms along the perimeter of the area to prevent the run-on of uncontaminated stormwater from adjacent areas as well as runoff of stormwater from the stockpile areas.
- ☐ 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.
- ☐ Do not store materials on top of or directly adjacent to storm drain inlets.
- ☐ Cover wood products treated with chromated copper arsenate, ammonical copper zinc arsenate, creosote, or pentachlorophenol with properly secured tarps or store indoors.

Preventative Maintenance

- ☐ Maintain outdoor storage containers in good condition. Replace leaky or otherwise inadequate containers as necessary.
- ☐ Maintain outdoor waterproof covers (e.g., tarps) in good condition and properly secure them to be storm resistant. Replace tarps damaged by UV exposure or wear and tear on a regular basis.

- ☐ Perform routine inspection of storm drains and sumps and regularly remove accumulated materials.
- ☐ Dry clean the work area regularly. Do not wash outdoor material storage areas with water if there is a direct connection to the storm drain.
- ☐ Pave outdoor storage areas for liquids such as solvents with concrete rather than asphalt.
- ☐ Conduct regular inspections of storage areas so that leaks and spills are detected as soon as possible.
- ☐ Routinely inspect berms, curbing, containment, and sediment controls for proper function and repair as necessary.

Spill and Leak Prevention and Response

- ☐ Keep the facility spill prevention and control plan up-to-date.
- ☐ Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- ☐ Have employees trained in spill containment and cleanup present during the loading/unloading of hazardous or otherwise dangerous materials.

Erosion and Sediment Controls

- ☐ Keep materials covered to prevent erosion of stockpiles. This may not be feasible for large stockpiles.
- ☐ 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 fence around the perimeter of the site to prevent transport of raw materials to the storm drain or offsite surface waters.

Employee Training Program

- ☐ Educate employees about pollution prevention measures and goals.
- ☐ Train employees how to properly store outdoor raw materials using the source control BMPs described above.
- ☐ Use a training log or similar method to document training.
- ☐ Ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.

Quality Assurance and Record Keeping

- ☐ Keep accurate maintenance logs that document minimum BMP activities performed for outdoor storage of raw materials, types and quantities of materials removed and disposed of, and any improvement actions.
- ☐ Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- ☐ Establish procedures to complete logs and file them in the central office.

Other Facility-Specific Considerations

- ☐ Storage sheds often must meet building and fire code requirements. Storage of reactive, ignitable, or flammable liquids must comply with the Uniform Fire Code and the National Electric Code.
- ☐ Some municipalities require that secondary containment areas (regardless of size) be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.
- ☐ The local fire district must be consulted for limitations on clearance of roof covers over containers used to store flammable materials.

Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended "work-arounds"

- ☐ Space limitations may preclude storing all materials indoors.
  - ✓ Implement good housekeeping, preventative maintenance, and erosion and sediment controls as described above.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- ☐ Many facilities will already have indoor covered areas where raw materials will be stored and will require no additional capital expenditures.
- ☐ If outdoor storage of materials is required, construction of berms or other means to prevent stormwater run-on and runoff may require appropriate constructed systems for containment. These containment areas may require significant new capital investment.
- ☐ Purchase and installation of erosion and sediment controls will require additional capital investments, and this amount will vary depending on site characteristics.
- ☐ Capital investments will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

Maintenance

- Accurate and up-to-date inventories should be kept of all stored materials.
- Berms and curbs may require periodic repair and patching.
- Parking lots or other surfaces near bulk materials storage areas should be swept 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.
- Erosion and sediment controls require regular inspection and periodic replacement or reinstallation.

Supplemental Information

Raw Material Containment

Paved areas should be sloped in a manner that minimizes pooling of water on the site, particularly with materials that may leach pollutants into stormwater and/or groundwater, such as compost, logs, and wood chips. A minimum slope of 1.5% is recommended.

- Curbing or berms should be placed along the perimeter of the area to prevent the run-on of uncontaminated stormwater from adjacent areas as well as runoff of stormwater from stockpile areas.
- 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.

The area should be sloped to drain stormwater to the perimeter where it can be collected or to internal drainage alleyways where material is not stockpiled.

The "doghouse" design has been used to store small liquid containers. The roof and flooring design prevent contact with direct rain or runoff. The doghouse has two solid structural walls and two canvas covered walls. The flooring is wire mesh about secondary containment.

References and Resources

Minnesota Pollution Control Agency, *Industrial Stormwater Best Management Practices Guidebook.* Available online at: http://www.pca.state.mn.us/index.php/view-document.html?gid=10557.

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US EPA. National Pollutant Discharge Elimination System – Industrial Fact Sheet Series for Activities Covered by EPA's Multi Sector General Permit. Available online at: http://cfpub.epa.gov/npdes/stormwater/swsectors.cfm.

Waste Handling & Disposal SC-34

Description

Improper storage and handling of solid wastes can allow toxic compounds, oils and greases, heavy metals, nutrients, suspended solids, and other pollutants to enter stormwater runoff. The discharge of pollutants to stormwater from waste handling and disposal can be prevented and reduced by tracking waste generation, storage, and disposal; reducing waste generation and disposal through source reduction, reuse, and recycling; and preventing run-on and runoff.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols

- ☐ Accomplish reduction in the amount of waste generated using the following source controls:
  - ✓ Production planning and sequencing;
  - ✓ Process or equipment modification;
  - ✓ Raw material substitution or elimination;
  - ✓ Loss prevention and housekeeping;
  - ✓ Waste segregation and separation; and
  - ✓ Close loop recycling.
- ☐ Establish a material tracking system to increase awareness about material usage. This may reduce spills and minimize contamination, thus reducing the amount of waste produced.
- ☐ Recycle materials whenever possible.

Objectives
■ *Cover*
■ *Contain*
■ *Educate*
■ *Reduce/Minimize*
■ *Product Substitution*

Targeted Constituents	
Sediment	
Nutrients	
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

Minimum BMPs Covered	
Good Housekeeping	✓
Preventative Maintenance	✓
Spill and Leak Prevention and Response	✓
Material Handling & Waste Management	✓
Erosion and Sediment Controls	
Employee Training Program	✓
Quality Assurance Record Keeping	✓

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- ☐ Use the entire product before disposing of the container.
- ☐ To the extent possible, store wastes under cover or indoors after ensuring all safety concerns such as fire hazard and ventilation are addressed.
- ☐ Provide containers for each waste stream at each work station. Allow time after shift to clean area.

Good Housekeeping

- ☐ Cover storage containers with leak proof lids or some other means. If waste is not in containers, cover all waste piles (plastic tarps are acceptable coverage) and prevent stormwater run-on and runoff with a berm. The waste containers or piles must be covered except when in use.
- ☐ Use drip pans or absorbent materials whenever grease containers are emptied by vacuum trucks or other means. Grease cannot be left on the ground. Collected grease must be properly disposed of as garbage.
- ☐ Dispose of rinse and wash water from cleaning waste containers into a sanitary sewer if allowed by the local sewer authority. Do not discharge wash water to the street or storm drain. Clean in a designated wash area that drains to a clarifier.
- ☐ Transfer waste from damaged containers into safe containers.
- ☐ Take special care when loading or unloading wastes to minimize losses. Loading systems can be used to minimize spills and fugitive emission losses such as dust or mist. Vacuum transfer systems can minimize waste loss.
- ☐ Keep the waste management area clean at all times by sweeping and cleaning up spills immediately.
- ☐ Use dry methods when possible (e.g., sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.
- ☐ Stencil or demarcate storm drains on the facility's property with prohibitive message regarding waste disposal.
- ☐ Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropylene or hypalon.
- ☐ If possible, move the activity indoor after ensuring all safety concerns such as fire hazard and ventilation are addressed.

Preventative Maintenance

- ☐ Prevent stormwater run-on from entering the waste management area by enclosing the area or building a berm around the area.
- ☐ Prevent waste materials from directly contacting rain.

- ☐ Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropylene or hypalon.
- ☐ 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.
- ☐ Check waste containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.
- ☐ Sweep and clean the waste management area regularly. Use dry methods when possible (e.g., sweeping, vacuuming, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.
- ☐ Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- ☐ Repair leaking equipment including valves, lines, seals, or pumps promptly.

Spill Response and Prevention Procedures

- ☐ Keep your spill prevention and plan up-to-date.
- ☐ Have an emergency plan, equipment and trained personnel ready at all times to deal immediately with major spills.
- ☐ Collect all spilled liquids and properly dispose of them.
- ☐ Store and maintain appropriate spill cleanup materials in a location known to all near the designated wash area.
- ☐ Ensure that vehicles transporting waste have spill prevention equipment that can prevent spills during transport. Spill prevention equipment includes:
  - ✓ Vehicles equipped with baffles for liquid waste; and
  - ✓ Trucks with sealed gates and spill guards for solid waste.

Material Handling and Waste Management

Litter Control

- ☐ Post "No Littering" signs and enforce anti-litter laws.
- ☐ Provide a sufficient number of litter receptacles for the facility.
- ☐ Clean out and cover litter receptacles frequently to prevent spillage.

Waste Collection

- ☐ Keep waste collection areas clean.

- ☐ Inspect solid waste containers for structural damage regularly. Repair or replace damaged containers as necessary.
- ☐ Secure solid waste containers; containers must be closed tightly when not in use.
- ☐ Do not fill waste containers with washout water or any other liquid.
- ☐ 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 (see chemical/ hazardous waste collection section below).
- ☐ Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal. Affix labels to all waste containers.

Chemical/Hazardous Wastes

- ☐ Select designated hazardous waste collection areas on-site.
- ☐ Store hazardous materials and wastes in covered containers and protect them from vandalism.
- ☐ Place hazardous waste containers in secondary containment.
- ☐ Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- ☐ Hazardous waste cannot be reused or recycled; it must be disposed of by a licensed hazardous waste hauler.

Employee Training Program

- ☐ Educate employees about pollution prevention measures and goals.
- ☐ Train employees how to properly handle and dispose of waste using the source control BMPs described above.
- ☐ Train employees and subcontractors in proper hazardous waste management.
- ☐ Use a training log or similar method to document training.
- ☐ Ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.

Quality Assurance and Record Keeping

- ☐ Keep accurate maintenance logs that document minimum BMP activities performed for waste handling and disposal, types and quantities of waste disposed of, and any improvement actions.
- ☐ Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.

- Establish procedures to complete logs and file them in the central office.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- Capital costs will vary substantially depending on the size of the facility and the types of waste handled. Significant capital costs may be associated with reducing wastes by modifying processes or implementing closed-loop recycling.
- Many facilities will already have indoor covered areas where waste materials will be stored and will require no additional capital expenditures for providing cover.
- If outdoor storage of wastes is required, construction of berms or other means to prevent stormwater run-on and runoff may require appropriate constructed systems for containment.
- Capital investments will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

Maintenance

- Check waste containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.
- Sweep and clean the waste management area regularly. Use dry methods when possible (e.g., sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.
- Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- Repair leaking equipment including valves, lines, seals, or pumps promptly.

References and Resources

Minnesota Pollution Control Agency, *Industrial Stormwater Best Management Practices Guidebook*. Available online at: http://www.pca.state.mn.us/index.php/view-document.html?gid=10557.

New Jersey Department of Environmental Protection, 2013. *Basic Industrial Stormwater General Permit Guidance Document NJPDES General Permit No NJ0088315,* Revised. Available online at: http://www.nj.gov/dep/dwq/pdf/5G2_guidance_color.pdf.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities

Oregon Department of Environmental Quality, 2013. *Industrial Stormwater Best Management Practices Manual- BMP 26 Fueling and Liquid Loading/Unloading Operations*. Available online at: http://www.deq.state.or.us/wq/wqpermit/docs/IndBMP021413.pdf.

Sacramento Stormwater Management Program. *Best Management Practices for Industrial Storm Water Pollution Control*. Available online at: http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf.

Sacramento County Environmental Management Stormwater Program: Best Management Practices. Available online at: http://www.emd.saccounty.net/EnvHealth/Stormwater/Stormwater-BMPs.html.

Santa Clara Valley Urban Runoff Pollution Prevention Program. http://www.scvurppp-w2k.com/

US EPA. National Pollutant Discharge Elimination System – Industrial Fact Sheet Series for Activities Covered by EPA's Multi Sector General Permit. Available online at: http://cfpub.epa.gov/npdes/stormwater/swsectors.cfm.

Safer Alternative Products SC-35

Description

Promote the use of less harmful products and products that contain little or no TMDL and 303(d) list pollutants. Alternatives exist for most product classes including chemical fertilizers, pesticides, cleaning solutions, janitorial chemicals, automotive and paint products, and consumables (batteries, fluorescent lamps).

Approach

Pattern a new program after the many established programs around the state and country. Integrate this best management practice as much as possible with existing programs at your facility.

Develop a comprehensive program based on:

- ☐ The "Precautionary Principle," which is an alternative to the "Risk Assessment" model that says it's acceptable to use a potentially harmful product until physical evidence of its harmful effects are established and deemed too costly from an environmental or public health perspective. For instance, a risk assessment approach might say it's acceptable to use a pesticide until there is direct proof of an environmental impact. The Precautionary Principle approach is used to evaluate whether a given product is safe, whether it is really necessary, and whether alternative products would perform just as well.
- ☐ Environmentally Preferable Purchasing Program to minimize the purchase of products containing hazardous ingredients used in the facility's custodial services, fleet maintenance, and facility maintenance in favor of using alternate products that pose less risk to employees and to the environment.
- ☐ Integrated Pest Management (IPM) or Less-Toxic Pesticide Program, which uses a pest management approach that minimizes the use of toxic chemicals and gets rid of pests

Objectives
■ *Educate*
■ *Reduce/Minimize*
■ *Product Substitution*

Targeted Constituents	
Sediment	
Nutrients	✓
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Minimum BMPs Covered	
Good Housekeeping	
Preventative Maintenance	
Spill and Leak Prevention and Response	
Material Handling & Waste Management	
Erosion and Sediment Controls	
Employee Training Program	✓
Quality Assurance Record Keeping	

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by methods that pose a lower risk to employees, the public, and the environment.

- ☐ Energy Efficiency Program including no-cost and low-cost energy conservation and efficiency actions that can reduce both energy consumption and electricity bills, along with long-term energy efficiency investments.

Consider the following mechanisms for developing and implementing a comprehensive program:

- ☐ Policies
- ☐ Procedures
  - ✓ Standard operating procedures (SOPs);
  - ✓ Purchasing guidelines and procedures; and
  - ✓ Bid packages (services and supplies).
- ☐ Materials
  - ✓ Preferred or approved product and supplier lists;
  - ✓ Product and supplier evaluation criteria;
  - ✓ Training sessions and manuals; and
  - ✓ Fact sheets for employees.

Implement this BMP in conjunction with the Vehicle and Equipment Management fact sheets (SC-20 – SC-22) and SC-41 Building and Grounds Maintenance.

Employee Training Program

- ☐ Employees who handle potentially harmful materials should be trained in the use of safer alternatives.
- ☐ Purchasing departments should be trained on safer alternative products and encouraged to procure less hazardous materials and products that contain little or no harmful substances or TMDL pollutants.
- ☐ Employees and contractors / service providers can both be educated about safer alternatives by using information developed by a number of organizations including the references and resources provided in this fact sheet.

Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended "work-arounds"

- ☐ Alternative products may not be available, suitable, or effective in every case.

- ✓ Minimize use of hazardous/harmful products if no alternative product is available.

Regulatory Considerations

This BMP has no regulatory requirements unless local/municipal ordinance applies. Existing regulations already encourage facilities to reduce the use of hazardous materials through incentives such as reduced:

- □ Specialized equipment storage and handling requirements;
- □ Storm water runoff sampling requirements;
- □ Training and licensing requirements; and
- □ Record keeping and reporting requirements.

Cost Considerations

- □ The primary cost is for staff time to: 1) develop new policies and procedures and 2) educate purchasing departments and employees who handle potentially harmful materials about the availability, procurement, and use of safer alternatives.
- □ Some alternative products may be slightly more expensive than conventional products.

Supplemental Information

The following discussion provides some general information on safer alternatives. More specific information on particular hazardous materials and the available alternatives may be found in the references and resources listed below.

- □ Automotive products – Less toxic alternatives are not available for many automotive products, especially engine fluids. But there are alternatives to grease lubricants, car polishes, degreasers, and windshield washer solution. Refined motor oil is also available.
- □ Vehicle/Trailer lubrication – Fifth wheel bearings on trucks require routine lubrication. Adhesive lubricants are available to replace typical chassis grease.
- □ Cleaners – Vegetables-based or citrus-based soaps are available to replace petroleum-based soaps/detergents.
- □ Paint products – Water-based paints, wood preservatives, stains, and finishes with low VOC content are available.
- □ Pesticides – Specific alternative products or methods exist to control most insects, fungi, and weeds.
- □ Chemical Fertilizers – Compost and soil amendments are natural alternatives.
- □ Consumables – Manufacturers have either reduced or are in the process of reducing the amount of heavy metals in consumables such as batteries and fluorescent lamps.

All fluorescent lamps contain mercury, however low-mercury containing lamps are now available from most hardware and lighting stores. Fluorescent lamps are also more energy efficient than the average incandescent lamp.

- Janitorial chemicals – Even biodegradable soap can harm fish and wildlife before it biodegrades. Biodegradable does not mean non-toxic. Safer products and procedures are available for floor stripping and cleaning, as well as carpet, glass, metal, and restroom cleaning and disinfecting. Use paper products with post-consumer recycled content and implement electric had dryers.

Examples

There are a number of business and trade associations, and communities with effective programs. Some of the more prominent are listed below in the references and resources section.

References and Resources

Note: Many of these references provide alternative products for materials that typically are used inside and disposed to the sanitary sewer as well as alternatives to products that usually end up in the storm drain.

General Sustainable Practices and Pollution Prevention Including Pollutant-Specific Information

California Department of Toxic Substances Control, http://www.dtsc.ca.gov/PollutionPrevention/GreenTechnology/Index.cfm.

CalRecycle, http://www.calrecycle.ca.gov/Business/Regulated.htm.

City of Santa Monica Office of Sustainability and Environment, http://www.smgov.net/departments/ose/.

City of Palo Alto, http:// www.city.palo-alto.ca.us/cleanbay.

City and County of San Francisco, Department of the Environment, http://www.sfenvironment.org/toxics-health/greener-business-practices.

Green Business Program, http://www.greenbiz.ca.gov/GRlocal.html .

Product Stewardship Institute, http://www.productstewardship.us/index.cfm.

Sacramento Clean Water Business Partners. http://www.sacstormwater.org/CleanWaterBusinessPartners/CleanWaterBusinessPartners.html.

USEPA. National Pollutant Discharge Elimination System (NPDES) Stormwater Discharges From Industrial Facilities, http://cfpub.epa.gov/npdes/stormwater/indust.cfm.

USEPA Region IX Pollution Prevention Program, http://www.epa.gov/region9/waste/p2/business.html.

Western Sustainability and Pollution Prevention Network, http://wsppn.org/.

Metals (mercury, copper)

National Electrical Manufacturers Association – Environmental Stewardship, http://www.nema.org/Policy/Environmental-Stewardship/pages/default.aspx.

Sustainable Conservation, http://www.suscon.org.

Auto Recycling Project

Brake Pad Partnership

Pesticides and Chemical Fertilizers

Bio-Integral Resource Center, http://www.birc.org.

California Department of Pesticide Regulation, http://www.cdpr.ca.gov/dprprograms.htm.

University of California Statewide IPM Program, http://www.ipm.ucdavis.edu/default.html.

Dioxins

Bay Area Dioxins Project, http://www.abag.ca.gov/bayarea/dioxin/project_materials.htm.

Contaminated or Erodible Areas SC-40

Description

Areas within an industrial site that are bare of vegetation or are subject to activities that promote the suppression of vegetation are often subject to erosion. In addition, they may or may not be contaminated from past or current activities. If the area is temporarily bare because of construction, see SC-42 Building Repair, Remodeling, and Construction. Sites with excessive erosion or the potential for excessive erosion should consider employing the soil erosion BMPs identified in the Construction BMP Handbook. Note that this fact sheet addresses soils that do not exceed hazardous waste criteria (see Title 22 California Code of Regulations for Hazardous Waste Criteria).

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols

Implement erosion and sediment control BMPs to stabilize soils and reduce pollutant discharges from contaminated or erodible surfaces.

Erosion and Sediment Controls

- ☐ Preserve natural vegetation whenever possible. See also EC-2 Preservation of Existing Vegetation, in the Construction BMP Handbook.
- ☐ Analyze soil conditions.
- ☐ Remove contaminated soil and dispose of properly.
- ☐ Stabilize loose soils by re-vegetating whenever possible. See also EC-4 Hydroseeding, in the Construction BMP Handbook.

Objectives
■ *Cover*
■ *Contain*
■ *Educate*
■ *Reduce/Minimize*
■ *Product Substitution*

Targeted Constituents	
Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

Minimum BMPs Covered	
Good Housekeeping	
Preventative Maintenance	
Spill and Leak Prevention and	
Material Handling & Waste Management	
Erosion and Sediment Controls	✓
Employee Training Program	✓
Quality Assurance Record Keeping	✓

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- ☐ Utilize non-vegetative stabilization methods for areas prone to erosion where vegetative options are not feasible. Examples include:
  - ✓ Areas of vehicular or pedestrian traffic such as roads or paths;
  - ✓ Arid environments where vegetation would not provide timely ground coverage, or would require excessive irrigation;
  - ✓ Rocky substrate, infertile or droughty soils where vegetation would be difficult to establish; and
  - ✓ Areas where vegetation will not grow adequately within the construction time frame.

  There are several non-vegetative stabilization methods and selection should be based on site-specific conditions. See also EC-16 Non-Vegetative Stabilization, in the Construction BMP Handbook.
- ☐ Utilize chemical stabilization when needed. See also EC-5 Soil Binders, in the Construction BMP Handbook.
- ☐ Use geosynthetic membranes to control erosion if feasible. See also EC-7 Geotextiles and Mats, in the Construction BMP Handbook.
- ☐ Stabilize all roadways, entrances, and exits to sufficiently control discharges of erodible materials from discharging or being tracked off the site. See also TC 1-3 Tracking Control, in the Construction BMP Handbook.
- ☐ Implement wind erosion control measures as necessary. See also WE-1 Wind Erosion Control, in the Construction BMP Handbook.

Employee Training Program

- ☐ Educate employees about pollution prevention measures and goals.
- ☐ Train employees how to properly install and maintain the erosion and sediment source control BMPs described above. Detailed information is provided in the Construction BMP Handbook.
- ☐ Use a training log or similar method to document training.

Quality Assurance and Record Keeping

- ☐ Keep accurate logs that document actions taken to maintain and improve the effectiveness of the erosion and sediment control BMPs described above.
- ☐ Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- ☐ Establish procedures to complete logs and file them in the central office.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- Many facilities do not have contaminated or erodible areas and will require no additional capital expenditures.
- For sites with contaminated or erodible areas, purchase and installation of erosion and sediment controls will require additional capital investments, and this amount will vary depending on site characteristics and the types of BMPs being implemented.
- Minimize costs by maintaining existing vegetation and limiting site operations on bare soils.

Maintenance

- The erosion and sediment control BMPs described above require periodic inspection and maintenance to remain effective. The cost of these actions will vary depending on site characteristics and the types of BMPs being implemented.
- Irrigation costs may be required to establish and maintain vegetation.

Supplemental Information

Stabilization of Erodible Areas

Preserving stabilized areas minimizes erosion potential, protects water quality, and provides aesthetic benefits. The most effective way to control erosion is to preserve existing vegetation. Preservation of natural vegetation provides a natural buffer zone and an opportunity for infiltration of stormwater and capture of pollutants in the soil matrix. This practice can be used as a permanent source control measure.

Vegetation preservation should be incorporated into the site. Preservation requires good site management to minimize operations on bare soils where vegetation exists. Proper maintenance is important to ensure healthy vegetation that can control erosion. Different species, soil types, and climatic conditions will require different maintenance activities such as mulching, fertilizing, liming, irrigation, pruning and weed and pest control.

The preferred approach is to leave as much native vegetation on-site as possible, thereby reducing or eliminating any erosion problem. However, assuming the site already has contaminated or erodible surface areas, there are four possible courses of action which can be taken:

- The area can be revegetated if it is not in use and therefore not subject to damage from site activities. In as much as the area is already devoid of vegetation, special measures are likely necessary. Lack of vegetation may be due to the lack of water and/or poor soils. The latter can perhaps be solved with fertilization, or the ground may simply be too compacted from prior use. Improving soil conditions may be sufficient to support the recovery of vegetation. Use process wastewater for irrigation if possible, and see the Construction BMP Handbook for further procedures on establishing vegetation.

- □ Watering trucks to prevent dust.

- □ Chemical stabilization can be used as an alternate method in areas where temporary seeding practices cannot be used because of season or climate. It can provide immediate, effective, and inexpensive erosion control. Application rates and procedures recommended by the manufacturer should be followed as closely as possible to prevent the products from forming ponds and creating large areas where moisture cannot penetrate the soil. See also EC-5, Soil Binders, in the Construction BMP Handbook for more information. Advantages of chemical stabilization include:

  - ✓ Applied easily to the surface;
  - ✓ Stabilizes areas effectively; and
  - ✓ Provides immediate protection to soils that are in danger of erosion.

- □ Contaminated soils should be cleaned up or removed. This requires determination of the level and extent of the contamination. Removal must comply with State and Federal regulations; permits must be acquired and fees paid.

- □ 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.

  Examples of non-vegetative stabilization BMPs are provided below:

  - ✓ ***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 (i.e., 10:1 [H:V]). 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 EC-3 Hydraulic Mulch, EC-6 Straw Mulch, EC-8 Wood Mulch, or EC-14 Compost Blankets of the Construction BMP Handbook 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. For more information on geotextiles and mats see EC-7 Geotextiles and Mats of the Construction BMP Handbook.
  - ✓ ***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 for more information. References and Resources.

References and Resources

California Stormwater Quality Association 2012, *Construction Stormwater Best Management Practice Handbook.* Available at http://www.casqa.org.

City of Seattle, Seattle Public Utilities Department of Planning and Development, 2009. *Stormwater Manual Vol. 1 Source Control Technical Requirements Manual.*

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities.

Sacramento Stormwater Management Program. *Best Management Practices for Industrial Storm Water Pollution Control.* Available online at: http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf.

Santa Clara Valley Urban Runoff Pollution Prevention Program, http://www.scvurppp-w2k.com/.

Tahoe Regional Planning Agency, *Best Management Practices Handbook*, 2012. Available online at: http://www.tahoebmp.org/Documents/2012%20BMP%20Handbook.pdf.

The Storm Water Managers Resource Center, http://www.stormwatercenter.net.

U.S. Environmental Protection Agency, *Construction Site Stormwater Runoff Control.* Available online at: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=4.

Building & Grounds Maintenance SC-41

Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, abnormal pH, and oils and greases. Utilizing the protocols in this fact sheet will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols

- ☐ Switch to non-toxic chemicals for maintenance to the maximum extent possible.
- ☐ Choose cleaning agents that can be recycled.
- ☐ Encourage proper lawn management and landscaping, including use of native vegetation.
- ☐ Encourage use of Integrated Pest Management techniques for pest control.
- ☐ Encourage proper onsite recycling of yard trimmings.
- ☐ Recycle residual paints, solvents, lumber, and other material as much as possible.

Objectives
■ *Cover*
■ *Contain*
■ *Educate*
■ *Reduce/Minimize*
■ *Product Substitution*

Targeted Constituents	
Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	
Organics	

Minimum BMPs Covered	
Good Housekeeping	✓
Preventative Maintenance	
Spill and Leak Prevention and Response	✓
Material Handling & Waste Management	✓
Erosion and Sediment Controls	
Employee Training Program	✓
Quality Assurance Record Keeping	✓

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- ☐ Clean work areas at the end of each work shift using dry cleaning methods such as sweeping and vacuuming.

Good Housekeeping

Pressure Washing of Buildings, Rooftops, and Other Large Objects

- ☐ In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a water collection device that enables collection of wash water and associated solids. 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.

- ☐ If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff.

- ☐ If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement.

Landscaping Activities

- ☐ Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.

- ☐ Use mulch or other erosion control measures on exposed soils. See also SC-40, Contaminated and Erodible Areas, for more information.

Building Repair, Remodeling, and Construction

- ☐ Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.

- ☐ Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.

- ☐ Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.

- ☐ Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.

- ☐ Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. This is particularly necessary on rainy days. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and

solids must be collected and disposed of before removing the containment device(s) at the end of the work day.

- ☐ If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. If directed off-site, you should direct the water through hay bales and filter fabric or use other sediment filters or traps.
- ☐ Store toxic material under cover during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

Mowing, Trimming, and Planting

- ☐ Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- ☐ Use mulch or other erosion control measures when soils are exposed.
- ☐ Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- ☐ Consider an alternative approach when bailing out muddy water: do not put it in the storm drain; pour over landscaped areas.
- ☐ Use hand weeding where practical.

Fertilizer and Pesticide Management

- ☐ Do not use pesticides if rain is expected.
- ☐ Do not mix or prepare pesticides for application near storm drains.
- ☐ Use the minimum amount needed for the job.
- ☐ Calibrate fertilizer distributors to avoid excessive application.
- ☐ Employ techniques to minimize off-target application (e.g., spray drift) of pesticides, including consideration of alternative application techniques.
- ☐ Apply pesticides only when wind speeds are low.
- ☐ Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- ☐ Irrigate slowly to prevent runoff and then only as much as is needed.
- ☐ Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.

Inspection

- ☐ Inspect irrigation system 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.

Building & Grounds Maintenance SC-41

Spill Response and Prevention Procedures

- ☐ Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- ☐ Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- ☐ Have employees trained in spill containment and cleanup present during the loading/unloading of dangerous wastes, liquid chemicals, or other materials.
- ☐ Familiarize employees with the Spill Prevention Control and Countermeasure Plan.
- ☐ Clean up spills immediately.

Material Handling and Waste Management

- ☐ Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- ☐ Use less toxic pesticides that will do the job when applicable. Avoid use of copper-based pesticides if possible.
- ☐ Dispose of empty pesticide containers according to the instructions on the container label.
- ☐ Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- ☐ Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

Employee Training Program

- ☐ Educate and train employees on pesticide use and in pesticide application techniques to prevent pollution.
- ☐ Train employees and contractors in proper techniques for spill containment and cleanup.
- ☐ Be sure the frequency of training takes into account the complexity of the operations and the needs of individual staff.

Quality Assurance and Record Keeping

- ☐ Keep accurate logs that document maintenance activities performed and minimum BMP measures implemented.
- ☐ Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- ☐ Establish procedures to complete logs and file them in the central office.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- Additional capital costs are not anticipated for building and grounds maintenance. Implementation of the minimum BMPs described above should be conducted as part of regular site operations.

Maintenance

- Maintenance activities for the BMPs described above will be minimal, and no additional cost is anticipated.

Supplemental Information

Fire Sprinkler Line Flushing

Site fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water, though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping, but it is subject to rusting and results in lower quality water. Initially, the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time (typically a year) and between flushes may accumulate iron, manganese, lead, copper, nickel, and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

References and Resources

City of Seattle, Seattle Public Utilities Department of Planning and Development, 2009. *Stormwater Manual Vol. 1 Source Control Technical Requirements Manual.*

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Building Repair and Construction SC-42

Description

Site modifications are common, particularly at large industrial sites. The activity 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. Protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants to stormwater from building repair, remodeling, and minor construction by using soil erosion controls, enclosing or covering building material storage areas, using good housekeeping practices, using safer alternative products, and training employees.

This fact sheet is intended to be used for minor repairs and construction. If major construction is required, the guidelines in the Construction BMP Handbook should be followed.

Approach

The BMP approach is to reduce potential for pollutant discharges through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols

- ☐ Recycle residual paints, solvents, lumber, and other materials to the maximum extent practicable.
- ☐ Avoid outdoor repairs and construction during periods of wet weather.
- ☐ Use safer alternative products to the maximum extent practicable. See also SC-35 Safer Alternative Products for more information.

Objectives
■ *Cover*
■ *Contain*
■ *Educate*
■ *Reduce/Minimize*
■ *Product Substitution*

Targeted Constituents	
Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Minimum BMPs Covered	
Good Housekeeping	✓
Preventative Maintenance	
Spill and Leak Prevention and Response	✓
Material Handling & Waste Management	✓
Erosion and Sediment Controls	✓
Employee Training Program	✓
Quality Assurance Record Keeping	✓

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- ☐ Buy recycled products to the maximum extent practicable.
- ☐ Inform on-site contractors of company policy on these matters and include appropriate provisions in their contract to ensure certain proper housekeeping and disposal practices are implemented.
- ☐ Make sure that nearby storm drains are well marked to minimize the chance of inadvertent disposal of residual paints and other liquids.

Good Housekeeping

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.
- ☐ Cover raw materials of particular concern that must be left outside, particularly during the rainy season. See also SC-33 Outdoor Storage of Raw Materials for more information.
- ☐ 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.
- ☐ Do not dump waste liquids down the storm drain.
- ☐ Dispose of wash water, sweepings, and sediments properly.
- ☐ Store liquid materials properly that are normally used in repair and remodeling such as paints and solvents. See also SC-31 Outdoor Liquid Container Storage for more information.
- ☐ 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. If the downspout is tight lined, place a temporary plug at the first convenient point in the storm drain and pump out the water with a vactor truck, and clean the catch basin sump where you placed the plug.
- ☐ Clean the storm drain system in the immediate vicinity of the construction activity after it is completed. See also SC-44 Drainage System Maintenance for more information.

Painting

- ☐ Enclose painting operations consistent with local air quality regulations and OSHA.
- ☐ Local air pollution regulations may, in many areas of the state, specify painting procedures which if properly carried out are usually sufficient to protect water quality.
- ☐ Develop paint handling 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.
- ☐ Do not transfer or load paint near storm drain inlets.
- ☐ Plug nearby storm drain inlets prior to starting painting and remove plugs when job is complete when there is risk of a spill reaching storm drains.
- ☐ Cover nearby storm drain inlets prior to starting work if sand blasting is used to remove paint.
- ☐ Use a ground cloth to 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 the application equipment in a sink that is connected to the sanitary sewer if using water based paints.
- ☐ Capture all cleanup-water and dispose of properly.
- ☐ Dispose of paints containing lead or tributyl tin and considered a hazardous waste properly.
- ☐ Store leftover paints if they are to be kept for the next job properly, or dispose properly.
- ☐ Recycle paint when possible. Dispose of paint at an appropriate household hazardous waste facility.

Spill Response and Prevention Procedures

- ☐ Keep your spill prevention and control plan up-to-date.
- ☐ Place a stockpile of spill cleanup materials where it will be readily accessible.
- ☐ Clean up spills immediately.
- ☐ Excavate and remove the contaminated (stained) soil if a spill occurs on dirt.

Material Handling and Waste Management

- ☐ Post "No Littering" signs and enforce anti-litter laws.

- ☐ Provide a sufficient number of litter receptacles for the facility.
- ☐ Clean out and cover litter receptacles frequently to prevent spillage.
- ☐ Keep waste collection areas clean.
- ☐ Inspect solid waste containers for structural damage regularly. Repair or replace damaged containers as necessary.
- ☐ Secure solid waste containers; containers must be closed tightly when not in use.
- ☐ Do not fill waste containers with washout water or any other liquid.
- ☐ 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 (see chemical/ hazardous waste collection section below).
- ☐ Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal. Affix labels to all waste containers.
- ☐ Make sure that hazardous waste is collected, removed, and disposed of properly. See also SC-34, Waste Handling and Disposal for more information.

Sediment and Erosion Controls

- ☐ Limit disturbance to bare soils and preserve natural vegetation whenever possible. See also EC-2, Preservation of Existing Vegetation, in the Construction BMP Handbook.
- ☐ Stabilize loose soils by re-vegetating whenever possible. See also EC-4 Hydroseeding, in the Construction BMP Handbook.
- ☐ Utilize non-vegetative stabilization methods for areas prone to erosion where vegetative options are not feasible. Examples include:
  - ✓ Areas of vehicular or pedestrian traffic such as roads or paths;
  - ✓ Arid environments where vegetation would not provide timely ground coverage, or would require excessive irrigation;
  - ✓ Rocky substrate, infertile or droughty soils where vegetation would be difficult to establish; and
  - ✓ Areas where vegetation will not grow adequately within the construction time frame.

  There are several non-vegetative stabilization methods and selection should be based on site-specific conditions. See also EC-16 Non-Vegetative Stabilization, in the Construction BMP Handbook.

- ☐ Utilize chemical stabilization when needed. See also EC-5 Soil Binders, in the Construction BMP Handbook.
- ☐ Use geosynthetic membranes to control erosion if feasible. See also EC-7 Geotextiles and Mats, in the Construction BMP Handbook.
- ☐ Stabilize all roadways, entrances, and exits to sufficiently control discharges of erodible materials from discharging or being tracked off the site. See also TC 1-3 Tracking Control, in the Construction BMP Handbook.
- ☐ Refer to the supplemental information provided below for projects that involve more extensive soil disturbance activities.

Employee Training Program

- ☐ Educate employees about pollution prevention measures and goals.
- ☐ Train employees how to properly implement the source control BMPs described above. Detailed information for Sediment and Erosion Control BMPs is provided in the Construction BMP Handbook.
- ☐ Proper education of off-site contractors is often overlooked. The conscientious efforts of well trained employees can be lost by unknowing off-site contractors, so make sure they are well informed about pollutant source control responsibilities.
- ☐ Use a training log or similar method to document training.

Quality Assurance and Record Keeping

- ☐ Keep accurate maintenance logs that document minimum BMP activities performed for building repair and construction, types and quantities of waste disposed of, and any improvement actions.
- ☐ Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- ☐ Establish procedures to complete logs and file them in the central office.

Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended "work-arounds."

- ☐ This BMP is for minor construction only. The State's General Construction Activity Stormwater Permit has more extensive requirements for larger projects that would disturb one or more acres of surface.
  - ✓ Refer to the companion "Construction Best Management Practice Handbook" which contains specific guidance and best management practices for larger-scale projects.

- Time constraints may require some outdoor repairs and construction during wet weather.
  - ✓ Require employees to understand and follow good housekeeping and spill and leak prevention BMPs.
  - ✓ Inspect sediment and erosion control BMPs daily during periods of wet weather and repair or improve BMP implementation as necessary.
- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
  - ✓ Minimize use of hazardous materials to the maximum extent practicable.
- Be certain that actions to help stormwater quality are consistent with Cal- and Fed-OSHA and air quality regulations.
- Prices for recycled/safer alternative materials and fluids may be higher than those of conventional materials.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- Limited capital investments may be required at some sites if adequate cover and containment facilities do not exist for construction materials and wastes.
- Purchase and installation of erosion and sediment controls, if needed will require additional capital investments, and this amount will vary depending on site characteristics and the types of BMPs being implemented.
- Minimize costs by maintaining existing vegetation and limiting construction operations on bare soils.

Maintenance

- The erosion and sediment control BMPs described above require periodic inspection and maintenance to remain effective. The cost of these actions will vary depending on site characteristics and the types of BMPs being implemented.
- Irrigation costs may be required to establish and maintain vegetation.

Supplemental Information

Soil/Erosion Control

If the work involves exposing large areas of soil, employ the appropriate soil erosion and control techniques. See the Construction Best Management Practice Handbook. If old buildings are being torn down and not replaced in the near future, stabilize the site using measures described in SC-40 Contaminated or Erodible Areas.

Building Repair and Construction SC-42

If a building is to be placed over an open area with a storm drainage system, make sure the storm inlets within the building are covered or removed, or the storm line is connected to the sanitary sewer. If because of the remodeling a new drainage system is to be installed or the existing system is to be modified, consider installing catch basins as they serve as effective "in-line" treatment devices. Include in the catch basin a "turn-down" elbow or similar device to trap floatables.

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Parking Area Maintenance SC-43

Description

Parking lots can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants from parking areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

BMPs for other outdoor areas on site (loading/unloading, material storage, and equipment operations) are described in SC-30 through SC-33.

Approach

The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas to reduce potential for pollutant discharge to receiving waters. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols

- ☐ Encourage advanced designs and maintenance strategies for impervious parking lots. Refer to the treatment control BMP fact sheets in this manual for additional information.
- ☐ Keep accurate maintenance logs to evaluate BMP implementation.

Good Housekeeping

- ☐ 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.

Objectives
■ *Cover*
■ *Contain*
■ *Educate*
■ *Reduce/Minimize*
■ *Product Substitution*

Targeted Constituents	
Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Minimum BMPs Covered	
Good Housekeeping	✓
Preventative Maintenance	✓
Spill and Leak Prevention and Response	✓
Material Handling & Waste Management	
Erosion and Sediment Controls	
Employee Training Program	✓
Quality Assurance Record Keeping	✓

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- ☐ Provide an adequate number of litter receptacles.
- ☐ Clean out and cover litter receptacles frequently to prevent spillage.

Preventative Maintenance

Inspection

Have designated personnel conduct inspections of parking facilities and stormwater conveyance systems associated with parking facilities on a regular basis.

- ☐ Inspect cleaning equipment/sweepers for leaks on a regular basis.

Surface Cleaning

- ☐ Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system if possible.
- ☐ Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- ☐ Sweep all parking lots at least once before the onset of the wet season.
- ☐ Dispose of parking lot sweeping debris and dirt at a landfill.
- ☐ Follow the procedures below if water is used to clean surfaces:
  - ✓ Block the storm drain or contain runoff.
  - ✓ Collect and pump wash water to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains.
- ☐ Follow the procedures below when cleaning heavy oily deposits:
  - ✓ Clean oily spots with absorbent materials.
  - ✓ Use a screen or filter fabric over inlet, then wash surfaces.
  - ✓ Do not allow discharges to the storm drain.
  - ✓ Vacuum/pump discharges to a tank or discharge to sanitary sewer.
  - ✓ Dispose of spilled materials and absorbents appropriately.

Surface Repair

- ☐ Check local ordinance for SUSMP/LID ordinance.
- ☐ 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 stormwater runoff.
- ☐ Cover and seal nearby storm drain inlets where applicable (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in

place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.

- ☐ 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.

Spill Response and Prevention Procedures

- ☐ Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- ☐ Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- ☐ Clean up fluid spills immediately with absorbent rags or material.
- ☐ Dispose of spilled material and absorbents properly.

Employee Training Program

- ☐ Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- ☐ Train employees and contractors in proper techniques for spill containment and cleanup.
- ☐ Use a training log or similar method to document training.

Quality Assurance and Record Keeping

- ☐ Keep accurate maintenance logs that document minimum BMP activities performed for parking area maintenance, types and quantities of waste disposed of, and any improvement actions.
- ☐ Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- ☐ Establish procedures to complete logs and file them in the central office.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- ☐ Capital investments may be required at some sites to purchase sweeping equipment, train sweeper operators, install oil/water/sand separators, or implement advanced BMPs. These costs can vary significantly depending upon site conditions and the amount of BMPs required.

Maintenance

- ☐ Sweep and clean parking lots regularly to minimize pollutant transport into storm drains from stormwater runoff.
- ☐ Clean out oil/water/sand separators regularly, especially after heavy storms.
- ☐ Maintain advanced BMPs such as vegetated swales, infiltration trenches, or detention basins as appropriate. Refer to the treatment control fact sheets for more information.

Supplemental Information

Advanced BMPs

Some parking areas may require advanced BMPs to further reduce pollutants in stormwater runoff, and a few examples are listed below. Refer to the Treatment Control Fact Sheets and the New Development and Redevelopment Manual for more information.

- ☐ 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 rooftop drains to prevent drainage directly onto paved surfaces.
- ☐ Design lot to include semi-permeable hardscape.

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City of Seattle, Seattle Public Utilities Department of Planning and Development, 2009. *Stormwater Manual Vol. 1 Source Control Technical Requirements Manual.*

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Drainage System Maintenance SC-44

Description

As a consequence of its function, the stormwater drainage facilities on site convey stormwater that may contain certain pollutants either to the offsite conveyance system that collects and transports urban runoff and stormwater, or directly to receiving waters. The protocols in this fact sheet are intended to reduce pollutants leaving the site to the offsite drainage infrastructure or to receiving waters through proper on-site conveyance system operation and maintenance. The targeted constituents will vary depending on site characteristics and operations.

Approach

Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols

- ☐ Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.
- ☐ 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.

Good Housekeeping

Illicit Connections and Discharges

- ☐ Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:

Objectives
■ *Cover*
■ *Contain*
■ *Educate*
■ *Reduce/Minimize*

Targeted Constituents	
Sediment	✓
Nutrients	✓
Trash	✓
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

Minimum BMPs Covered	
Good Housekeeping	✓
Preventative Maintenance	✓
Spill and Leak Prevention and Response	✓
Material Handling & Waste Management	
Erosion and Sediment Controls	
Employee Training Program	✓
Quality Assurance Record Keeping	✓

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- ✓ Identify evidence of spills such as paints, discoloring, odors, etc.
- ✓ Record locations of apparent illegal discharges/illicit connections.
- ✓ Track flows back to potential discharges and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- ✓ Eliminate the discharge once the origin of flow is established.

- ☐ Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" or similar stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- ☐ Refer to fact sheet SC-10 Non-Stormwater Discharges for additional information.

Illegal Dumping

- ☐ Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- ☐ Establish a system for tracking incidents. The system should be designed to identify the following:
  - ✓ Illegal dumping hot spots;
  - ✓ Types and quantities (in some cases) of wastes;
  - ✓ Patterns in time of occurrence (time of day/night, month, or year);
  - ✓ Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills); and
  - ✓ Responsible parties.
- ☐ Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- ☐ Refer to fact sheet SC-10 Non-Stormwater Discharges for additional information.

Preventative Maintenance

Catch Basins/Inlet Structures

- ☐ Staff should regularly inspect facilities to ensure compliance with the following:
  - ✓ Immediate repair of any deterioration threatening structural integrity.
  - ✓ Cleaning 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 sediments and debris accumulated during the summer.
- ☐ 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 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.

Storm Drain Conveyance System

- ☐ Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- ☐ Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

Pump Stations

- ☐ Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- ☐ Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- ☐ Conduct routine maintenance at each pump station.
- ☐ Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

Open Channel

- ☐ Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- ☐ Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Wildlife. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Army Corps of Engineers and USFWS.

Spill Response and Prevention Procedures

- ☐ Keep your spill prevention control plan up-to-date.

- ☐ Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- ☐ Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- ☐ Clean up all spills and leaks using "dry" methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.

Employee Training Program

- ☐ Educate employees about pollution prevention measures and goals.
- ☐ Train employees how to properly handle and dispose of waste using the source control BMPs described above.
- ☐ Train employees and subcontractors in proper hazardous waste management.
- ☐ Use a training log or similar method to document training.
- ☐ Ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.
- ☐ Have staff involved in detection and removal of illicit connections trained in the following:
  - ✓ OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).
  - ✓ OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).
  - ✓ Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

Quality Assurance and Record Keeping

- ☐ Keep accurate maintenance logs that document minimum BMP activities performed for drainage system maintenance, types and quantities of waste disposed of, and any improvement actions.
- ☐ Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- ☐ Keep accurate logs of illicit connections, illicit discharges, and illegal dumping into the storm drain system including how wastes were cleaned up and disposed.
- ☐ Establish procedures to complete logs and file them in the central office.

Potential Limitations and Work-Arounds

Provided below are typical limitations and recommended "work-arounds" for drainage system maintenance:

- Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.

  - ✓ Perform all maintenance onsite and do not flush accumulated material downstream to private property or riparian habitats.

- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, and liquid/sediment disposal.

  - ✓ 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.

- Regulations may include adoption of substantial penalties for illegal dumping and disposal.

  - ✓ Do not dump illegal materials anywhere onsite.

  - ✓ Identify illicit connections, illicit discharge, and illegal dumping.

  - ✓ Cleanup spills immediately and properly dispose of wastes.

- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the sanitary sewer system.

  - ✓ Collect all materials and pollutants accumulated in drainage system and dispose of according to local regulations.

  - ✓ Install debris excluders in areas with a trash TMDL.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- Capital costs will vary substantially depending on the size of the facility and characteristics of the drainage system. Significant capital costs may be associated with purchasing water trucks, vacuum trucks, and any other necessary cleaning equipment or improving the drainage infrastructure to reduce the potential .

- Developing and implementing a site specific drainage system maintenance plan will require additional capital if a similar program is not already in place.

Maintenance

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.
- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

Supplemental Information

Storm Drain Flushing

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing re-suspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used if allowed or that fire hydrant line flushing coincide with storm sewer flushing.

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Non-Stormwater Discharges SC-10

Description

Non-stormwater discharges (NSWDs) are flows that do not consist entirely of stormwater. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain if local regulations allow. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include: potable water sources, fire hydrant flushing, air conditioner condensate, landscape irrigation drainage and landscape watering, emergency firefighting, etc. as discussed in Section 2.

However there are certain non-stormwater discharges that pose an environmental concern. These discharges may originate from illegal dumping of industrial material or wastes and illegal connections such as internal floor drains, appliances, industrial processes, sinks, and toilets that are illegally connected to the nearby storm drainage system through on-site drainage and piping. These unauthorized discharges (examples of which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants into storm drains.

Non-stormwater discharges will need to be addressed through a combination of detection and elimination. The ultimate goal is to effectively eliminate unauthorized non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges of

Objectives
■ *Cover*
■ *Contain*
■ *Educate*
■ *Reduce/Minimize*
■ *Product Substitution*

Targeted Constituents	
Sediment	
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

Minimum BMPs Covered	
Good Housekeeping	✓
Preventative Maintenance	
Spill and Leak Prevention and Response	✓
Material Handling & Waste Management	
Erosion and Sediment Controls	
Employee Training Program	✓
Quality Assurance Record Keeping	✓

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pollutants on streets and into the storm drain system and downstream water bodies.

Approach

Initially the Discharger must make an assessment of non-stormwater discharges to determine which types must be eliminated or addressed through BMPs. The focus of the following approach is the elimination of unauthorized non-stormwater discharges. See other BMP Fact Sheets for activity-specific pollution prevention procedures.

General Pollution Prevention Protocols

- ☐ Implement waste management controls described in SC-34 Waste Handling and Disposal.

- ☐ Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially those that are not classified as hazardous. These are often not responded to as effectively as they need to be.

- ☐ Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" or similar stenciled or demarcated next to them to warn against ignorant or unintentional dumping of pollutants into the storm drainage system.

- ☐ Manage and control sources of water such as hose bibs, faucets, wash racks, irrigation heads, etc. Identify hoses and faucets in the SWPPP, and post signage for appropriate use.

Non-Stormwater Discharge Investigation Protocols

Identifying the sources of non-stormwater discharges requires the Discharger to conduct an investigation of the facility at regular intervals. There are several categories of non-stormwater discharges:

- ☐ Visible, easily identifiable discharges, typically generated as surface runoff, such as uncontained surface runoff from vehicle or equipment washing; and

- ☐ Non-visible, (e.g., subsurface) discharges into the site drainage system through a variety of pathways that are not obvious.

The approach to detecting and eliminating non-stormwater discharges will vary considerably, as discussed below:

Visible and identifiable discharges

- ☐ Conduct routine inspections of the facilities and of each major activity area and identify visible evidence of unauthorized non-stormwater discharges. This may include:

  - ✓ Visual observations of actual discharges occurring;

- ✓ Evidence of surface staining, discoloring etc. that indicates that discharges have occurred;
- ✓ Pools of water in low lying areas when a rain event has not occurred; and
- ✓ Discussions with operations personnel to understand practices that may lead to unauthorized discharges.

□ If evidence of non-stormwater discharges is discovered:

- ✓ Document the location and circumstances using Worksheets 5 and 6 (Section 2 of the manual), including digital photos;
- ✓ Identify and implement any quick remedy or corrective action (e.g., moving uncovered containers inside or to a proper location); and
- ✓ Develop a plan to eliminate the discharge. Consult the appropriate activity-specific BMP Fact Sheet for alternative approaches to manage and eliminate the discharge.

□ Consult the appropriate activity-specific BMP Fact Sheet for alternative approaches to manage and eliminate the discharge. Make sure the facility SWPPP is up-to-date and includes applicable BMPs to address the non-stormwater discharge.

Other Illegal Discharges (Non visible)

Illicit Connections

□ Locate discharges from the industrial storm drainage system to the municipal storm drain system through review of "as-built" piping schematics.

□ Isolate problem areas and plug illicit discharge points.

□ Locate and evaluate discharges to the storm drain system.

□ Visual Inspection and Inventory:

- ✓ Inventory and inspect each discharge point during dry weather.
- ✓ Keep in mind that drainage from a storm event can continue for a day or two following the end of a storm and groundwater may infiltrate the underground stormwater collection system.
- ✓ Non-stormwater discharges are often intermittent and may require periodic inspections.

Review Infield Piping

□ A review of the "as-built" piping schematic is a way to determine if there are any connections to the stormwater collection system.

- ☐ Inspect the path of loading/unloading area drain inlets and floor drains in older buildings.

- ☐ Never assume storm drains are connected to the sanitary sewer system.

Monitoring for investigation/detection of illegal discharges

- ☐ If a suspected illegal or unknown discharge is detected, monitoring of the discharge may help identify the content and/or suggest the source. This may be done with a field screening analysis, flow meter measurements, or by collecting a sample for laboratory analysis. Section 5 and Appendix D describe the necessary field equipment and procedures for field investigations.

- ☐ Investigative monitoring may be conducted over time. For example if, a discharge is intermittent, then monitoring might be conducted to determine the timing of the discharge to determine the source.

- ☐ Investigative monitoring may be conducted over a spatial area. For example, if a discharge is observed in a pipe, then monitoring might be conducted at accessible upstream locations in order to pinpoint the source of the discharge.

- ☐ Generally, investigative monitoring requiring collection of samples and submittal for lab analysis requires proper planning and specially trained staff.

Smoke Testing

Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two piping systems. Smoke testing is generally performed at a downstream location and the smoke is forced upstream using blowers to create positive pressure. The advantage to smoke testing is that it can potentially identify multiple potential discharge sources at once.

- ☐ Smoke testing uses a harmless, non-toxic smoke cartridges developed specifically for this purpose.

- ☐ Smoke testing requires specialized equipment (e.g., cartridges, blowers) and is generally only appropriate for specially trained staff.

- ☐ A Standard Operating Procedure (SOP) for smoke testing is highly desirable. The SOP should address the following elements:

  - ✓ Proper planning and notification of nearby residents and emergency services is necessary since introducing smoke into the system may result in false alarms;

  - ✓ During dry weather, the stormwater collection system is filled with smoke and then traced back to sources;

- ✓ Temporary isolation of segments of pipe using sand bags is often needed to force the smoke into leaking pipes; and

- ✓ The appearance of smoke in a waste vent pipe, at a sewer manhole, or even the base of a toilet indicates that there may be a connection between the sanitary and storm water systems.

- □ Most municipal wastewater agencies will have necessary staff and equipment to conduct smoke testing and they should be contacted if cross connections with the sanitary sewer are suspected. See SC-44 Drainage System Maintenance for more information.

Dye Testing

- □ Dye testing is typically performed when there is a suspected specific pollutant source and location (i.e., leaking sanitary sewer) and there is evidence of dry weather flows in the stormwater collection system.

- □ Dye is released at a probable upstream source location, either the facility's sanitary or process wastewater system. The dye must be released with a sufficient volume of water to flush the system.

- □ Operators then visually examine the downstream discharge points from the stormwater collection system for the presence of the dye.

- □ Dye testing can be performed informally using commercially available products in order to conduct an initial investigation for fairly obvious cross-connections.

- □ More detailed dye testing should be performed by properly trained staff and follow SOPs. Specialized equipment such as fluorometers may be necessary to detect low concentrations of dye.

- □ Most municipal wastewater agencies will have necessary staff and equipment to conduct dye testing and they should be contacted if cross connections with the sanitary sewer are suspected.

TV Inspection of Drainage System

- □ Closed Circuit Television (CCTV) can be employed to visually identify illicit connections to the industrial storm drainage system. Two types of CCTV systems are available: (1) a small specially designed camera that can be manually pushed on a stiff cable through storm drains to observe the interior of the piping, or (2) a larger remote operated video camera on treads or wheels that can be guided through storm drains to view the interior of the pipe.

- □ CCTV systems often include a high-pressure water jet and camera on a flexible cable. The water jet cleans debris and biofilm off the inside of pipes so the camera can take video images of the pipe condition.

- ☐ CCTV units can detect large cracks and other defects such as offsets in pipe ends caused by root intrusions or shifting substrate.
- ☐ CCTV can also be used to detect dye introduced into the sanitary sewer.
- ☐ CCTV inspections require specialized equipment and properly trained staff and are generally best left to specialized contractors or municipal public works staff.

Illegal Dumping

- ☐ Substances illegally dumped on streets and into the storm drain systems and creeks may include paints, used oil and other automotive fluids, construction debris, chemicals, fresh concrete, leaves, grass clippings, and pet wastes. These wastes can cause stormwater and receiving water quality problems as well as clog the storm drain system itself.
- ☐ Establish a system for tracking incidents. The system should be designed to identify the following:
  - ✓ Illegal dumping hot spots;
  - ✓ Types and quantities (in some cases) of wastes;
  - ✓ Patterns in time of occurrence (time of day/night, month, or year);
  - ✓ Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills);
  - ✓ An anonymous tip/reporting mechanism; and
  - ✓ Evidence of responsible parties (e.g., tagging, encampments, etc.).
- ☐ One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people at the facility who are aware of the problem and who have the tools to at least identify the incident, if not correct it. Therefore, train field staff to recognize and report the incidents.

Once a site has been cleaned:

- ☐ Post "No Dumping" signs with a phone number for reporting dumping and disposal.
- ☐ Landscaping and beautification efforts of hot spots may also discourage future dumping, as well as provide open space and increase property values.
- ☐ Lighting or barriers may also be needed to discourage future dumping.
- ☐ See fact sheet SC-11 Spill Prevention, Control, and Cleanup.

Inspection

- ☐ Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- ☐ Conduct field investigations of the industrial storm drain system for potential sources of non-stormwater discharges.
- ☐ Pro-actively conduct investigations of high priority areas. Based on historical data, prioritize specific geographic areas and/or incident type for pro-active investigations.

Spill and Leak Prevention and Response

- ☐ On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.
- ☐ Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- ☐ Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- ☐ For larger spills, a private spill cleanup company or Hazmat team may be necessary.
- ☐ See SC-11 Spill Prevention Control and Cleanup.

Employee Training Program

- ☐ Training of technical staff in identifying and documenting illegal dumping incidents is required. The frequency of training must be presented in the SWPPP, and depends on site-specific industrial materials and activities.
- ☐ Consider posting a quick reference table near storm drains to reinforce training.
- ☐ Train employees to identify non-stormwater discharges and report discharges to the appropriate departments.
- ☐ Educate employees about spill prevention and cleanup.
- ☐ Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan. Employees should be able to identify work/jobs with high potential for spills and suggest methods to reduce possibility.
- ☐ Determine and implement appropriate outreach efforts to reduce non-permissible non-stormwater discharges.

- ☐ Conduct spill response drills annually (if no events occurred) in order to evaluate the effectiveness of the plan.
- ☐ When a responsible party is identified, educate the party on the impacts of his or her actions.

Quality Assurance and Record Keeping

Performance Evaluation

- ☐ Annually review internal investigation results; assess whether goals were met and what changes or improvements are necessary.
- ☐ Obtain feedback from personnel assigned to respond to, or inspect for, illicit connections and illegal dumping incidents.
- ☐ Develop document and data management procedures.
- ☐ A database is useful for defining and tracking the magnitude and location of the problem.
- ☐ Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained, and cleaned up or eliminated.
- ☐ Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any on-site drainage points observed.
- ☐ Annually document and report the results of the program.
- ☐ Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.
- ☐ Document training activities.

Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended "work-arounds."

- ☐ Many facilities do not have accurate, up-to-date 'as-built' plans or drawings which may be necessary in order to conduct non-stormwater discharge assessments.
  - ✓ Online tools such as Google Earth™ can provide an aerial view of the facility and may be useful in understanding drainage patterns and potential sources of non-stormwater discharges
  - ✓ Local municipal jurisdictions may have useful drainage systems maps.

- Video surveillance cameras are commonly used to secure the perimeter of industrial facilities against break-ins and theft. These surveillance systems may also be useful for capturing illegal dumping activities. Minor, temporary adjustments to the field of view of existing surveillance camera systems to target known or suspected problem areas may be a cost-effective way of capturing illegal dumping activities and identifying the perpetrators.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- Capital facility cost requirements may be minimal unless cross-connections to storm drains are detected.
- Indoor floor drains may require re-plumbing if cross-connections are detected.
- Leaky sanitary sewers will require repair or replacement which can have significant costs depending on the size and industrial activity at the facility.

Maintenance (including administrative and staffing)

- The primary effort is for staff time and depends on how aggressively a program is implemented.
- Costs for containment, and disposal of any leak or discharge is borne by the Discharger.
- Illicit connections can be difficult to locate especially if there is groundwater infiltration.
- Illegal dumping and illicit connection violations requires technical staff to detect and investigate them.

Supplemental Information

Permit Requirements

The IGP authorizes certain Non-Storm Water Discharges (NSWDs) provided BMPs are included in the SWPPP and implemented to:

- Reduce or prevent the contact of authorized NSWDs with materials or equipment that are potential sources of pollutants;
- Reduce, to the extent practicable, the flow or volume of authorized NSWDs;
- Ensure that authorized NSWDs do not contain quantities of pollutants that cause or contribute to an exceedance of a water quality standards (WQS); and,

- Reduce or prevent discharges of pollutants in authorized NSWDs in a manner that reflects best industry practice considering technological availability and economic practicability and achievability."

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Spill Prevention, Control & Cleanup SC-11

Description

Many activities that occur at an industrial or commercial site have the potential to cause accidental spills. Preparation for accidental spills, with proper training and reporting systems implemented, can minimize the discharge of pollutants to the environment.

Spills and leaks are one of the largest contributors of stormwater pollutants. Spill prevention and control plans are applicable to any site at which hazardous materials are stored or used. An effective plan should have spill prevention and response procedures that identify hazardous material storage areas, specify material handling procedures, describe spill response procedures, and provide locations of spill clean-up equipment and materials. The plan should take steps to identify and characterize potential spills, eliminate and reduce spill potential, respond to spills when they occur in an effort to prevent pollutants from entering the stormwater drainage system, and train personnel to prevent and control future spills. An adequate supply of spill clean-up materials must be maintained onsite.

Objectives
■ *Cover*
■ *Contain*
■ *Educate*
■ *Reduce/Minimize*
■ *Product Substitution*

Targeted Constituents	
Sediment	
Nutrients	
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Minimum BMPs Covered	
Good Housekeeping	
Preventative Maintenance	
Spill and Leak Prevention and Response	✓
Material Handling & Waste Management	
Erosion and Sediment Controls	
Employee Training Program	✓
Quality Assurance Record Keeping	✓

Approach

General Pollution Prevention Protocols

- ☐ Develop procedures to prevent/mitigate spills to storm drain systems.
- ☐ Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.
- ☐ Establish procedures and/or controls to minimize spills and leaks. The procedures should address:
  - ✓ Description of the facility, owner and address, activities, chemicals, and quantities present;

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- ✓ Facility map of the locations of industrial materials;
- ✓ Notification and evacuation procedures;
- ✓ Cleanup instructions;
- ✓ Identification of responsible departments; and
- ✓ Identify key spill response personnel.

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

Spill and Leak Prevention and Response

Spill Prevention

- □ Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- □ If illegal dumping is observed at the facility:
  - ✓ Post "No Dumping" signs with a phone number for reporting illegal dumping and disposal. Signs should also indicate fines and penalties applicable for illegal dumping.
  - ✓ Landscaping and beautification efforts may also discourage illegal dumping.
  - ✓ Bright lighting and/or entrance barriers may also be needed to discourage illegal dumping.

- □ 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.

- □ If the liquid is oil, gas, or other material that separates from and floats on water, install a spill control device (such as a tee section) in the catch basins that collects runoff from the storage tank area.

Preventative Maintenance

- □ Place drip pans or absorbent materials beneath all mounted taps, and at all potential drip and spill locations during filling and unloading of tanks. Any collected liquids or soiled absorbent materials must be reused/recycled or properly disposed.

- □ Store and maintain appropriate spill cleanup materials in a location known to all near the tank storage area; and ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.

- ☐ Sweep and clean the storage area monthly if it is paved, *do not hose down the area to a storm drain.*

- ☐ 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. Collect all spilled liquids and properly dispose of them.

- ☐ 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).

- ☐ Identify key spill response personnel.

Spill Response

- ☐ Clean up leaks and spills immediately.

- ☐ Place a stockpile of spill cleanup materials where it will be readily accessible (e.g., near storage and maintenance areas).

- ☐ On paved surfaces, clean up spills with as little water as possible.

  - ✓ Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills.

  - ✓ If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.

  - ✓ If possible use physical methods for the cleanup of dry chemicals (e.g., brooms, shovels, sweepers, or vacuums).

- ☐ Never hose down or bury dry material spills. Sweep up the material and dispose of properly.

- ☐ Chemical cleanups of material can be achieved with the use of adsorbents, gels, and foams. Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.

- ☐ For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Reporting

- ☐ Report spills that pose an immediate threat to human health or the environment to the Regional Water Quality Control Board or local authority as location regulations dictate.
- ☐ 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 800-424-8802 (24 hour).
- ☐ Report spills to 911 for dispatch and clean-up assistance when needed. Do not contact fire agencies directly.
- ☐ Establish a system for tracking incidents. The system should be designed to identify the following:
  - ✓ Types and quantities (in some cases) of wastes;
  - ✓ Patterns in time of occurrence (time of day/night, month, or year);
  - ✓ Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills);
  - ✓ Clean-up procedures; and
  - ✓ Responsible parties.

Employee Training Program

- ☐ Educate employees about spill prevention and cleanup.
- ☐ Well-trained employees can reduce human errors that lead to accidental releases or spills:
  - ✓ The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur; and
  - ✓ Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- ☐ Employees should be educated about aboveground storage tank requirements. Employees responsible for aboveground storage tanks and liquid transfers should be thoroughly familiar with the Spill Prevention Control and Countermeasure Plan and the plan should be readily available.
- ☐ Train employees to recognize and report illegal dumping incidents.

Other Considerations (Limitations and Regulations)

- State regulations exist for facilities with a storage capacity of 10,000 gallons or more of petroleum to prepare a Spill Prevention Control and Countermeasure (SPCC) Plan (Health & Safety Code Chapter 6.67).
- State regulations also exist for storage of hazardous materials (Health & Safety Code Chapter 6.95), including the preparation of area and business plans for emergency response to the releases or threatened releases.
- Consider requiring smaller secondary containment areas (less than 200 sq. ft.) to be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

Requirements

Costs (including capital and operation & maintenance)

- Will vary depending on the size of the facility and the necessary controls.
- Prevention of leaks and spills is inexpensive. Treatment and/or disposal of contaminated soil or water can be quite expensive.

Maintenance (including administrative and staffing)

- Develop spill prevention and control plan, provide and document training, conduct inspections of material storage areas, and supply spill kits.
- Extra time is needed to properly handle and dispose of spills, which results in increased labor costs.

Supplemental Information

Further Detail of the BMP

Reporting

Record keeping and internal reporting represent good operating practices because they can increase the efficiency of the facility and the effectiveness of BMPs. A good record keeping system helps the facility minimize incident recurrence, correctly respond with appropriate cleanup activities, and comply with legal requirements. A record keeping and reporting system should be set up for documenting spills, leaks, and other discharges, including discharges of hazardous substances in reportable quantities. Incident records describe the quality and quantity of non-stormwater discharges to the storm sewer. These records should contain the following information:

- Date and time of the incident;
- Weather conditions;
- Duration of the spill/leak/discharge;

- Cause of the spill/leak/discharge;
- Response procedures implemented;
- Persons notified; and
- Environmental problems associated with the spill/leak/discharge.

Separate record keeping systems should be established to document housekeeping and preventive maintenance inspections, and training activities. All housekeeping and preventive maintenance inspections should be documented. Inspection documentation should contain the following information:

- Date and time the inspection was performed;
- Name of the inspector;
- Items inspected;
- Problems noted;
- Corrective action required; and
- Date corrective action was taken.

Other means to document and record inspection results are field notes, timed and dated photographs, videotapes, and drawings and maps.

Aboveground Tank Leak and Spill Control

Accidental releases of materials from aboveground liquid storage tanks present the potential for contaminating stormwater with many different pollutants. Materials spilled, leaked, or lost from tanks may accumulate in soils or on impervious surfaces and be carried away by stormwater runoff.

The most common causes of unintentional releases are:

- Installation problems;
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves);
- External corrosion and structural failure;
- Spills and overfills due to operator error; and
- Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa.

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Practices listed below should be employed to enhance the code requirements:

- Tanks should be placed in a designated area.
- Tanks located in areas where firearms are discharged should be encapsulated in concrete or the equivalent.
- Designated areas should be impervious and paved with Portland cement concrete, free of cracks and gaps, in order to contain leaks and spills.
- Liquid materials should be stored in UL approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10 percent of the volume of all of the containers or 110 percent 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, a dead-end sump should be installed in the drain.
- All other liquids 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.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine inspections and:

- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanges, coupling, hoses, and valves).
- Check for leaks or spills during pumping of liquids or gases from truck or rail car 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.
- Frequently relocate accumulated stormwater during the wet season.

- ☐ Periodically conduct integrity testing by a qualified professional.

Vehicle Leak and Spill Control

Major spills on roadways and other public areas are generally handled by highly trained Hazmat teams from local fire departments or environmental health departments. The measures listed below pertain to leaks and smaller spills at vehicle maintenance shops.

In addition to implementing the spill prevention, control, and clean up practices above, use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- ☐ Perform all vehicle fluid removal or changing inside or under cover to prevent the run-on of stormwater and the runoff of spills.
- ☐ Regularly inspect vehicles and equipment for leaks, and repair immediately.
- ☐ Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- ☐ Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- ☐ Immediately drain all fluids from wrecked vehicles.
- ☐ Store wrecked vehicles or damaged equipment under cover.
- ☐ Place drip pans or absorbent materials under heavy equipment when not in use.
- ☐ Use absorbent materials on small spills rather than hosing down the spill.
- ☐ Remove the adsorbent materials promptly and dispose of properly.
- ☐ Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- ☐ Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.
- ☐ Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- ☐ Design the fueling area to prevent the run-on of stormwater and the runoff of spills:

  Cover fueling area if possible.

  Use a perimeter drain or slope pavement inward with drainage to a sump.

  Pave fueling area with concrete rather than asphalt.

- ☐ If dead-end sump is not used to collect spills, install an oil/water separator.
- ☐ Install vapor recovery nozzles to help control drips as well as air pollution.
- ☐ Discourage "topping-off' of fuel tanks.
- ☐ Use secondary containment when transferring fuel from the tank truck to the fuel tank.
- ☐ Use absorbent materials on small spills and general cleaning rather than hosing down the area. Remove the absorbent materials promptly.
- ☐ Carry out all Federal and State requirements regarding underground storage tanks, or install above ground tanks.
- ☐ Do not use mobile fueling of mobile industrial equipment around the facility; rather, transport the equipment to designated fueling areas.
- ☐ Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- ☐ Train employees in proper fueling and cleanup procedures.

Industrial Spill Prevention Response

For the purposes of developing a spill prevention and response program to meet the stormwater regulations, facility managers should use information provided in this fact sheet and the spill prevention/response portions of the fact sheets in this handbook, for specific activities.

The program should:

- ☐ Integrate with existing emergency response/hazardous materials programs (e.g., Fire Department).
- ☐ Develop procedures to prevent/mitigate spills to storm drain systems.
- ☐ Identify responsible departments.

- ☐ Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.
- ☐ Address spills at municipal facilities, as well as public areas.
- ☐ Provide training concerning spill prevention, response and cleanup to all appropriate personnel.

References and Resources

California's Nonpoint Source Program Plan. http://www.swrcb.ca.gov/nps/index.html.

Clark County Storm Water Pollution Control Manual. Available online at: http://www.co.clark.wa.us/pubworks/bmpman.pdf.

King County Storm Water Pollution Control Manual. Available online at: http://dnr.metrokc.gov/wlr/dss/spcm.htm.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities

Santa Clara Valley Urban Runoff Pollution Prevention Program. http://www.scvurppp.org.

The Stormwater Managers Resource Center. http://www.stormwatercenter.net/.

Vehicle and Equipment Repair SC-22

Description

Vehicle or equipment maintenance and repair are potentially significant sources of stormwater pollution, due to use of harmful materials and wastes during maintenance and repair processes. Engine repair and service (e.g., parts cleaning), replacement of fluids (e.g., oil change), and outdoor equipment storage and parking (leaking vehicles) can impact water quality if stormwater runoff from areas with these activities becomes polluted by a variety of contaminants. Implementation of the following activities must be done where applicable to prevent or reduce the discharge of pollutants to stormwater from vehicle and equipment maintenance and repair activities.

Approach

The BMP approach is to reduce the potential for pollutant discharges through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives. General pollution prevention protocols are presented followed by applicable minimum BMPs as required by the Industrial General Permit.

General Pollution Prevention Protocols

- ☐ Designate a vehicle maintenance area designed to prevent stormwater pollution.
- ☐ Minimize contact of stormwater with outside operations through berming and appropriate drainage routing.
- ☐ Keep accurate maintenance logs to evaluate materials removed and improvements made.
- ☐ Switch to non-toxic chemicals for maintenance when possible.
- ☐ Choose cleaning agents that can be recycled.
- ☐ Use drop cloths and drip pans.

Objectives
■ *Cover*
■ *Contain*
■ *Educate*
■ *Reduce/Minimize*
■ *Product Substitution*

Targeted Constituents	
Sediment	
Nutrients	
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Minimum BMPs Covered	
Good Housekeeping	✓
Preventative Maintenance	✓
Spill and Leak Prevention and Response	✓
Material Handling & Waste Management	✓
Erosion and Sediment Controls	
Employee Training Program	✓
Quality Assurance Record Keeping	✓

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- ☐ Minimize use of solvents. Clean parts without using solvents whenever possible, or use water-based solvents for cleaning.
- ☐ Recycle used motor oil, diesel oil, and other vehicle fluids and parts whenever possible.

Operational Protocols

General

- ☐ Move maintenance and repair activities indoors whenever feasible.
- ☐ Place curbs around the immediate boundaries of process equipment.

Good Housekeeping

- ☐ Store idle equipment under cover
- ☐ Use a vehicle maintenance area designed to prevent stormwater pollution - minimize contact of stormwater with outside operations through berming and appropriate drainage routing.
- ☐ Avoid hosing down your work areas. If work areas are washed, collect and direct wash water to sanitary sewer. Use dry sweeping if possible.
- ☐ Paint signs on storm drain inlets to indicate that they are not to receive liquid or solid wastes.
- ☐ Post signs at sinks to remind employees not to pour wastes down drains.
- ☐ Clean yard storm drain inlets(s) regularly and especially after large storms.
- ☐ Do not pour materials down storm drains.
- ☐ Cover the work area to limit exposure to rain.
- ☐ Place curbs around the immediate boundaries of process equipment.
- ☐ Build a shed or temporary roof over areas where parked cars await repair or salvage, especially wrecked vehicles. Build a roof over vehicles kept for parts.

Preventive Maintenance and Repair Activities

- ☐ Provide a designated area for vehicle maintenance.
- ☐ Inspect vehicles and equipment for leaks regularly and repair immediately.
- ☐ Make sure incoming vehicles are checked for leaking oil and fluids. Do not allow leaking vehicles or equipment on-site without correcting the source of the leak and cleaning up any spill.
- ☐ Keep equipment clean; don't allow excessive build-up of oil and grease.

- ☐ Perform all vehicle fluid removal or changing inside or under cover if possible to prevent the run-on of stormwater and the runoff of spills.

- ☐ 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 outside. Collected drips and spills must be disposed, reused, or recycled properly.

- ☐ It is important to sweep the maintenance area weekly, if it is paved, to collect loose particles, and wipe up spills with rags and other absorbent material immediately. Do not hose down the area to a storm drain.

- ☐ Establish standard procedures to prevent spillage/leakage of fluids including:

  - ✓ Keep a drip pan under the vehicle while you unclip hoses, unscrew filters, or remove other parts. Use a drip pan under any vehicle that might leak while working on it to keep splatters or drips off the shop floor.

  - ✓ Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.

  - ✓ Keep drip pans or containers under vehicles or equipment that may drip during repairs.

  - ✓ Do not change motor oil or perform equipment maintenance in non-appropriate areas.

- ☐ Drain oil and other fluids first if the vehicle or equipment is to be stored outdoors. Elevate and tarp stored vehicles and equipment.

- ☐ Monitor parked vehicles closely for leaks. Pans should be placed under any leaks to collect the fluids for proper disposal or recycling.

- ☐ Mechanics should clean vehicle parts without using liquid cleaners wherever possible to reduce waste.

- ☐ Steam cleaning and pressure washing may be used instead of solvent parts cleaning. The wastewater generated from steam cleaning must be discharged to an on-site oil water separator that is connected to a sanitary sewer or blind sump. Non-caustic detergents should be used instead of caustic cleaning agents, detergent-based or water-based cleaning systems in place of organic solvent degreasers, and non-chlorinated solvent in place of chlorinated organic solvents for parts cleaning. Refer to SC21 for more information on steam cleaning.

- ☐ Fifth-wheel bearings on trucks require routine lubrication. Typically chassis grease is applied to the fifth-wheel bearing at rates that result in grease dripping off of the bearing into the environment. To address this concern the following options are available:

  - ✓ Use specialized lubricants with good adhesion (e.g., stay in place) properties. Carefully follow manufacturer's label regarding the use of adhesive lubricant for

truck fifth-wheels. Typically this means applying no more than 8 oz. of grease. No visible extrusion of lubricant from the fifth-wheel bearing when truck and trailer are connected should be present.

- ✓ Use on-board truck or on-board trailer automatic lubrication systems. If these systems apply lube thinner than National Grease Lubrication Institute #2, equipment for collection of used lubricant is needed to prevent excess lubricant from dripping off the truck.
- ✓ Use plastic or Teflon plates instead of grease or other lubricants. Carefully follow manufacturer's instructions for installation and operation.

- □ Use one of the following for lubricating vehicle-trailer coupling:
  - ✓ Specialized adhesive lubricants;
  - ✓ Grease-free fifth wheel slip plates (e.g., plastic or Teflon coatings); and
  - ✓ On-Board automatic lubricating systems.

Spill and Leak Prevention and Response Procedures

- □ Keep your spill prevention and control plan up-to-date.
- □ Place an adequate stockpile of spill cleanup materials where it will be readily accessible.
- □ Clean leaks, drips, and other spills with as little water as possible. Use rags for small spills, a damp mop for general cleanup, and dry absorbent material for larger spills. Use the following three-step method for cleaning floors:
  - ✓ Clean spills with rags or other absorbent materials;
  - ✓ Sweep floor using dry absorbent material; and
  - ✓ Mop the floor.

  Mop water may be discharged to the sanitary sewer via a toilet or sink.
- □ Remove the adsorbent materials promptly and dispose of properly when using adsorbent materials on small spills.

Material Handling and Waste Management

- □ Designate a special area to drain and replace motor oil, coolant, and other fluids, where there are no connections to the storm drain or the sanitary sewer, and drips and spills can be easily cleaned up.
- □ Drain all fluids immediately from wrecked vehicles. 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).

- ☐ Do not pour liquid waste to floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections.
- ☐ Do not put used or leftover cleaning solutions, solvents, and automotive fluids and in the sanitary sewer.
- ☐ Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separate.
- ☐ Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.
- ☐ Place oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal since municipalities prohibit or discourage disposal of these items in solid waste facilities.
- ☐ Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters. Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater.
- ☐ Store cracked batteries in a non-leaking secondary container and dispose of properly at recycling or household hazardous waste facilities.

Employee Training Program

- ☐ Train employees and contractors in the proper handling and disposal of engine fluids and waste materials.
- ☐ Employees should have the tools and knowledge to immediately begin cleaning up a spill should one occur.
- ☐ Conduct annual training to ensure that employees are familiar with the facility's spill control plan and/or proper spill cleanup procedures (You can use reusable cloth rags to clean up small drips and spills instead of disposables; these can be washed by a permitted industrial laundry. Do not clean them at home or at a coin-operated laundry business).
- ☐ Use a training log or similar method to document training.

Quality Assurance and Recordkeeping

- ☐ Keep accurate maintenance logs to evaluate materials removed and improvements made.
- ☐ Establish procedures to collect and file maintenance logs in the central office.

Other Facility-Specific Considerations

Parts Cleaning

Vehicle and equipment maintenance facilities often must clean parts as a part of day-today operations. The following activities should be considered:

- ☐ Clean vehicle parts without using liquid cleaners wherever possible to reduce waste.
- ☐ Steam cleaning and pressure washing may be used instead of solvent parts cleaning.
- ☐ Wastewater generated from steam cleaning must be discharged to an on-site oil water separator that is connected to a sanitary sewer or blind sump.
- ☐ Use non-caustic detergents instead of caustic cleaning agents, detergent-based or water-based cleaning systems in place of organic solvent degreasers, and non-chlorinated solvent in place of chlorinated organic solvents for parts cleaning. Refer to SC21 for more information on steam cleaning.

Potential Limitations and Work-Arounds

- ☐ Some facilities may have space constraints and time limitations that may preclude all work from being conducted indoors.
  - ✓ Designate specific areas for outdoor activities.
  - ✓ Require employees to understand and follow preventive maintenance and spill and leak prevention BMPs.
- ☐ It may not be possible to contain and clean up spills from vehicles/equipment brought on-site after working hours.
  - ✓ Provide a designated area for afterhours deliveries.
  - ✓ Install spill kits.
- ☐ Drain pans (usually 1 ft. x 1 ft.) are generally too small to contain antifreeze
  - ✓ Purchase or fabricate large drip pans (3 ft. x 3 ft.) with sufficient volume to contain expected quantities of liquids based on equipment/vehicle specifications.
- ☐ Dry floor cleaning methods may not be sufficient for some spills.
  - ✓ Use three-step method instead.
- ☐ Identification of engine leaks may require some use of solvents.
  - ✓ Minimize the use of solvents and use drip pans to collect spills and leaks.
- ☐ Prices for recycled materials and fluids may be higher than those of non-recycled materials.

- Some facilities may be limited by a lack of providers of recycled materials, and by the absence of businesses to provide services such as hazardous waste removal, structural treatment practice maintenance, or solvent equipment and solvent recycling.

Potential Facilities and Maintenance Requirements

Facilities Requirements

- For facilities that already have covered areas where maintenance takes place, have berms or other means to retain spills and leaks, and/ have other appropriate constructed systems for containment, there may not need to be any significant new capital investment. Capital costs will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

Maintenance Requirements

- Most of the operations and maintenance activity associated with implementing this BMP are integrally linked to routine operations as previously described. Therefore, significant additional operations and maintenance efforts are not likely to be required.

- For facilities responsible for pre-treating their wastewater prior to discharging, the proper functioning of structural treatment system is an important maintenance consideration. Routine cleanout of oil and grease is required for the 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 on a regular basis to keep the device working efficiently.

- It is important to sweep the maintenance area weekly, if it is paved, to collect loose particles, and wipe up spills with rags and other absorbent material immediately. Do not hose down the area to a storm drain.

Supplemental Information

Waste Reduction

Parts are often cleaned using solvents such as trichloroethylene, 1,1,1-trichloroethane or methylene chloride. Many of these cleaners are harmful and must be disposed of as a hazardous waste. Cleaning without using liquid cleaners (e.g., wire brush) whenever possible reduces waste. Prevent spills and drips of solvents and cleansers to the shop floor. 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. Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents.

- Clean parts without using liquid cleaners whenever possible to reduce waste.

- Prevent spills and drips of solvents and cleansers to the shop floor.

- ☐ 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.

Recycling

Separating wastes allows for easier recycling and may reduce treatment costs. Keep hazardous and non-hazardous wastes separate, do not mix used oil and solvents, and keep chlorinated solvents (e.g., 1,1,1-trichloroethane) separate from non-chlorinated solvents (e.g., kerosene and mineral spirits).

Many products made of recycled (i.e., refined or purified) materials are available. Engine oil, transmission fluid, antifreeze, and hydraulic fluid are available in recycled form. Buying recycled products supports the market for recycled materials.

- ☐ Recycling is always preferable to disposal of unwanted materials.

- ☐ 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).

- ☐ Purchase recycled products to support the market for recycled materials.

Safer Alternatives

If possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous material:

- ☐ Use non-caustic detergents instead of caustic cleaning for parts cleaning.

- ☐ Use detergent-based or water-based cleaning systems in place of organic solvent degreasers. Wash water may require treatment before it can be discharged to the sewer.

- ☐ Replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check list of active ingredients to see whether it contains chlorinated solvents.

- ☐ Choose cleaning agents that can be recycled.

References and Resources

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities.

Oregon Department of Environmental Quality, 2013. *Industrial Stormwater Best Management Practices Manual- BMP 8 Vehicle, Pavement and Building Washing.* Available online at: http://www.deq.state.or.us/wq/wqpermit/docs/IndBMP021413.pdf.

Sacramento Stormwater Management Program. *Best Management Practices for Industrial Storm Water Pollution Control.* Available online at: http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf.

Sacramento County Environmental Management Stormwater Program: Best Management Practices –Vehicle Washing. Available online at: http://www.emd.saccounty.net/EnvHealth/Stormwater/Stormwater-BMPs.html.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp-w2k.com/.

US EPA, National Pollutant Discharge Elimination System – Stormwater Menu of BMPs - Municipal Vehicle and Equipment Washing. Available online at: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=132.

Washington State Department of Ecology, 2012. *Vehicle and Equipment Washwater Discharges Best Management Practices Manual.* Publication no. WQ-R-95-056. Available online at: https://fortress.wa.gov/ecy/publications/publications/95056.pdf.

Outdoor Loading/Unloading SC-30

Description

The loading/unloading of materials usually takes place outside on docks or terminals; therefore, materials spilled, leaked, or lost during loading/unloading may collect in the soil or on other surfaces and have the potential to be carried away by wind, stormwater runoff or when the area is cleaned. Additionally, rainfall may wash pollutants from machinery used to unload or move materials. Implementation of the following protocols will prevent or reduce the discharge of pollutants to stormwater from outdoor loading/unloading of materials.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols

- ☐ Park tank trucks or delivery vehicles in designated areas so that spills or leaks can be contained.
- ☐ Limit exposure of material to rainfall whenever possible.
- ☐ Prevent stormwater run-on.
- ☐ Check equipment regularly for leaks.

Good Housekeeping

- ☐ Develop an operations plan that describes procedures for loading and/or unloading.
- ☐ Conduct loading and unloading in dry weather if possible.

Objectives
■ *Cover*
■ *Contain*
■ *Educate*
■ *Reduce/Minimize*
■ *Product Substitution*

Targeted Constituents	
Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Minimum BMPs Covered	
Good Housekeeping	✓
Preventative Maintenance	
Spill and Leak Prevention and Response	✓
Material Handling & Waste Management	✓
Erosion and Sediment Controls	
Employee Training Program	✓
Quality Assurance Record Keeping	✓

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- ☐ 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.
- ☐ Design loading/unloading area to prevent stormwater run-on, which would include grading or berming the area, and position roof downspouts so they direct stormwater away from the loading/unloading areas.
- ☐ Have employees load and unload all materials and equipment in covered areas such as building overhangs at loading docks if feasible.
- ☐ Load/unload only at designated loading areas.
- ☐ Use drip pans underneath hose and pipe connections and other leak-prone spots during liquid transfer operations, and when making and breaking connections. Several drip pans should be stored in a covered location near the liquid transfer area so that they are always available, yet protected from precipitation when not in use. Drip pans can be made specifically for railroad tracks. Drip pans must be cleaned periodically, and drip collected materials must be disposed of properly.
- ☐ Pave loading areas with concrete instead of asphalt.
- ☐ Avoid placing storm drains inlets in the area.
- ☐ Grade and/or berm the loading/unloading area with drainage to sump; regularly remove materials accumulated in sump.

Spill Response and Prevention Procedures

- ☐ Keep your spill prevention and control plan up-to-date or have an emergency spill cleanup plan readily available, as applicable.
- ☐ Contain leaks during transfer.
- ☐ Store and maintain appropriate spill cleanup materials in a location that is readily accessible and known to all employees.
- ☐ Ensure that employees are familiar with the site's spill control plan and proper spill cleanup procedures.
- ☐ Use drip pans or comparable devices when transferring oils, solvents, and paints.

Material Handling and Waste Management

- ☐ Spot clean leaks and drips routinely to prevent runoff of spillage.
- ☐ Do not pour liquid wastes into floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections.

- ☐ Do not put used or leftover cleaning solutions, solvents, and automotive fluids in the storm drain or sanitary sewer.
- ☐ Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separate.
- ☐ Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.
- ☐ Minimize the possibility of stormwater pollution from outside waste receptacles by doing at least one of the following:
  - ✓ Use only watertight waste receptacle(s) and keep the lid(s) closed.
  - ✓ Grade and pave the waste receptacle area to prevent run-on of stormwater.
  - ✓ Install a roof over the waste receptacle area.
  - ✓ Install a low containment berm around the waste receptacle area.
  - ✓ Use and maintain drip pans under waste receptacles.
- ☐ Post "no littering" signs.
- ☐ Perform work area clean-up and dry sweep after daily operations.

Employee Training Program

- ☐ Train employees (e.g., fork lift operators) and contractors on proper spill containment and cleanup.
- ☐ Have employees trained in spill containment and cleanup present during loading/unloading.
- ☐ Train employees in proper handling techniques during liquid transfers to avoid spills.
- ☐ Make sure forklift operators are properly trained on loading and unloading procedures.

Quality Assurance and Record Keeping

- ☐ Keep accurate maintenance logs that document activities performed, quantities of materials removed, and improvement actions.
- ☐ Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- ☐ Establish procedures to complete logs and file them in the central office.
- ☐ Keep accurate logs of daily clean-up operations.

Potential Limitations and Work-Arounds

Some facilities may have space constraints, limited staffing and time limitations that may preclude implementation of BMPs. Provided below are typical limitations and recommended "work-arounds."

- ☐ Space and time limitations may preclude all transfers from being performed indoors or under cover.
  - ✓ Designate specific areas for outdoor loading and unloading.
  - ✓ Require employees to understand and follow spill and leak prevention BMPs.
- ☐ It may not be possible to conduct transfers only during dry weather.
  - ✓ Limit materials and equipment rainfall exposure to all extents practicable.
  - ✓ Require employees to understand and follow spill and leak prevention BMPs.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

Many facilities will already have indoor or covered areas where loading/unloading takes place and will require no additional capital expenditures.

If outdoor activities are required, construction of berms or other means to retain spills and leaks may require appropriate constructed systems for containment. These containment areas may require significant new capital investment.

Capital investments will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

Maintenance

Most of the operations and maintenance activities associated with implementing this BMP are integrally linked to routine operations as previously described. Therefore additional O&M is not required.

- ☐ 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.

Supplemental Information

Loading and Unloading of Liquids

- ☐ Loading or unloading of liquids should occur in the manufacturing building so that any spills that are not completely retained can be discharged to the sanitary sewer,

treatment plant, or treated in a manner consistent with local sewer authorities and permit requirements.

- □ For loading and unloading tank trucks to above and below ground storage tanks, the following procedures should be used:
  - ✓ The area where the transfer takes place should be paved. If the liquid is reactive with the asphalt, Portland cement should be used to pave the area.
  - ✓ The transfer area should be designed to prevent run-on of stormwater from adjacent areas. Sloping the pad and using a curb, like a speed bump, around the uphill side of the transfer area should reduce run-on.
  - ✓ The transfer area should be designed to prevent runoff of spilled liquids from the area. Sloping the area to a drain should prevent runoff. The drain should be connected to a dead-end sump or to the sanitary sewer. A positive control valve should be installed on the drain.
- □ For transfer from rail cars to storage tanks that must occur outside, use the following procedures:
  - ✓ Drip pans should be placed at locations where spillage may occur, such as hose connections, hose reels, and filler nozzles. Use drip pans when making and breaking connections.
  - ✓ Drip pan systems should be installed between the rails to collect spillage from tank cars.

References and Resources

Minnesota Pollution Control Agency, *Industrial Stormwater Best Management Practices Guidebook BMP 26 Fueling and Liquid Loading/Unloading Operations.* Available online at: http://www.pca.state.mn.us/index.php/view-document.html?gid=10557.

New Jersey Department of Environmental Protection, 2013. *Basic Industrial Stormwater General Permit Guidance Document NJPDES General Permit No NJ0088315.* Available online at: http://www.nj.gov/dep/dwq/pdf/5G2_guidance_color.pdf.

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Outdoor Liquid Container Storage SC-31

Description

Accidental releases of materials from above ground liquid storage tanks, drums, and dumpsters present the potential for contaminating stormwater with many different pollutants. Tanks may store many potential stormwater runoff pollutants, such as gasoline, aviation gas, diesel fuel, kerosene, oils, greases, lubricants and other distilled, blended and refined products derived from crude petroleum. Materials spilled, leaked, or lost from storage tanks may accumulate in soils or on other surfaces and be carried away by rainfall runoff. These source controls apply to containers located outside of a building used to temporarily store liquid materials and include installing safeguards against accidental releases, installing secondary containment, conducting regular inspections, and training employees in standard operating procedures and spill cleanup techniques.

Objectives
■ *Cover*
■ *Contain*
■ *Educate*
■ *Reduce/Minimize*

Targeted Constituents	
Sediment	
Nutrients	✓
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Minimum BMPs Covered	
Good Housekeeping	
Preventative Maintenance	✓
Spill and Leak Prevention and Response	✓
Material Handling & Waste Management	✓
Erosion and Sediment Controls	
Employee Training Program	✓
Quality Assurance Record Keeping	✓

Approach

General Pollution Prevention Protocols

- ☐ Educate employees about pollution prevention measures and goals.
- ☐ Keep an accurate, up-to-date inventory of the materials delivered and stored on-site.
- ☐ Try to keep chemicals in their original containers, and keep them well labeled.
- ☐ Develop an operations plan that describes procedures for loading and/or unloading. Refer to SC-30 Outdoor Loading/Unloading of Materials for more detailed BMP information pertaining to loading and unloading of liquids.
- ☐ Protect materials from rainfall, run-on, runoff, and wind dispersal:
  - ✓ Cover the storage area with a roof.

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- ✓ Minimize stormwater run-on by enclosing the area or building a berm around it.
- ✓ Use a walled structure for storage of liquid containers.
- ✓ Use only watertight containers and keep the lids closed.

- □ Employ safeguards against accidental releases:
  - ✓ Provide 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.
  - ✓ Provide clear tagging or labeling, and restrict access to valves to reduce human error.
  - ✓ Berm or surround tank or container with secondary containment system, including dikes, liners, vaults, or double walled tanks.
  - ✓ Be aware and ready to address the fact that some municipalities require secondary containment areas to be connected 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.
  - ✓ Have registered and specifically trained professional engineers identify and correct potential problems such as loose fittings, poor welding, and improper or poorly fitted gaskets for newly installed tank systems.
- □ Use MSDSs to ID hazardous components and keep incompatible products apart and to list/have available appropriate PPE and clean-up products.

Good Housekeeping

- □ 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.
- □ Provide barriers such as posts or guardrails, where tanks are exposed, to prevent collision damage with vehicles.
- □ Provide secure storage to prevent vandalism-caused contamination.
- □ Place tight-fitting lids on containers.

- ☐ Enclose or cover the containers where they are stored.
- ☐ Raise the containers off the ground by use of pallet or similar method, with provisions for spill control.
- ☐ Do not store liquid containers near the storm drainage system or surface waters.
- ☐ Sweep and clean the storage area regularly if it is paved, do not hose down the area to a storm drain.

Preventative Maintenance

- ☐ Inspect storage areas regularly for leaks or spills.
- ☐ Conduct routine inspections and check for external corrosion of material containers. Also check for structural failure, spills and overfills due to operator error, failure of piping system.
- ☐ Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.
- ☐ Visually 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.
- ☐ 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.

Spill Response and Prevention Procedures

- ☐ Keep your spill prevention and control plan up-to-date.
- ☐ Maintain an adequate stockpile of spill cleanup materials at locations where it will be readily accessible.
- ☐ Have an emergency plan, equipment, and trained personnel ready at all times to deal immediately with major spills.
- ☐ Collect spilled liquids and properly dispose of them.
- ☐ Remove the adsorbent materials promptly and dispose of properly when using adsorbent materials on small spills.
- ☐ Have employees trained in emergency spill cleanup procedures present when dangerous waste, liquid chemicals, or other wastes are delivered.

- Prevent operator errors by using engineering safeguards and thus reducing accidental releases of pollutants.

Material Handling and Waste Management

- Contain the material in such a manner that if the container leaks or spills, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters or groundwater.
- Place drip pans or absorbent materials beneath mounted container taps, and at potential drip and spill locations during filling and unloading of containers. Any collected liquids or soiled absorbent materials must be reused/recycled or properly disposed.
- Ensure that any underground or aboveground storage tanks are designed and managed in accordance with applicable regulations, identified as a potential pollution source, and have secondary containment such as a berm or dike with an impervious surface.
- Do not pour liquids into floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections.
- Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separate.
- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.

Employee Training Program

- Train employee (e.g., fork lift operators) and contractors in proper spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur.
- Train employees in proper spill response and prevention, materials handling, and waste management.
- Use a training log or similar method to document training.

Quality Assurance and Record Keeping

- Keep accurate maintenance/inspection logs that document minimum BMP activities performed for liquid container storage and improvement actions.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Establish procedures to complete logs and file them in the central office.

Other Facility-Specific Considerations

- Storage sheds often must meet building and fire code requirements.

- 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 Plan (SPCC) Plan;
  - ✓ Secondary containment;
  - ✓ Integrity and leak detection monitoring; and
  - ✓ Emergency preparedness plans.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- Capital investments such as sheds, covers, dikes, and curbs will likely be required at some sites if adequate cover and containment facilities do not exist and can vary significantly depending upon site conditions.

Maintenance

- Most of the operations and maintenance activities associated with implementing this BMP are integrally linked to routine operations as previously described. Therefore additional O&M is not required.
- Conduct regular inspections and make repairs and improvements as necessary.
- Conduct regular broom dry-sweeping of area. Do not wash with water.

Supplemental Information

The most common causes of unintentional releases are:

- Installation problems;
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves);
- External corrosion and structural failure;
- Spills and overfills due to operator error; and
- Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa.

Aboveground Tank Leak and Spill Control

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Practices listed below should be employed to enhance the code requirements:

- Tanks should be placed in a designated area.
- Tanks located in areas where firearms are discharged should be encapsulated in concrete or the equivalent.
- Designated areas should be paved with Portland cement concrete, free of cracks and gaps, and impervious in order to contain leaks and spills.
- Liquid materials should be stored in UL approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10% 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, a dead-end sump should be installed in the drain.
- Other liquids 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.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine weekly inspections and:

- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanger, coupling, hoses, and valves).
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.
- Inspect new tank or container installation visually 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.
- Frequently release accumulated stormwater during the wet season.
- Have periodic integrity testing conducted by a qualified professional.

Dikes

One of the best protective measures against contamination of stormwater is the use of dikes. Containment dikes are berms or retaining walls that are designed to hold spills. Use of dikes is an effective pollution prevention measure for above ground storage tanks and railcar or tank truck loading and unloading areas. The dike surrounds the area of concern and holds the spill, keeping spill materials separated from the stormwater side of the dike area. Diking can be used in any industrial or municipal facility, but it is most commonly used for controlling large spills or releases from liquid storage areas and liquid transfer areas.

- For single-wall tanks, containment dikes should be large enough to hold the contents of the storage tank for the facility plus rain water.
- 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.
- Where strong acids or bases or 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 to insure the dikes are capable of holding spills should be conducted.
- Inability of a structure to retain stormwater, dike erosion, soggy areas, or changes in vegetation indicate 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 stormwater after precipitation events and dispose of according to local regulations.

Curbing

Curbing is a barrier that surrounds an area of concern. Curbing is similar to containment diking in the way that it prevents spills and leaks from being released into the environment. Curbing is usually small scaled and does not contain large spills to the degree that dikes can. Curbing is common at many facilities in small areas where

handling and transfer of liquid materials occur. Curbing can redirect contaminated stormwater away from the storage area. It is useful in areas where liquid materials are transferred from one container to another. Asphalt is a common material used for curbing; however, curbing materials can include earth, concrete, synthetic materials, metal, or other impenetrable materials.

- Spilled materials should be removed immediately from curbed areas to allow space for future spills.
- Curbs should have manually-controlled pump systems rather than common drainage systems for collection of spilled materials.
- The curbed area should be inspected regularly to clear clogging debris.
- Maintenance should also be conducted frequently to prevent overflow of any spilled materials as curbed areas are designed only for smaller spills.
- Remove accumulated stormwater after precipitation events and dispose of according to local regulations.
- Curbing has the following advantages:
  - ✓ Excellent run-on control;
  - ✓ Inexpensive;
  - ✓ Ease of installment;
  - ✓ Provides option to recycle materials spilled in curb areas; and
  - ✓ Common industry practice.

References and Resources

Clark County Clean Water Program. 2009. *Clark County Stormwater Pollution Control Manual Best Management Practices for Businesses and Government Agencies, AS A2 & A3*. Available online at: http://www.clark.wa.gov/boards/CleanWater/documents/PollutionControlManual.pdf.

King County Storm Water Pollution Prevention Manual, 2009 *Commercial Best Management Practice (BMP) Activity Sheets: A-2 Storage of Liquid Materials in Stationary Tanks and A-3 Storage of Liquid Materials in Portable Containers*. Available online at: http://www.kingcounty.gov/environment/waterandland/stormwater/documents/pollution-prevention-manual/commercial-bmp.aspx.

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APPENDIX H

INDUSTRIAL GENERAL PERMIT

(SEE ATTACHED DISK INCLUDED

IN HARD COPY)

ATTACHMENT 1

MONTHLY OBSERVATION MONITORING RECORDS

ATTACHMENT 2

SAMPLE EVENT VISUAL OBSERVATION & ANALYTICAL MONITORING RECORDS

ATTACHMENT 3

TRAINING SIGN IN SHEETS

ATTACHMENT 4

OTHER REGULATORY DOCUMENTS