DEPARTMENT OF ECOLOGY
State of Washington

Modification of Permit Coverage Form for Industrial Stormwater General Permit

Permit No. WAR002339

I. Operator/Permittee for the Facility (All permit and billing correspondence will be mailed here)

Operator/Permittee's Name	Phone No.	Email Address
Alex Norr	(425) 646-2400	anorr@republicservices.com

Company Name
Republic Services, Inc. dba Allied Waste of Lynnwood

Street Address or P.O. Box
21325 66th Avenue West

City	State	Zip + 4
Lynnwood	WA	98036-7327

II. Modified Permit Information CHECK ALL THAT APPLY

☐ New Industrial Process (requires public notice), please list the associated SIC codes:

1					**2**					**3**					**4**					**5**				

Type or Nature of New Industrial Activities: _____

Are there new monitoring points associated with the new industrial process? ☐ No ☐ Yes

If no, please list the previously established monitoring points associated with the new process (i.e, CB1, DP4):

_____

If yes, please identify new monitoring points: _____

Discharge identifier. These cannot be symbols. (maximum of three characters ex. 01A)			Latitude degrees, minutes, seconds		Longitude degrees, minutes, seconds		Location description (i.e. Catch Basin 1)
			° '	N	° '	W	
			° '	N	° '	W	
			° '	N	° '	W	

If Applicable, New Receiving Water

Receiving Water Body	Latitude degrees, minutes, seconds		Longitude degrees, minutes, seconds	
	° '	N	° '	W
	° '	N	° '	W

What type of modification are you requesting?

☐ Level 2 / Level 3 Deadline Extension, please list the new deadline requested (MM/DD/YYYY): _____.

- Attach detailed technical basis for extension. Include proposed timeline for completion and describe issues that affect completion date; for example, state/local permits, study, design, financing, professional services and contracting, etc.

☒ Level 2 / Level 3 Waiver. Attach technical basis for request.

- If request is based on claim that it is "not feasible" to perform corrective actions, provide detailed information to support request (e.g., lease, contract, affidavit, maps, photos, and/or other documentation).
- If request is based on claim that corrective action is "not necessary" to prevent violations of water quality standards, Ecology recommends including an engineering report and sampling information to support claim. **Requesting a Level 3 Waiver in favor of a Level 2 corrective action (upgrading bioswale media) per attached Engineering Report.**

☐ Other (please explain): _____

III. Public Notice

Facilities modifying existing coverage must publish a public notice at least once a week for **two** consecutive weeks with **seven** days in between publications, in a **single** newspaper of general circulation in the county in which the facility is located. Ecology cannot grant permit coverage sooner than the end of the 30-day public comment period, which begins on the date of the second public notice.
Submit (or fax: 360-407-6426) the application to Ecology on or **before** the date of the first public notice. If you fax the application to Ecology, you must follow up with hard copy by mail.

Date of the first public notice: 06 / 01 / 2021
Date of second public notice: 06/ 08 / 2021 (Begins 30-day public comment period)
Example: Date of the first public notice: 01 / 01 / 2010
Date of second public notice: 01 / 08 / 2010

Name of the newspaper that will publish the public notices: Everett Herald.

Complete this template using site-specific information. The **bold** language is required by WAC 173-226-130 and must be included in its entirety. (Either use the fill-in template below or attach on a separate sheet of paper, if necessary.)

Republic Services, Inc. dba Allied Waste of Lynnwood, 21325 66th Avenue West, Lynnwood WA is seeking modification of coverage under the Washington Department of Ecology's NPDES General Permit for Stormwater Discharges Associated with Industrial Activities at the industrial site, known as Lynnwood Hauling located at 21325 66th Avenue West in Lynnwood.

Activities requiring permit modification include a waiver of the Level 3 Corrective Action in favor of a Level 2 Corrective action (upgrading bioswale media).

Any person desiring to present their views to the Department of Ecology concerning this application may notify Ecology in writing within 30 days from the last date of publication of this notice. Comments may be submitted to:

Washington Dept of Ecology
Water Quality Program – Industrial Stormwater
PO Box 47696
Olympia, WA 98504-7696

IV. Certification of Permittee

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure 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, the information submitted is, to the best of my knowledge and belief, 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."

Art Mains	Republic Services, Inc.	5/14/2021
Printed Name	Company	Date
		5/14/2021
Signature		Date

***Federal regulations require this application is signed by one of the following:**

A. In the case of corporations, by a principal executive officer of at least the level of vice president.
B. In the case of a partnership, by a general partner of a partnership.
C. In the case of sole proprietorship, by the proprietor.
D. In the case of a municipality, state, federal, or other public facility: by either a principal executive officer or ranking elected official.

Return this signed original document to the address below. Make sure you retain a copy for your records.

Washington Department of Ecology
Water Quality Program – Industrial Stormwater
PO Box 47696
Olympia, WA 98504-7696

If you have any questions, please call:

- **Shawn Hopkins** 360-407-6442 or shop461@ecy.wa.gov for *Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Skagit, Snohomish, Spokane, Stevens, Walla Walla, Whatcom, and Whitman counties.*
- **Clay Keown** 360-407-6048 or ckeo461@ecy.wa.gov for *Island, King (except Seattle), and San Juan* counties.
- **Josh Klimek** 360-407-7451 or jokl461@ecy.wa.gov for city of *Seattle* and *Kitsap, Pierce, and Thurston counties*
- **Joyce Smith** 360-407-6858 or josm461@ecy.wa.gov for *Benton, Chelan, Clallam, Clark, Cowlitz, Douglas, Grays Harbor, Jefferson, Kittitas, Klickitat, Lewis, Mason Okanogan, Pacific, Skamania, Wahkiakum, and Yakima counties.*

To ask about the availability of this document in a version for the visually impaired call the Water Quality Program at 360-407-6600. Persons with hearing loss, call 711 for Washington Relay Service. Persons with a speech disability, call 877-833-6341.

Request for Waiver of Level 3 Corrective Action in favor of Level 2 Corrective Action

As described in the attached Engineering Report, Republic Services Inc. (Republic) initiated a Level 3 Corrective Action in response to three consecutive zinc exceedances in 2020. After collecting stormwater samples within the existing BMP treatment system and performing an engineering evaluation it was determined that BMP modifications consistent with a Level 2 Corrective Action (specifically, changing existing biofiltration swale media to higher performance media) would likely reduce zinc, copper, and turbidity concentrations to below the required benchmarks. Therefore, the Engineering Report provides the results and conclusions consistent with a Level 3 Corrective Action Engineering Report but suggests a phased BMP implementation strategy where certain Level 3 strategies (namely, installation of an oil water separator) would be implemented only if the Level 2 strategy does not cause stormwater discharges to be below the benchmark requirements. With the technical justifications demonstrated in this report, Republic request Washington State Department of Ecology's (Ecology) approval of a Level 2 Corrective Action.

GOLDER
MEMBER OF WSP

REPORT

Lynnwood Hauling Facility Level III Corrective Action Engineering Report

21309 66th Ave W, Lynnwood, WA 98036

Submitted to:

Republic Services, Inc.
500 Roosevelt Grade Road
Roosevelt, WA 99356

Submitted by:

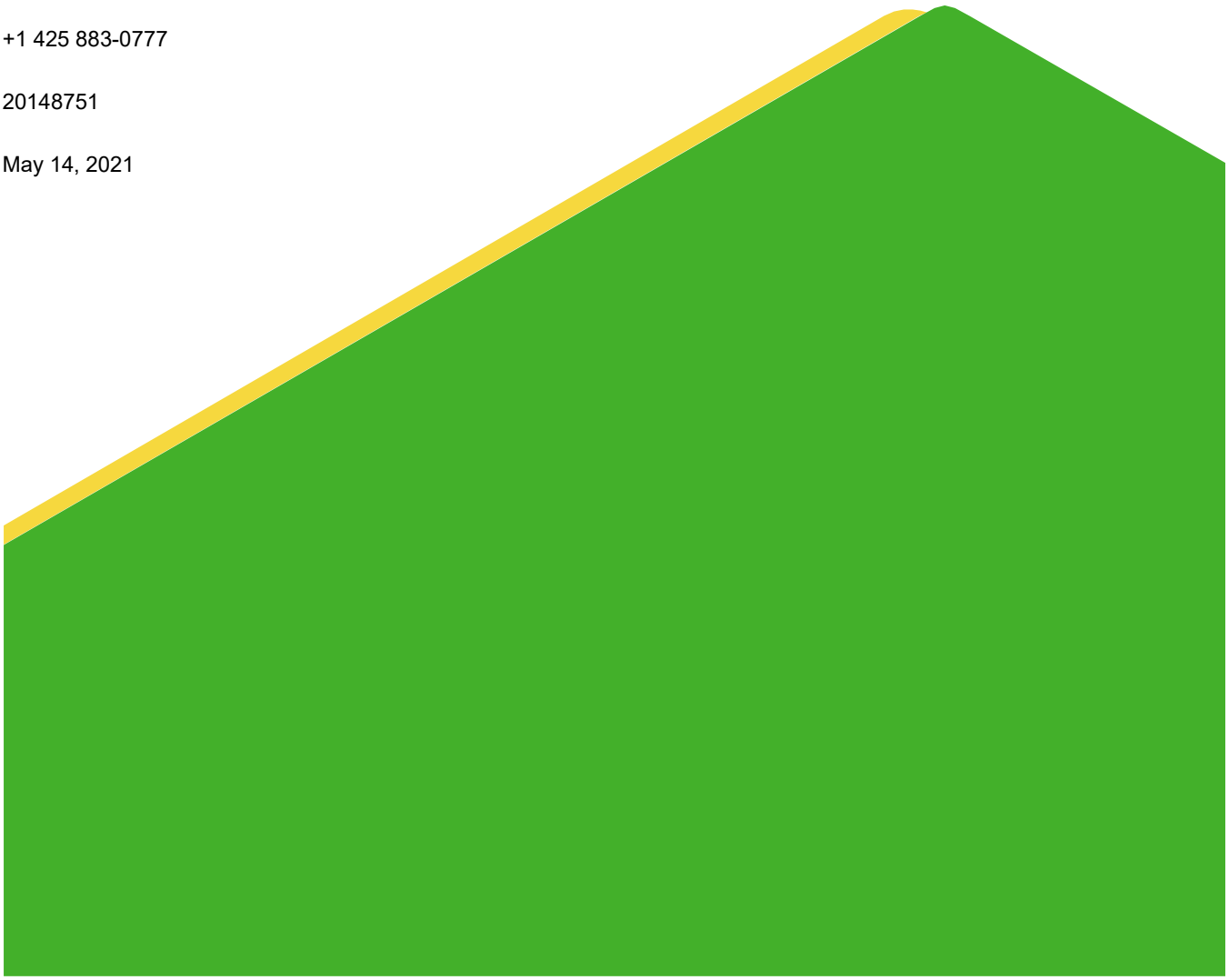
Golder Associates Inc.

18300 NE Union Hill Road, Suite 200, Redmond, Washington, USA 98052

+1 425 883-0777

20148751

May 14, 2021



Distribution List

Table of Contents

1.0 INTRODUCTION 1

2.0 SITE DESCRIPTION 1

3.0 STORMWATER CHARACTERIZATION 1

3.1 Historical Stormwater Monitoring 1

3.2 Source Characterization 2

3.2.1 Sample Locations 2

3.2.2 Summary of Stormwater Characterization 3

3.2.3 Other Site Observations 4

4.0 PROPOSED BMP PLAN 4

4.1 Phase 1 4

4.2 Phase 2 5

5.0 CLOSING 6

6.0 REFERENCES 7

TABLES

Table 1: Zinc, Copper, and Turbidity Concentrations From 2020 to 2021 2

Table 2: Stormwater Characterization Results 3

FIGURES

Figure 1: Process Diagram

APPENDICES

APPENDIX A
BMP Process Flow Diagram

APPENDIX B
BMP Plan Layout

APPENDIX C
Source Characterization Results

APPENDIX D
Photo Log

APPENDIX E
WWHM Modeling

APPENDIX F
Oldcastle Oil Water Separator

APPENDIX G
Zeolite Product Information

CERTIFICATION PAGE

Per the requirements of the Washington Department of Ecology, Industrial Stormwater General Permit, Special Condition S8 Item D,3.a.vii., the following report was prepared under the supervision of the undersigned qualified industrial stormwater professionals:

Golder Associates Inc.

Joseph Mitzel, PE
Staff Engineer

Lee Holder, PE
Practice Leader

Reviewed by:

Kent Wiken, PE
Senior Consultant/Project Manager

JMM/KWW/LKH/kkm

1.0 INTRODUCTION

Golder Associates Inc. member of WSP (Golder) has prepared this Level III Corrective Action Engineering Report on behalf of the Republic Lynnwood Hauling Facility located at 21309 66th Ave W, Lynnwood, Washington. Republic's Lynnwood Hauling Facility operates a fleet of approximately 30 hauling vehicles and provides waste disposal and recycling services to the City of Lynnwood. Stormwater discharges associated with the site's industrial activity are permitted through an Industrial Stormwater General Permit (ISGP) (Permit # WAR002339) issued on December 3rd, 2014 and includes activities related to SIC codes 4212 and 4231 for *Local Trucking Without Storage* and *Terminal and Join Terminal Maintenance Facilities for Motor Freight Transportation,* respectively. The facility is required to monitor pH, turbidity, total zinc, total copper, observations of oil sheen, and Total Petroleum Hydrocarbons (NWTPH-Dx). Republic initiated a Level III Corrective Action after exceeding Ecology's western Washington benchmarks for zinc (117 µg/L) during the 2nd, 3rd, and 4th quarters of 2020. In addition, the site had one benchmark exceedance of turbidity in the 3rd quarter and two exceedances of copper in the 2nd and 3rd quarters of 2020. The corrective actions outlined in the present engineering report are designed to primarily address zinc exceedances but will also address copper and turbidity.

2.0 SITE DESCRIPTION

The Lynnwood Hauling Facility covers approximately 2.5 acres and is used for truck parking, fueling, washing, vehicle maintenance, and storage of waste bins. The portion of the facility discharging industrial stormwater consists of a single hydrologic basin with 1.54 acres of impervious asphalt and rooftops. A process diagram of the facility is found in Figure 1 of Appendix A and a facility layout is found in Sheet 1 of Appendix B.

The facility slopes gently towards the southeast. All stormwater runoff flows across the facility and is conveyed through two catch basins into a 54-inch-diameter manhole, located along the southern portion of the facility. The manhole is equipped with a down-turned elbow on the outlet flowing into a linear detention pond. A flow restrictor at the outlet of the detention pond releases flows through a 10-inch pipe into a biofiltration swale. The biofiltration swale is approximately 100 feet long with an under drain. Stormwater leaves the biofiltration through a surface grate or through the under drain and leaves the facility through a 10-inch pipe. The outlet of this pipe is identified as Outfall D02 and discharges to an unnamed creek east of the facility. The unnamed creek originates from Halls Lake and is part of the Halls Creek drainage basin that discharges into Lake Ballinger.

3.0 STORMWATER CHARACTERIZATION

3.1 Historical Stormwater Monitoring

Republic regularly collects stormwater samples at compliance outfall D02, consistent with its ISGP and SWPPP. Table 1 shows the average quarterly zinc concentrations ranged between 135 – 405 µg/L and were consistently above the benchmark. Most individual zinc measurements were between 120 – 190 µg/L, with one high measurement of 620 µg/L occurring on 6/12/2020. Average quarterly copper concentrations ranged between 10 – 30 µg/L, and average quarterly turbidity ranged between 14 – 27 NTUs. Samples collected in the 1st quarter of 2021 had concentrations of zinc, copper, and turbidity that were consistent with the 2020 ranges.

Table 1: Zinc, Copper, and Turbidity Concentrations From 2020 to 2021

Quarter	Date	Total Zinc (µg/L)	Total Copper (µg/L)	Turbidity (NTU)
Benchmark		**117**	**14**	**25**
2Q2020	5/21/2020	190	16	4.77
2Q2020	6/12/2020	620	43	22.4
3Q2020	9/23/2020	160	17	26.7
4Q2020	11/17/2020	150	12	28.7
4Q2020	12/21/2020	120	8.1	8.44
1Q2021	3/25/2021	160	21	6.97

Measurements collected in 2020 and the 1st quarter of 2021 indicate that zinc and copper exceedances are occurring even in discharges with relatively low (<25 NTUs) turbidity. This suggests that zinc and copper causing benchmark exceedances are likely in the dissolved phase.

3.2 Source Characterization

On May 7, 2021, Golder personnel visited the Lynnwood Hauling Facility during a storm event and collected stormwater samples at three locations within the suite of treatment BMPs. Golder personnel were able to observe the stormwater BMPs before rainfall runoff began and through the apparent peak discharge. The stormwater sample locations are shown in Figure 1 of Appendix B and summarized in Table 2 below. Analytical laboratory reports are attached in Appendix C and a photo log in Appendix D.

3.2.1 Sample Locations

The sampling locations included:

- **Detention Pond Influent (DPI) –** a sample was collected from the 10” PVC pipe discharging from the 54” diameter manhole and flow-control structure into the detention pond BMP.
- **Detention Pond Effluent (DPE) –** a sample was collected from the 10” PVC pipe discharging from the 54” diameter manhole and down-turned elbow into the biofiltration swale BMP.
- **Outfall (D02) –** a sample was collected from the 10” PVC pipe discharging from the under-drain of the biofiltration swale through Outfall D02. Discharge through the outfall was a slight trickle from the under-drain and no stormwater was discharging through the bypass overflow.

All samples were analyzed for the following analytes.

- pH
- Turbidity
- Total and Dissolved Zinc
- Total and Dissolved Copper
- NWTPH-Dx (Lube Oil and Diesel Range Organics)
- Total Suspended Solids (TSS)

3.2.2 Summary of Stormwater Characterization

Table 2 summarizes the results of the source characterization sampling event from 05-07-2021. The results of the source characterization indicate stormwater entering the detention pond BMP had a low pH and high concentrations (> 10 mg/L) of diesel range organics and lube oil. Low pH is generally associated with higher fractions of dissolved-phase metals. Consistent with the low pH, most of the zinc and copper in stormwater entering the detention pond was in the dissolved phase.

Stormwater leaving the detention pond and entering the biofiltration swale had total and dissolved zinc and copper concentrations above the benchmark concentrations of 117 µg/L and 14 µg/L but significantly lower than influent concentrations. The TSS concentration in the detention pond effluent was non-detectable in comparison to the influent of concentration of 31 mg/L. In addition, the detention pond had a removal efficiency of 82% and 84% for diesel range organics and lube oil, respectively.

Discharge from Outfall D02 had reductions in zinc, copper, turbidity, and petroleum concentrations in comparison to the biofiltration swale influent, indicating the biofiltration swale was effective at reducing pollutant concentrations except for TSS. However, total and dissolved copper and zinc concentrations were above the benchmark values and would require the biofiltration swale to have a removal efficiency of 83% (660 µg/L to 117 µg/L) and 77% (300 µg/L to 60 µg/L) respectively.

Table 2: Stormwater Characterization Results

Parameter	Sample		
Short ID	Detention Pond Influent	Detention Pond Effluent	Outfall D02
Sample ID	20210507-DPI	20210507-DEP	20210507-D02
Date Collected	2021-05-07	2021-05-07	2021-05-07
Time	845	1037	1200
pH	2.92	5.26	6.30
Turbidity (NTU)	52.6	7.51	6.84
Zn, Total (µg/L)	2600	660	310
Zn, Dissolved (µg/L)	3300[a]	650	180
Cu, Total (µg/L)	300	60	46
Cu, Dissolved (µg/L)	310[a]	47	30
NWTPH-Dx, Diesel Range (mg/L)	13	2.3	1.4
NWTPH-Dx, Lube Oil (mg/L)	22	3.6	2.6
TSS (mg/L)	31	ND	12

a) The measured dissolved metal concentration was greater than the total metal concentration. Onsite Environmental Laboratory confirmed the measurement, suggesting the field personnel likely accidentally swapped the labels for the total and dissolved bottles.

In summary, the source characterization indicates the Lynnwood Hauling Facility has stormwater with concentrations of diesel range organics, lube oil, zinc, and copper entering the existing BMP system that are significantly greater than the benchmark concentrations. The existing detention pond and biofiltration swale remove most diesel range organics and lube oil, but do not remove total zinc and copper to concentrations below the benchmark thresholds.

3.2.3 Other Site Observations

Prior to the site investigation and sampling event, Golder contacted the supplier of Republic's engine oil and hydraulic fluid to determine the concentration and form of any zinc that might be present in leaks/drips from the large fleet of waste hauling vehicles based on guidance from Ecology's June 2008 publication *Suggested Practices to Reduce Zinc Concentrations in Industrial Stormwater Discharges* (Ecology 2008). The publication suggests there are high elevations of zinc in motor oil and hydraulic fluid. Republic's supplier confirmed the engine oil and hydraulic fluid used by the fleet vehicles contains a generic zinc dialkyl dithiophosphate with concentrations of 1260 mg/L and 470 mg/L zinc, respectively. Therefore, drips/incidental leaks of engine oil at the Lynnwood Hauling Facility likely contribute to the measured amounts of zinc in the stormwater draining to the filtration swale.

4.0 PROPOSED BMP PLAN

Based on the results of the source characterization study and stormwater monitoring program, an incremental BMP plan has been developed to address zinc and copper exceedances in two phases.

The first phase would consist of replacing the biofiltration swale media mix (oyster shell + compost) with sand and zeolite for additional metals adsorption. The first phase would be initiated by August 1, 2021 and completed by December 31, 2021. The proposed sand and zeolite modification would be considered a "Level II Corrective Action" but is expected to reduce copper and zinc concentrations below the benchmark.

The second phase would include the installation of a coalescing plate oil water separator at the inlet of the existing detention pond to increase removal of diesel, oil, and zinc-laden petroleum additives. The second phase would only be initiated if zinc and copper measurements showed concentrations were above the benchmarks even after completion of phase one. If zinc and copper exceedances continued after December 31, 2021 phase two would be initiated by August 1, 2022 and completed by December 31, 2020.

A process flow diagram of the suggested improvements is shown in Figure 2 of Appendix A with a detailed BMP plan figure provided as Sheet 2 of Appendix B.

4.1 Phase 1

The following improvements would be initiated by August 1, 2021 and completed by December 31, 2021.

- **Replace the biofiltration swale oyster shell and compost media with a sand and zeolite mix for enhanced zinc and copper adsorption. Install a rock berm upstream the catch basin outlet to slightly increase the maximum water surface elevation in the filtration swale.**

  A sand and zeolite media blend are recommended to provide filtration (sand) of particulate zinc and copper and adsorption (zeolite) of dissolved zinc and copper. The existing compost and oyster shell media would be removed and replaced with approximately 1-foot of sand and zeolite. In addition, an approximately 8"-12" rock berm (to be field fitted) would be installed just upstream the catch basin overflow to slightly increase the storage capacity of the modified biofiltration swale where stormwater would otherwise bypass the filter media through the overflow catch basin inlet. Golder has designed and constructed several projects for removal of total and dissolved zinc using sand/zeolite beds and has sourced a 7-14 mesh zeolite from IDA-ORE in Nampa, ID (Appendix F). The specific zeolite-to-sand ratio and specifications to be used in the present project will be determined using column tests as part of the engineering design and construction package. The spent sand zeolite media would be replaced using a vacuum truck or excavator and new media (shipped in large sacks) would be spread using an excavator

and/or rakes. The estimated replacement schedule for the sand-zeolite media will be determined through the results of the laboratory column testing and field performance of the filter during the first year but is typically annually.

4.2 Phase 2

If zinc and copper concentrations are not within benchmark limits after completion of Phase 1, the following improvements would be initiated on August 1, 2022 and completed by December 31, 2022.

- **Install a coalescing plate oil water separator at the inlet of the existing detention pond to remove diesel range organics, lube oil, and zinc dialkyl dithiophosphate additives.**

  A coalescing plate (CP) type separator is recommended to remove the finer oil droplets that are mobilized in the stormwater runoff. Conventional oil/water separators provide gravity separation by using baffles or T-sections but are typically effective removing oil droplets greater than 150 microns. The coalescing media maximizes surface area, increasing performance and effluent quality, allows for a smaller vault footprint, and can remove oil droplets as small as 60 microns.

  The hydrologic basin draining to the existing BMP system is approximately 1.54 acres of impervious pavement and rooftops. As shown in Appendix E, the Western Washington Hydrologic Model (WWHM 2012) model provides the following “Water Quality Design Flows”:

  - Standard Flow Rate for On-Line BMP: 0.2784 cfs
  - Standard Flow Rate for Off-Line BMP: 0.1577 cfs

  Using a 6-month storm event of 1.10 inches at the Everett rain gage (Ecology 2019, Appendix III-C) and Figures 7.7 and 7.8 from the Western Washington Stormwater Manual (Ecology 2019, Figure V-7.7 and V-7.8), the “K” ratio to be multiplied by the Standard Water Quality Design Flow Rates at 1.10 inches are K = 1.5 (On-Line) and K = 2.7 (Off-Line).

  Considering the entire east subbasin at the Lynnwood Hauling Facility would drain to the proposed oil water separator through the existing manhole, the oil water separator has been designed to be “On-Line” and use a design flow rate of:

  - 0.2784 cfs x 1.5 x 450 gpm/cfs = 188 gpm.

  A design flow rate of 188 gpm would require an Oldcastle 5106-CPS (183 GPM) or equivalent (Appendix F). If small amounts of metals in the oils escape the oil-water separator, the metals will be removed by the detention pond vegetation, and eventually the sand/zeolite filtration.

The combination of the proposed coalescing plate oil water separator and sand/zeolite filter with the existing detention pond and flow restrictor BMPs can reasonably be expected to reduce the concentrations of pollutants such that concentration of zinc and copper in discharging stormwater would be below the benchmark limits.

5.0 CLOSING

The BMPs proposed in this engineering report are designed to retrofit and use existing site infrastructure as much as possible. With Ecology concurrence with the proposed solution in this engineering report, Republic will proceed with the construction-level design.

6.0 REFERENCES

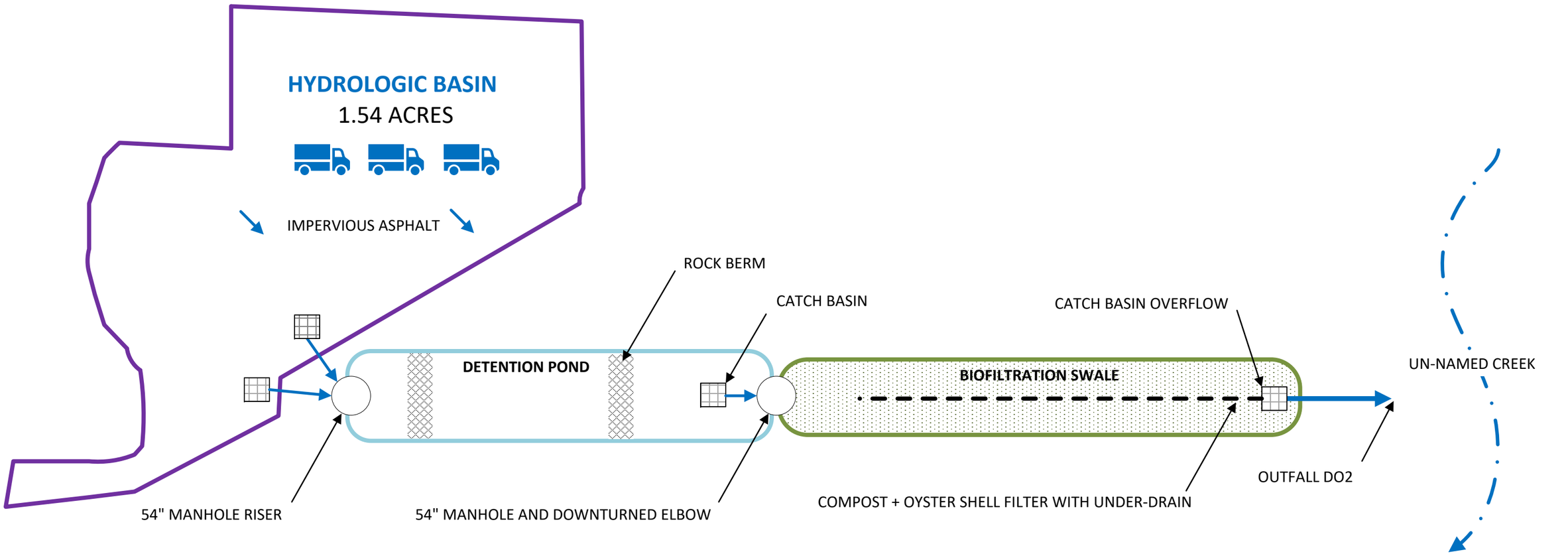
Washington State Department of Ecology. 2019. Stormwater Management Manual for Western Washington. July 2019. Publication Number 19-10-021.

Washington State Department of Ecology. 2008. Suggested Practices to Reduce Zinc Concentrations in Industrial Stormwater Discharges. June 2008. Publication Number 08-10-025.

Clear Creek Solutions. 2012. Western Washington Hydrology Model (WWHM).

APPENDIX A

BMP Process Flow Diagram



CLIENT
REPUBLIC SERVICES INC
500 ROOSEVELT GRADE ROAD
ROOSEVELT, WA 99356

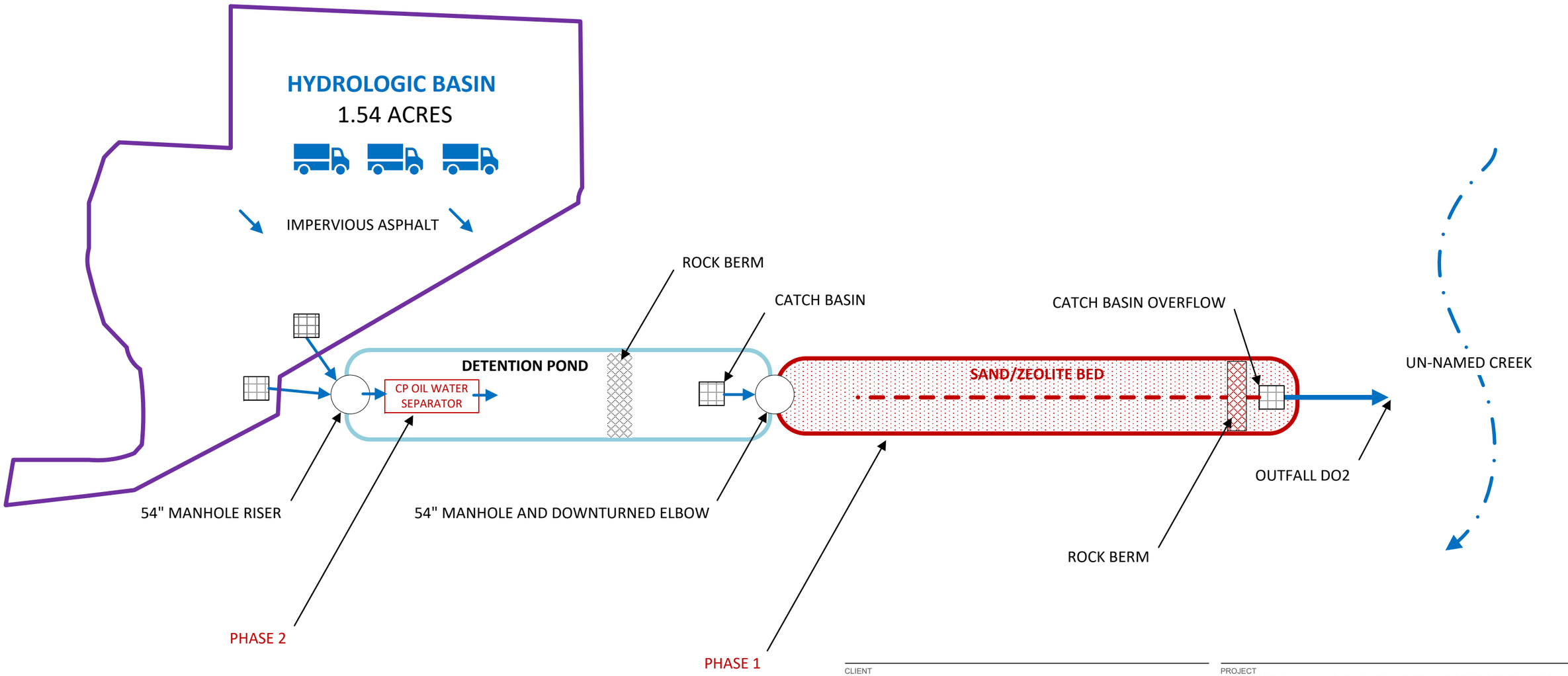
CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-05-11
DESIGNED	JMM
PREPARED	REDMOND
REVIEWED	LKH
APPROVED	KWW

PROJECT
LYNNWOOD HAULING FACILITY LEVEL III CORRECTIVE ACTION

TITLE
EXISTING BMP PLAN

PROJECT NO.	PHASE	REV.	FIGURE
20148751	300	0	1



CLIENT
REPUBLIC SERVICES INC
500 ROOSEVELT GRADE ROAD
ROOSEVELT, WA 99356

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-05-11
DESIGNED	JMM
PREPARED	REDMOND
REVIEWED	LKH
APPROVED	KWW

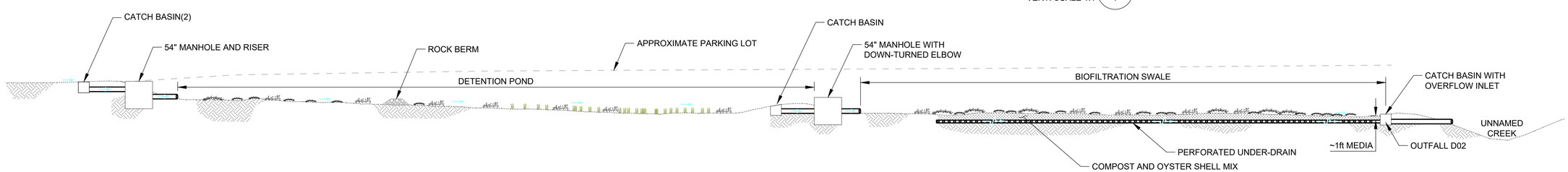
PROJECT
LYNNWOOD HAULING FACILITY LEVEL III CORRECTIVE ACTION

TITLE
PROPOSED BMP PLAN

PROJECT NO.	PHASE	REV.	FIGURE
20148751	300	0	2

APPENDIX B

BMP Plan Layout



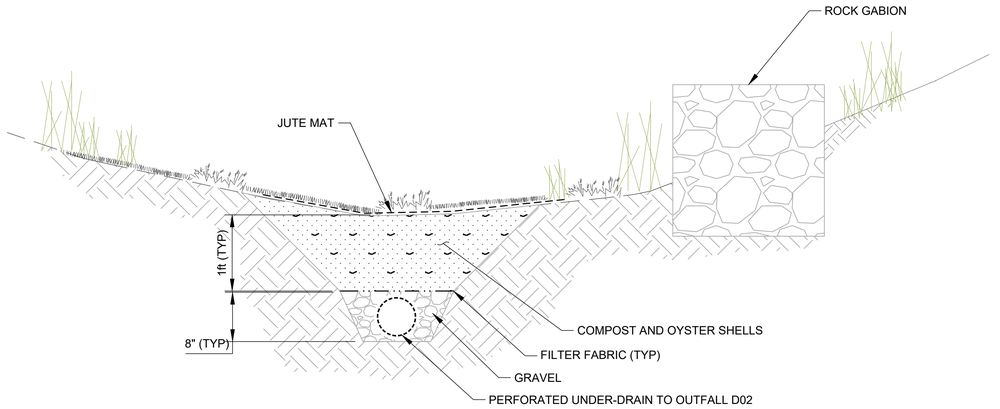
SCALE NTS
VERT. SCALE 1:1
A 1
EXISTING BMP PROFILE

LEGEND

- HYDROLOGIC BASIN
- SHEET FLOW
- CONCENTRATED FLOW
- SS — SANITARY SEWER
- WOODEN FENCE
- PROPERTY LINE
- MAJOR CONTOUR (5ft)
- MINOR CONTOUR (1ft)

NOTE(S)

1. CONTOURS AND SURFACE PROFILE GENERATED FROM 2016 USGS DEM (1m) ACCESSED FROM THE NATIONAL MAP ONLINE (TNM) PORTAL.
2. SITE FEATURES AND BOUNDARIES ARE APPROXIMATE BASED ON DESIGN DRAWINGS AND SWPPP MAP PROVIDED BY REPUBLIC AND PRODUCED BY SHAW ENVIRONMENTAL IN 12/2010.
3. BIOFILTRATION SWALE FEATURES ARE APPROXIMATE BASED ON TEXT DESCRIPTIONS FROM THE REPUBLIC SWPPP AND SITE OBSERVATIONS MADE BY GOLDER ON 04/30/2021 AND 05/07/2021.



SCALE NTS
VERT. SCALE 1:1
B 1
LYNNWOOD BIOFILTRATION SWALE (TYP)

REV.	YYYY-MM-DD	DESCRIPTION	DESIGNED	PREPARED	REVIEWED	APPROVED
A	2021-05-12	CONCEPTUAL DESIGN	JMM	REDMOND	KWW	SJS

CLIENT
REPUBLIC SERVICES INC
500 ROOSEVELT GRADE ROAD
ROOSEVELT, WA 99356

CONSULTANT
GOLDER
MEMBER OF WSP
REDMOND
18300 NE UNION HILL ROAD, SUITE 200
REDMOND, WA 98052
UNITED STATES
[+1] (425) 883 0777
www.golder.com

PROJECT
LYNNWOOD HAULING FACILITY CORRECTIVE ACTION

TITLE
EXISTING BMP PLAN

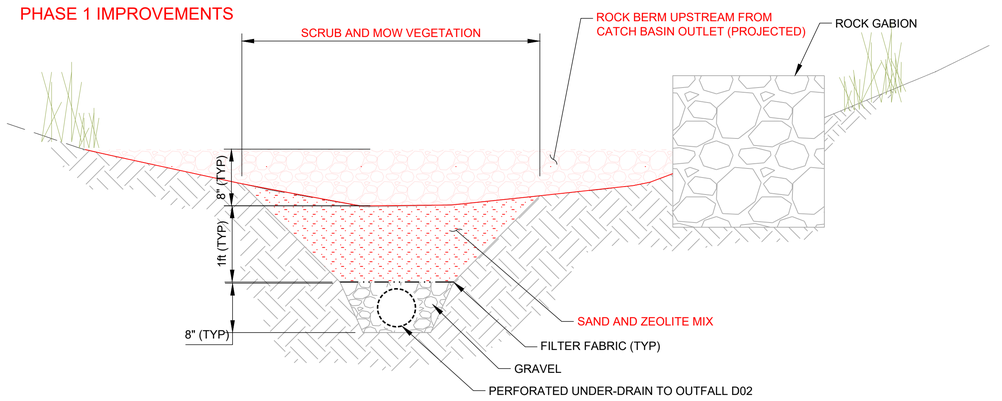
PROJECT NO.	PHASE	REV.		SHEET
20148751	300	A	1 of 2	1

LEGEND

- HYDROLOGIC BASIN
- SHEET FLOW
- CONCENTRATED FLOW
- SS — SANITARY SEWER
- WOODEN FENCE
- PROPERTY LINE
- MAJOR CONTOUR (5ft)
- MINOR CONTOUR (1ft)

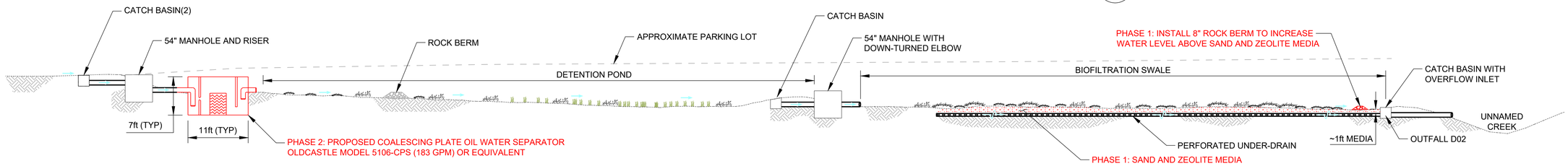
NOTE(S)

1. CONTOURS AND SURFACE PROFILE GENERATED FROM 2016 USGS DEM (1m) ACCESSED FROM THE NATIONAL MAP ONLINE (TNM) PORTAL.
2. SITE FEATURES AND BOUNDARIES ARE APPROXIMATE BASED ON DESIGN DRAWINGS AND SWPPP MAP PROVIDED BY REPUBLIC AND PRODUCED BY SHAW ENVIRONMENTAL IN 12/2010.
3. BIOFILTRATION SWALE FEATURES ARE APPROXIMATE BASED ON TEXT DESCRIPTIONS FROM THE REPUBLIC SWPPP AND SITE OBSERVATIONS MADE BY GOLDER ON 04/30/2021 AND 05/07/2021.



SCALE NTS
VERT. SCALE 1: 2

D — PROPOSED BIOFILTRATION SWALE MODIFICATION



SCALE NTS
VERT. SCALE 1: 2

C — PROPOSED BMP PROFILE

REV.	YYYY-MM-DD	DESCRIPTION	DESIGNED	PREPARED	REVIEWED	APPROVED
A	2021-05-12	CONCEPTUAL DESIGN	JMM	REDMOND	KWW	SJS

CLIENT
REPUBLIC SERVICES INC
500 ROOSEVELT GRADE ROAD
ROOSEVELT, WA 99356

CONSULTANT
GOLDER
MEMBER OF WSP
REDMOND
18300 NE UNION HILL ROAD, SUITE 200
REDMOND, WA 98052
UNITED STATES
[+1] (425) 883 0777
www.golder.com

PROJECT
LYNNWOOD HAULING FACILITY CORRECTIVE ACTION

TITLE
PROPOSED BMP PLAN

PROJECT NO.	PHASE	REV.	SHEET
20148751	300	A	2 of 2 2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

0 1in

APPENDIX C

Source Characterization Results

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

May 10, 2021

Kent Wiken
Golder Associates, Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333

Re: Analytical Data for Project 20148751
Laboratory Reference No. 2105-067

Dear Kent:

Enclosed are the analytical results and associated quality control data for samples submitted on May 7, 2021.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: May 10, 2021
Samples Submitted: May 7, 2021
Laboratory Reference: 2105-067
Project: 20148751

Case Narrative

Samples were collected on May 7, 2021 and received by the laboratory on May 7, 2021. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: May 10, 2021
Samples Submitted: May 7, 2021
Laboratory Reference: 2105-067
Project: 20148751

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**20210507-DPI**					
Laboratory ID:	05-067-01					
Diesel Range Organics	**13**	1.0	NWTPH-Dx	5-7-21	5-10-21	
Lube Oil Range Organics	**22**	4.0	NWTPH-Dx	5-7-21	5-10-21	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	---	*50-150*				S
Client ID:	**20210507-DPE**					
Laboratory ID:	05-067-02					
Diesel Range Organics	**2.3**	0.10	NWTPH-Dx	5-7-21	5-10-21	
Lube Oil Range Organics	**3.6**	0.40	NWTPH-Dx	5-7-21	5-10-21	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*79*	*50-150*				
Client ID:	**20210507-DO2**					
Laboratory ID:	05-067-03					
Diesel Range Organics	**1.4**	0.10	NWTPH-Dx	5-7-21	5-10-21	
Lube Oil Range Organics	**2.6**	0.40	NWTPH-Dx	5-7-21	5-10-21	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*90*	*50-150*				

Date of Report: May 10, 2021
Samples Submitted: May 7, 2021
Laboratory Reference: 2105-067
Project: 20148751

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0507W1					
Diesel Range Organics	**ND**	0.10	NWTPH-Dx	5-7-21	5-10-21	
Lube Oil Range Organics	**ND**	0.40	NWTPH-Dx	5-7-21	5-10-21	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*93*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	SB0507W1										
	ORIG	DUP									
Diesel Fuel #2	**0.557**	**0.521**	NA	NA		NA		NA	7	NA	
Surrogate:											
o-Terphenyl						*98*	*98*	*50-150*			

Date of Report: May 10, 2021
Samples Submitted: May 7, 2021
Laboratory Reference: 2105-067
Project: 20148751

TOTAL SUSPENDED SOLIDS
SM 2540D

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**20210507-DPI**					
Laboratory ID:	05-067-01					
Total Suspended Solids	**31**	4.0	SM 2540D	5-7-21	5-10-21	
Client ID:	**20210507-DPE**					
Laboratory ID:	05-067-02					
Total Suspended Solids	**ND**	4.0	SM 2540D	5-7-21	5-10-21	
Client ID:	**20210507-DO2**					
Laboratory ID:	05-067-03					
Total Suspended Solids	**12**	4.0	SM 2540D	5-7-21	5-10-21	

Date of Report: May 10, 2021
Samples Submitted: May 7, 2021
Laboratory Reference: 2105-067
Project: 20148751

TOTAL SUSPENDED SOLIDS
SM 2540D
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0507W1					
Total Suspended Solids	**ND**	4.0	SM 2540D	5-7-21	5-10-21	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-067-01								
	ORIG	DUP							
Total Suspended Solids	**31.0**	**34.0**	NA	NA	NA	NA	9	26	
SPIKE BLANK									
Laboratory ID:	SB0507W1								
	SB		SB		SB				
Total Suspended Solids	**94.0**		100	NA	94	67-118	NA	NA	

Date of Report: May 10, 2021
Samples Submitted: May 7, 2021
Laboratory Reference: 2105-067
Project: 20148751

TOTAL METALS
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**20210507-DPI**					
Laboratory ID:	05-067-01					
Copper	**300**	50	EPA 200.8	5-10-21	5-10-21	
Zinc	**2600**	63	EPA 200.8	5-10-21	5-10-21	
Client ID:	**20210507-DPE**					
Laboratory ID:	05-067-02					
Copper	**60**	10	EPA 200.8	5-10-21	5-10-21	
Zinc	**660**	13	EPA 200.8	5-10-21	5-10-21	
Client ID:	**20210507-DO2**					
Laboratory ID:	05-067-03					
Copper	**46**	5.0	EPA 200.8	5-10-21	5-10-21	
Zinc	**310**	6.3	EPA 200.8	5-10-21	5-10-21	

Date of Report: May 10, 2021
Samples Submitted: May 7, 2021
Laboratory Reference: 2105-067
Project: 20148751

TOTAL METALS
EPA 200.8
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0510WH1					
Copper	**ND**	2.0	EPA 200.8	5-10-21	5-10-21	
Zinc	**ND**	2.5	EPA 200.8	5-10-21	5-10-21	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-215-11										
	ORIG	DUP									
Copper	**ND**	**ND**	NA	NA		NA		NA	NA	20	
Zinc	**6.20**	**6.54**	NA	NA		NA		NA	5	20	
MATRIX SPIKES											
Laboratory ID:	04-215-11										
	MS	MSD	MS	MSD		MS	MSD				
Copper	**98.4**	**101**	100	100	ND	**98**	**101**	75-125	3	20	
Zinc	**102**	**103**	100	100	6.20	**96**	**96**	75-125	0	20	

Date of Report: May 10, 2021
Samples Submitted: May 7, 2021
Laboratory Reference: 2105-067
Project: 20148751

DISSOLVED METALS
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**20210507-DPI**					
Laboratory ID:	05-067-01					
Copper	**310**	50	EPA 200.8		5-10-21	
Zinc	**3300**	63	EPA 200.8		5-10-21	
Client ID:	**20210507-DPE**					
Laboratory ID:	05-067-02					
Copper	**47**	10	EPA 200.8		5-10-21	
Zinc	**650**	13	EPA 200.8		5-10-21	
Client ID:	**20210507-DO2**					
Laboratory ID:	05-067-03					
Copper	**30**	5.0	EPA 200.8		5-10-21	
Zinc	**180**	6.3	EPA 200.8		5-10-21	

Date of Report: May 10, 2021
Samples Submitted: May 7, 2021
Laboratory Reference: 2105-067
Project: 20148751

DISSOLVED METALS
EPA 200.8
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0510D1					
Copper	**ND**	2.0	EPA 200.8		5-10-21	
Zinc	**ND**	2.5	EPA 200.8		5-10-21	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	05-067-03										
	ORIG	DUP									
Copper	**29.9**	**30.6**	NA	NA		NA		NA	2	20	
Zinc	**184**	**188**	NA	NA		NA		NA	2	20	
MATRIX SPIKES											
Laboratory ID:	05-067-03										
	MS	MSD	MS	MSD		MS	MSD				
Copper	**216**	**217**	200	200	29.9	**93**	**93**	75-125	0	20	
Zinc	**371**	**373**	200	200	184	**94**	**95**	75-125	1	20	

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Golder
Project Number: 20148751
Project Name: Lynnwood Corrective Action
Project Manager: Kent Wiken
Sampled by: Joe Mitzel

Turnaround Request (in working days)
(Check One)
☐ Same Day ☑ 1 Day
☐ 2 Days ☐ 3 Days
☐ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 05-067

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	TSS	Total metal (Zn +Cu)	Dissolved metal (Zn+Cu)		% Moisture
1	20210507 - DPI	5/7/21	845	SW	5				X														X	X	X		
2	20210507 - DPE	5/7/21	1034	SW	5				X														X	X	X		
3	20210507 - DO2	5/7/21	1200	SW	5				X														X	X	X		

	Signature	Company	Date	Time
Relinquished	Joe Mitzel	Golder	5/7/21	1433
Received		OSE	5/7/21	1433
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Email Results to: joseph_mitzel@golder.com
CC Kent_Wiken@golder.com

FF = Field Filtered
DPI: pH = 2.92, Turb. = 52.6 NTU
DPE: pH = 5.26, Turb = 7.51 NTU
DO2: pH = 6.30, Turb = 6.84 NTU

Data Package: Standard ☑ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

APPENDIX D

Photo Log

Project Title: Lynwood Hauling Facility Stormwater Characterization	
PHOTO 1 Photo from the most upstream side of the Lynnwood Hauling Facility treatment BMP system.	
PHOTO 2 Photo of the detention pond with soil staining.	

PHOTO 3 Absorbent booms intercepting stormwater runoff along the curb of the parking lot.	
PHOTO 4 Photo showing stormwater runoff and oil sheen along the curb of the parking lot	

PHOTO 5 Photo of the inside of the 54” diameter manhole and flow control riser.	
PHOTO 6 Stormwater discharge from the 54” diameter manhole to the detention pond (sample DPI).	

PHOTO 9 Photo of the detention pond as precipitation accumulates.	
PHOTO 10 Stormwater discharge from the 54” diameter manhole and down-turned elbow to the biofiltration swale.	

PHOTO 10 Photo of the biofiltration swale looking downstream.	
PHOTO 11 Photo of a slight discharge from Outfall D02. Stormwater was discharging to the outfall through the biofiltration swale underdrain, but no the bypass overflow.	

PHOTO 12 Photo of the catch basin outfall and overflow bypass looking upstream.	

APPENDIX E

WWHM Modeling

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	LynnwoodHaulingFacility
Site Name:	Lynnwood Hauling
Site Address:	21309 66th Ave W
City:	Lynnwood
Report Date:	5/6/2021
Gage:	Everett
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2019/09/13
Version:	4.2.17

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
PARKING MOD	1.54
Impervious Total	1.54
Basin Total	1.54

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
PARKING MOD	1.54
Impervious Total	1.54
Basin Total	1.54

Element Flows To:

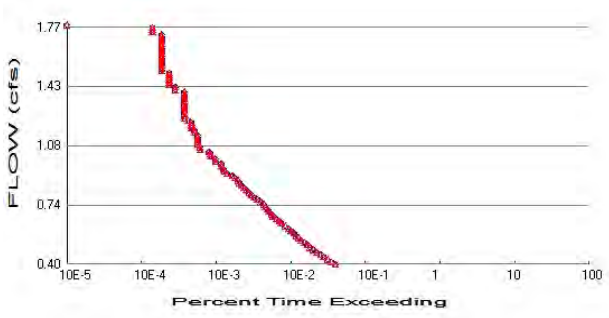
Surface	Interflow	Groundwater

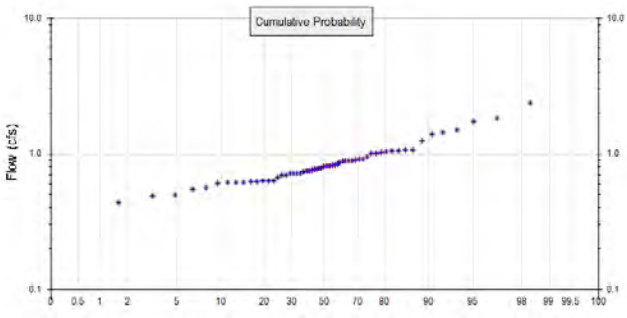
Routing Elements
Predeveloped Routing

Mitigated Routing

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0
Total Impervious Area: 1.54

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0
Total Impervious Area: 1.54

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.799465
5 year	1.07474
10 year	1.275042
25 year	1.549435
50 year	1.769834
100 year	2.004382

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.799465
5 year	1.07474
10 year	1.275042
25 year	1.549435
50 year	1.769834
100 year	2.004382

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	0.811	0.811
1950	0.799	0.799
1951	1.062	1.062
1952	0.774	0.774
1953	0.883	0.883
1954	1.241	1.241
1955	1.014	1.014
1956	0.436	0.436
1957	0.671	0.671
1958	1.735	1.735

1959	0.742	0.742
1960	0.750	0.750
1961	2.349	2.349
1962	0.898	0.898
1963	0.856	0.856
1964	0.545	0.545
1965	0.721	0.721
1966	0.713	0.713
1967	1.435	1.435
1968	0.718	0.718
1969	1.509	1.509
1970	0.633	0.633
1971	0.784	0.784
1972	1.041	1.041
1973	0.841	0.841
1974	1.060	1.060
1975	0.830	0.830
1976	0.615	0.615
1977	0.615	0.615
1978	0.492	0.492
1979	0.955	0.955
1980	0.915	0.915
1981	0.618	0.618
1982	0.698	0.698
1983	0.829	0.829
1984	0.778	0.778
1985	1.051	1.051
1986	1.008	1.008
1987	0.914	0.914
1988	0.817	0.817
1989	0.715	0.715
1990	0.631	0.631
1991	0.889	0.889
1992	0.767	0.767
1993	0.632	0.632
1994	0.701	0.701
1995	0.617	0.617
1996	1.056	1.056
1997	0.885	0.885
1998	1.016	1.016
1999	0.409	0.409
2000	1.821	1.821
2001	0.489	0.489
2002	0.561	0.561
2003	0.756	0.756
2004	1.400	1.400
2005	0.620	0.620
2006	0.892	0.892
2007	0.817	0.817
2008	0.744	0.744
2009	0.606	0.606

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	2.3495	2.3495
2	1.8205	1.8205
3	1.7352	1.7352

4	1.5092	1.5092
5	1.4348	1.4348
6	1.4002	1.4002
7	1.2411	1.2411
8	1.0619	1.0619
9	1.0601	1.0601
10	1.0559	1.0559
11	1.0507	1.0507
12	1.0411	1.0411
13	1.0160	1.0160
14	1.0139	1.0139
15	1.0081	1.0081
16	0.9549	0.9549
17	0.9150	0.9150
18	0.9137	0.9137
19	0.8976	0.8976
20	0.8920	0.8920
21	0.8894	0.8894
22	0.8846	0.8846
23	0.8832	0.8832
24	0.8562	0.8562
25	0.8410	0.8410
26	0.8297	0.8297
27	0.8286	0.8286
28	0.8172	0.8172
29	0.8170	0.8170
30	0.8112	0.8112
31	0.7991	0.7991
32	0.7843	0.7843
33	0.7784	0.7784
34	0.7739	0.7739
35	0.7673	0.7673
36	0.7564	0.7564
37	0.7497	0.7497
38	0.7440	0.7440
39	0.7415	0.7415
40	0.7206	0.7206
41	0.7183	0.7183
42	0.7149	0.7149
43	0.7125	0.7125
44	0.7013	0.7013
45	0.6981	0.6981
46	0.6707	0.6707
47	0.6332	0.6332
48	0.6322	0.6322
49	0.6308	0.6308
50	0.6198	0.6198
51	0.6176	0.6176
52	0.6174	0.6174
53	0.6150	0.6150
54	0.6148	0.6148
55	0.6057	0.6057
56	0.5615	0.5615
57	0.5448	0.5448
58	0.4922	0.4922
59	0.4888	0.4888
60	0.4361	0.4361
61	0.4092	0.4092

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.3997	839	839	100	Pass
0.4136	752	752	100	Pass
0.4274	665	665	100	Pass
0.4413	589	589	100	Pass
0.4551	537	537	100	Pass
0.4689	475	475	100	Pass
0.4828	432	432	100	Pass
0.4966	391	391	100	Pass
0.5104	357	357	100	Pass
0.5243	326	326	100	Pass
0.5381	293	293	100	Pass
0.5520	273	273	100	Pass
0.5658	251	251	100	Pass
0.5796	235	235	100	Pass
0.5935	216	216	100	Pass
0.6073	200	200	100	Pass
0.6212	179	179	100	Pass
0.6350	159	159	100	Pass
0.6488	149	149	100	Pass
0.6627	136	136	100	Pass
0.6765	124	124	100	Pass
0.6904	118	118	100	Pass
0.7042	109	109	100	Pass
0.7180	103	103	100	Pass
0.7319	98	98	100	Pass
0.7457	93	93	100	Pass
0.7596	85	85	100	Pass
0.7734	77	77	100	Pass
0.7872	69	69	100	Pass
0.8011	63	63	100	Pass
0.8149	59	59	100	Pass
0.8288	54	54	100	Pass
0.8426	50	50	100	Pass
0.8564	46	46	100	Pass
0.8703	44	44	100	Pass
0.8841	42	42	100	Pass
0.8980	38	38	100	Pass
0.9118	35	35	100	Pass
0.9256	30	30	100	Pass
0.9395	28	28	100	Pass
0.9533	27	27	100	Pass
0.9671	25	25	100	Pass
0.9810	25	25	100	Pass
0.9948	21	21	100	Pass
1.0087	21	21	100	Pass
1.0225	18	18	100	Pass
1.0363	18	18	100	Pass
1.0502	17	17	100	Pass
1.0640	13	13	100	Pass
1.0779	13	13	100	Pass
1.0917	12	12	100	Pass
1.1055	12	12	100	Pass
1.1194	12	12	100	Pass

1.1332	12	12	100	Pass
1.1471	12	12	100	Pass
1.1609	11	11	100	Pass
1.1747	11	11	100	Pass
1.1886	10	10	100	Pass
1.2024	10	10	100	Pass
1.2163	10	10	100	Pass
1.2301	9	9	100	Pass
1.2439	8	8	100	Pass
1.2578	8	8	100	Pass
1.2716	8	8	100	Pass
1.2855	8	8	100	Pass
1.2993	8	8	100	Pass
1.3131	8	8	100	Pass
1.3270	8	8	100	Pass
1.3408	8	8	100	Pass
1.3547	8	8	100	Pass
1.3685	8	8	100	Pass
1.3823	8	8	100	Pass
1.3962	8	8	100	Pass
1.4100	6	6	100	Pass
1.4238	6	6	100	Pass
1.4377	5	5	100	Pass
1.4515	5	5	100	Pass
1.4654	5	5	100	Pass
1.4792	5	5	100	Pass
1.4930	5	5	100	Pass
1.5069	5	5	100	Pass
1.5207	4	4	100	Pass
1.5346	4	4	100	Pass
1.5484	4	4	100	Pass
1.5622	4	4	100	Pass
1.5761	4	4	100	Pass
1.5899	4	4	100	Pass
1.6038	4	4	100	Pass
1.6176	4	4	100	Pass
1.6314	4	4	100	Pass
1.6453	4	4	100	Pass
1.6591	4	4	100	Pass
1.6730	4	4	100	Pass
1.6868	4	4	100	Pass
1.7006	4	4	100	Pass
1.7145	4	4	100	Pass
1.7283	4	4	100	Pass
1.7422	3	3	100	Pass
1.7560	3	3	100	Pass
1.7698	3	3	100	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.1558 acre-feet
On-line facility target flow:	0.2784 cfs.
Adjusted for 15 min:	0.2784 cfs.
Off-line facility target flow:	0.1577 cfs.
Adjusted for 15 min:	0.1577 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Total Volume Infiltrated		0.00	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

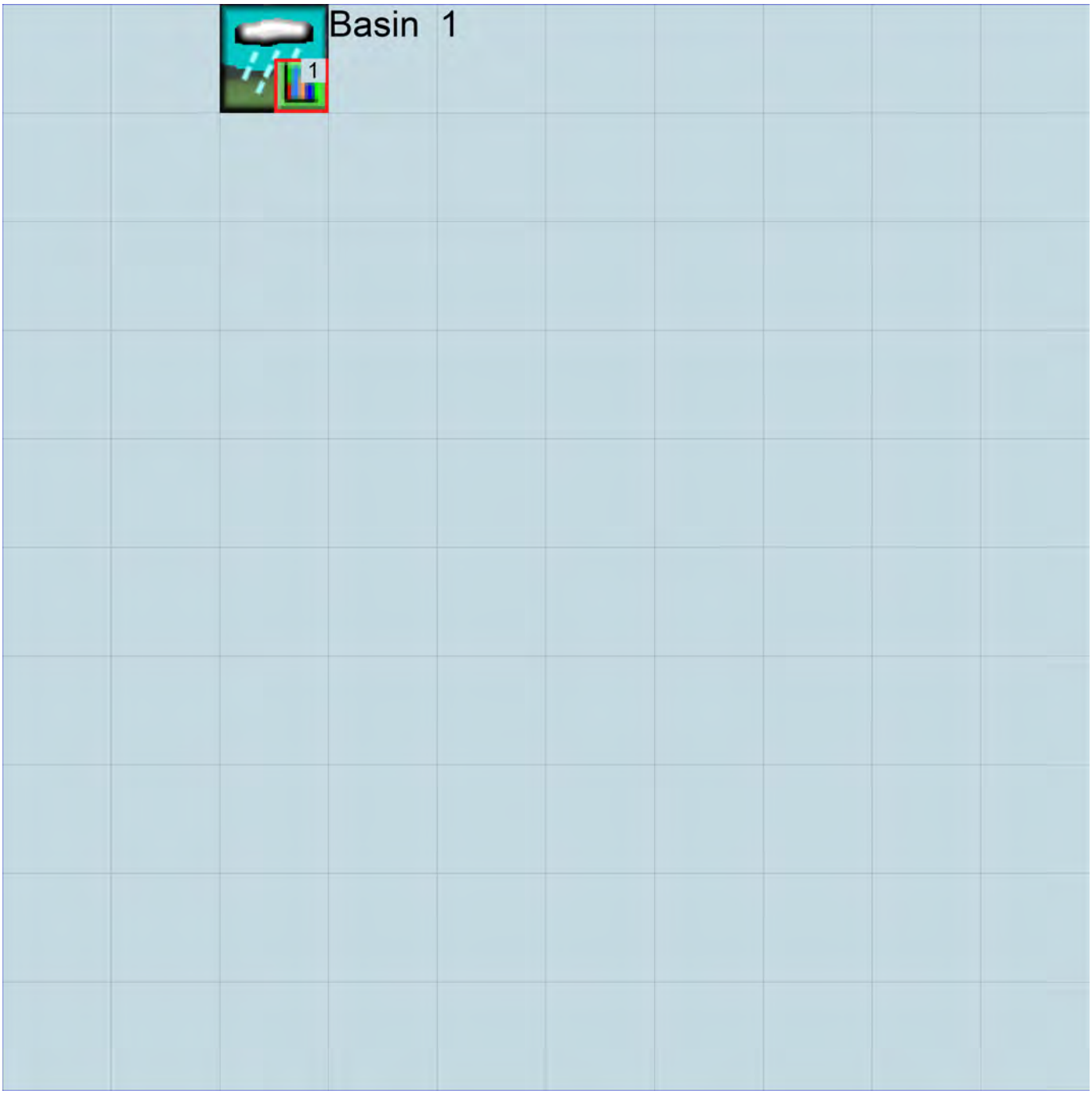
PERLND Changes

No PERLND changes have been made.

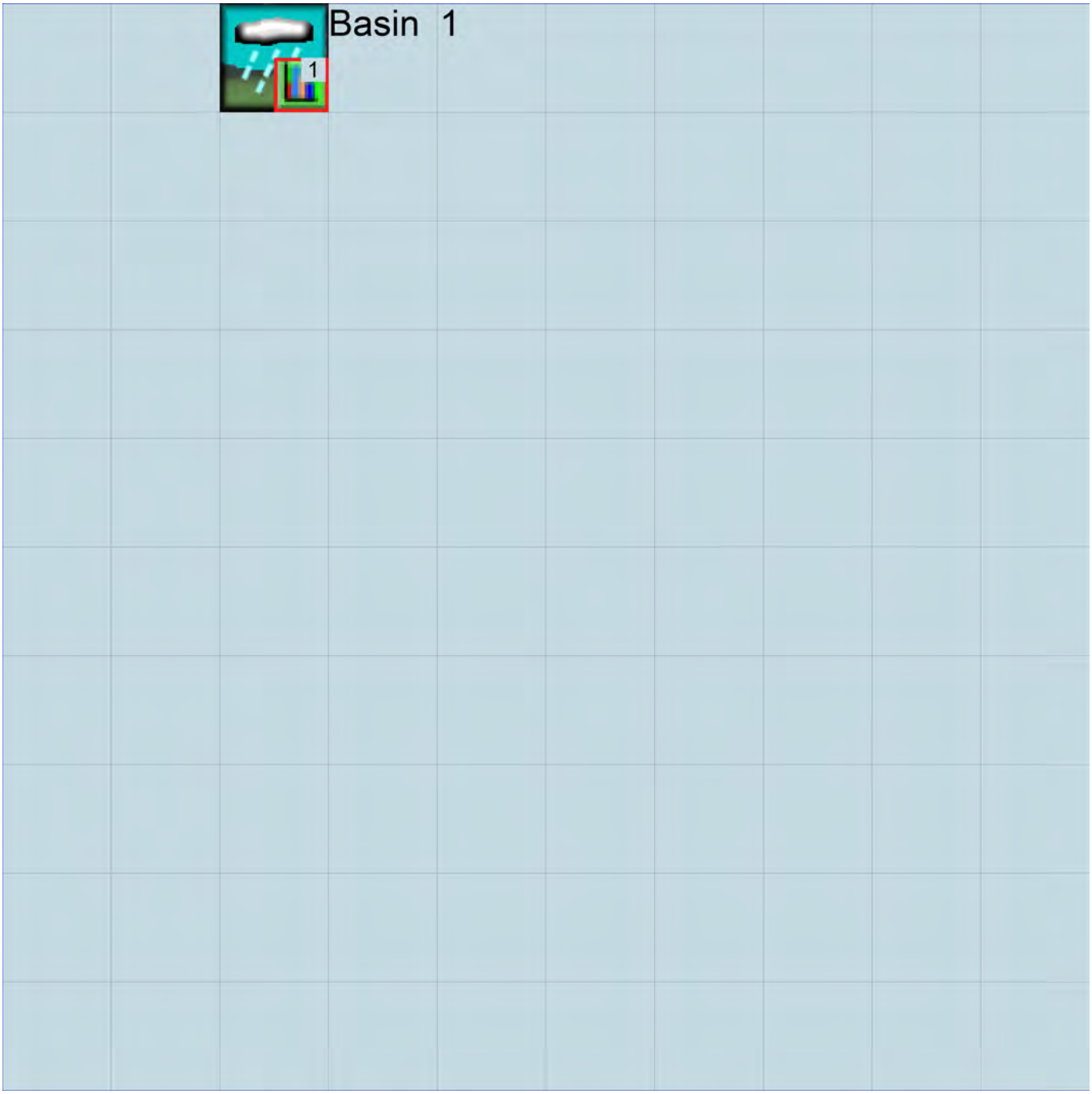
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   LynnwoodHaulingFacility.wdm
MESSU       25   PreLynnwoodHaulingFacility.MES
            27   PreLynnwoodHaulingFacility.L61
            28   PreLynnwoodHaulingFacility.L62
            30   POCLynnwoodHaulingFacility1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      IMPLND      12
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                         User  t-series Engl Metr ***
                                          in  out           ***
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
```

```
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS       AGWS      GWVS
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
   12      PARKING/MOD            1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    ***
   12         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL     *********
   12         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
   12         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
   12            400      0.05       0.1      0.08
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
   12              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
   12              0         0
  END IWAT-STATE1

END IMPLND
```

```
SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
IMPLND  12                        1.54     COPY   501     15

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                       in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                   ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *      *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                      ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP
```

```
END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   LynnwoodHaulingFacility.wdm
MESSU      25   MitLynnwoodHaulingFacility.MES
           27   MitLynnwoodHaulingFacility.L61
           28   MitLynnwoodHaulingFacility.L62
           30   POCLynnwoodHaulingFacility1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      IMPLND      12
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                         User  t-series Engl Metr ***
                                      in  out           ***
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
```

```
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS       AGWS      GWVS
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
   12      PARKING/MOD            1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    ***
   12         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL     *********
   12         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
   12         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
   12            400      0.05       0.1      0.08
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
   12              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
   12              0         0
  END IWAT-STATE1

END IMPLND
```

```
SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
IMPLND  12                        1.54     COPY   501     15

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                       in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                   ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *      *  *  *  *  *        ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                      ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP
```

```
END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

Disclaimer

Legal Notice

This program and accompanying documentation are provided 'as-is' without warranty of any kind. The entire risk regarding the performance and results of this program is assumed by End User. Clear Creek Solutions Inc. and the governmental licensee or sublicensees disclaim all warranties, either expressed or implied, including but not limited to implied warranties of program and accompanying documentation. In no event shall Clear Creek Solutions Inc. be liable for any damages whatsoever (including without limitation to damages for loss of business profits, loss of business information, business interruption, and the like) arising out of the use of, or inability to use this program even if Clear Creek Solutions Inc. or their authorized representatives have been advised of the possibility of such damages.

Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

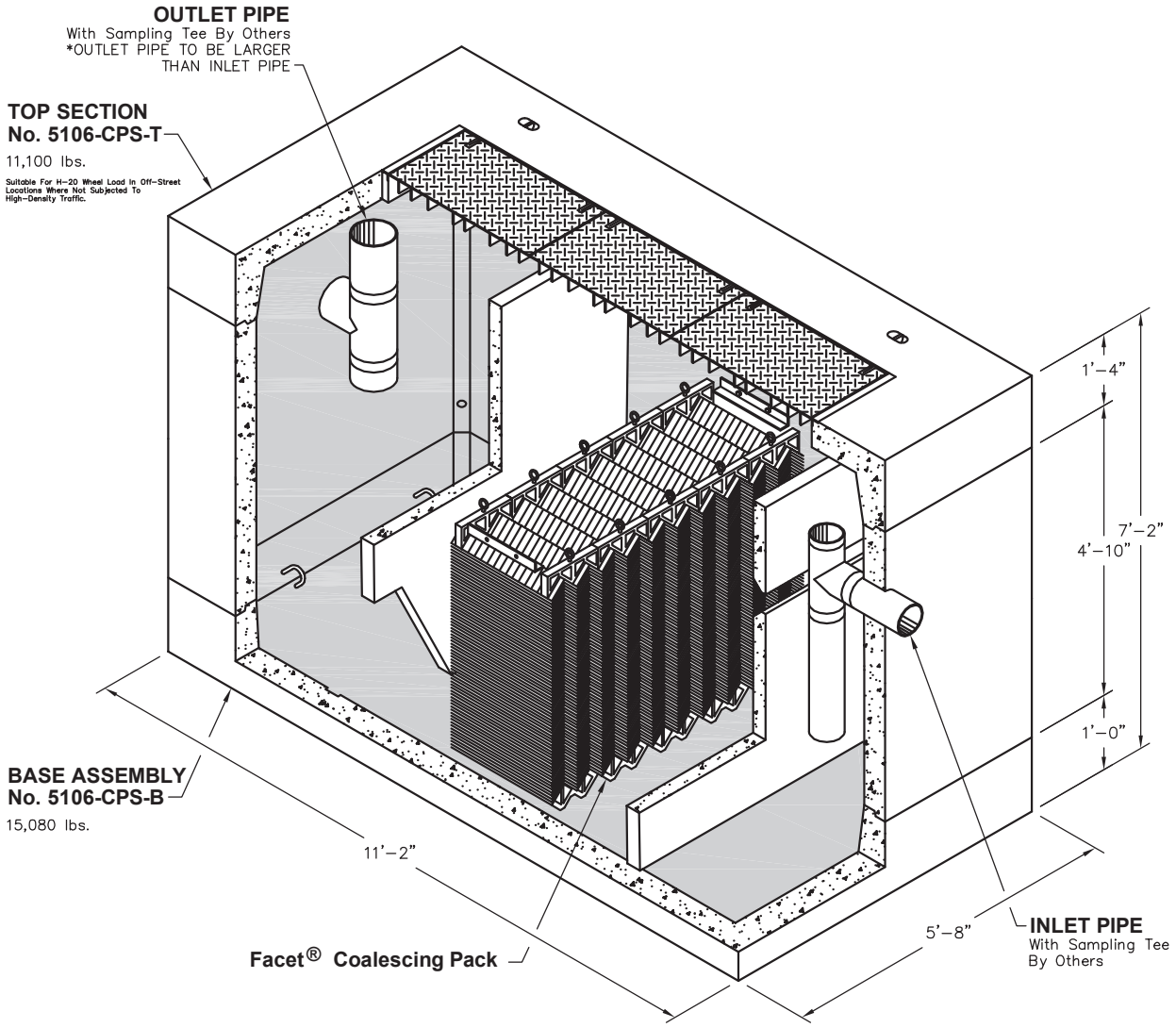
www.clearcreeksolutions.com

APPENDIX F

Oldcastle Oil Water Separator

5106-CPS OIL WATER SEPARATOR

Project Plate Area = 740 Sq/ft
Maximum Process Flow = 690 GPM



FOR DETAILS, SEE REVERSE>>

Items Shown Are Subject To Change Without Notice
Issue Date: April 2016

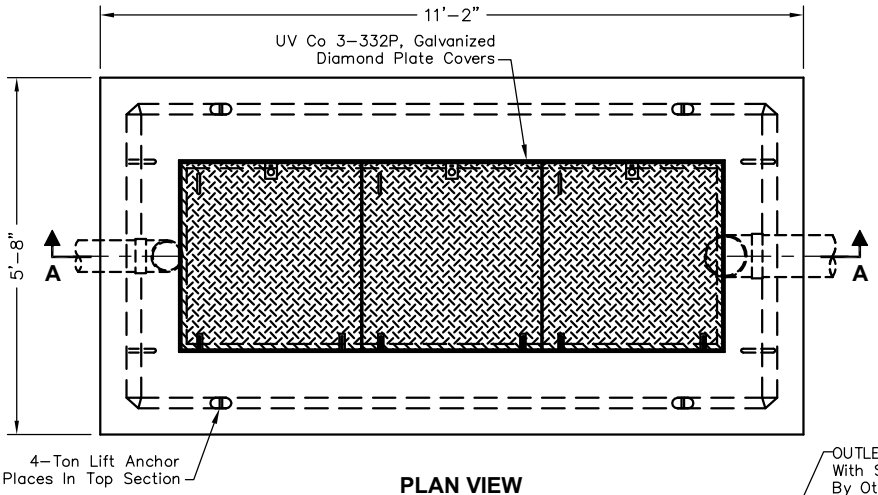
Mailing Address
PO Box 588
Auburn, WA 98071

Phone: 800-892-1538
Fax: 253-735-4201
Email: opauburn@oldcastle.com

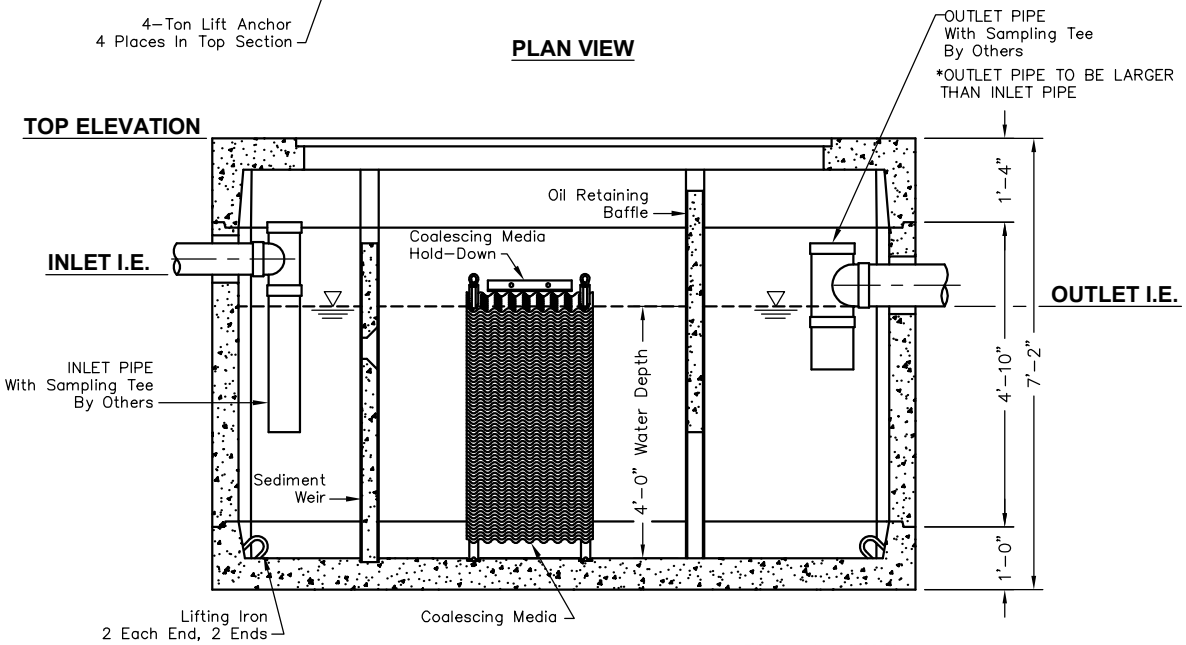
opauburn.com

5106-CPS

Project Plate Area = 740 Sq/ft
Maximum Process Flow = 690 GPM



PLAN VIEW



SECTION AA

STRUCTURAL NOTES:
1. Concrete: 28 Day Compressive Strength f'c= 7000 psi
2. Rebar: ASTM A–615 Grade 60
3. Mesh: ASTM A–185 Grade 65
4. Design: ACI–318–05 Building Code
   ASTM C–890 "Minimum Structural Design
   Loading For Underground Precast Concrete
   Water and Wastewater Structures"
5. Loads: HS–20 Truck Wheel w/ 30% Impact Per AASHTO

GENERAL NOTES:
1. All Baffles and Weirs To Be Precast Concrete
2. Static Water Depth = 4'–0"
3. Contractor to:
   Supply and Install All Piping & Sampling Tees
   Grout In All Pipes
   Fill With Clean Water Prior To "Start–Up" Of System
   Verify All BLockout Sizes and Locations

INFORMATION NEEDED:
Top Of Separator Elevation:
Inlet Pipe Size:
Inlet Pipe Elevation:
Outlet Pipe Size:
Outlet Pipe Elevation:

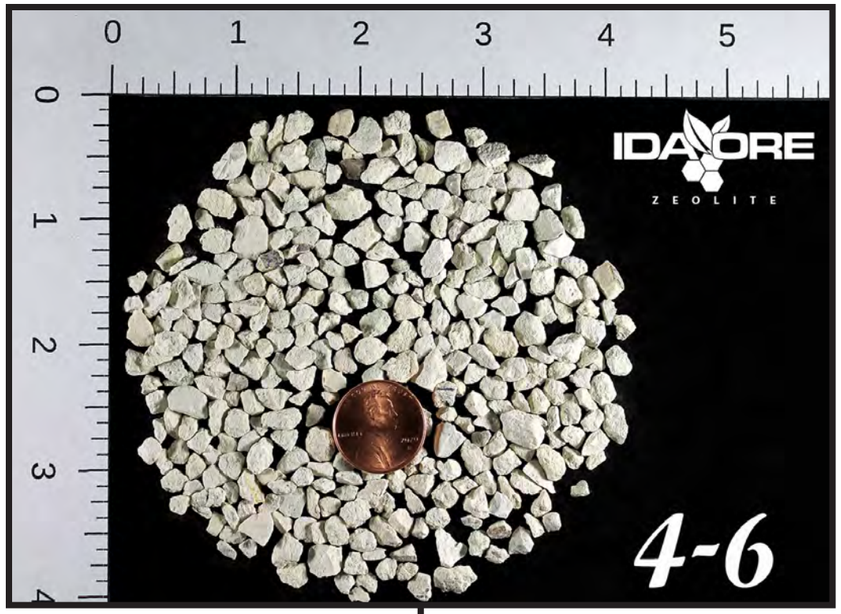
BASIC DESIGN INFORMATION:
INFLUENT CHARACTERISTICS:
Oil Specific Gravity: 0.88
Operating Temperature: 50°
Influent Oil Concentration: 100 ppm
Mean Oil Droplet Size: 130 Microns
0.33 ft/min Rise Rate
Designed Per Washington State Department Of Ecology

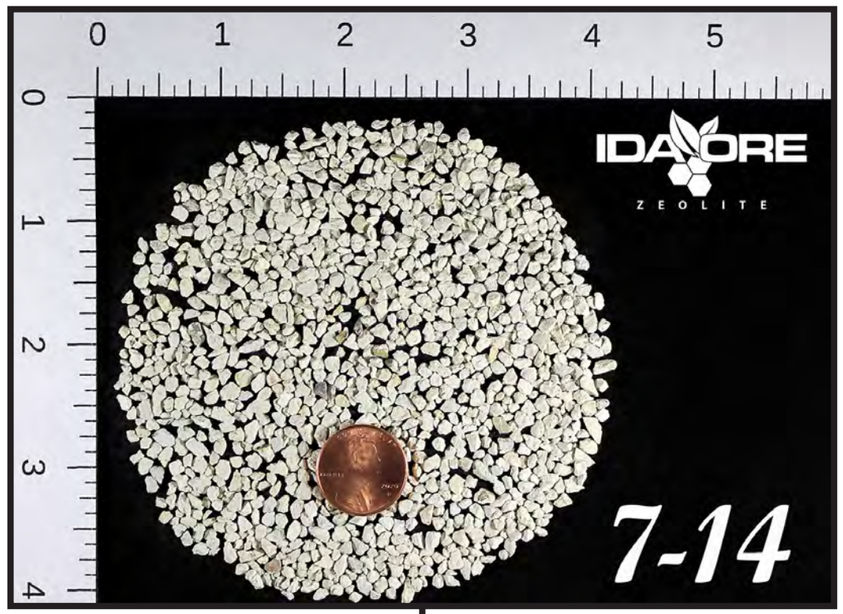
FLOW RATE	EFFLUENT QUALITY	100% COLLECTED SIZE
183 GPM	10 ppm	60 Micron

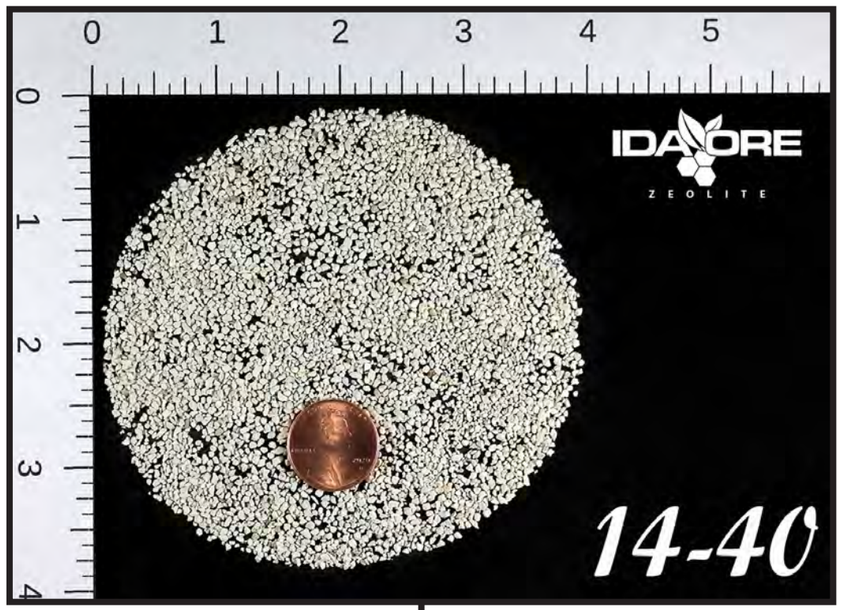
SCALE: 3/8"=1'-0"

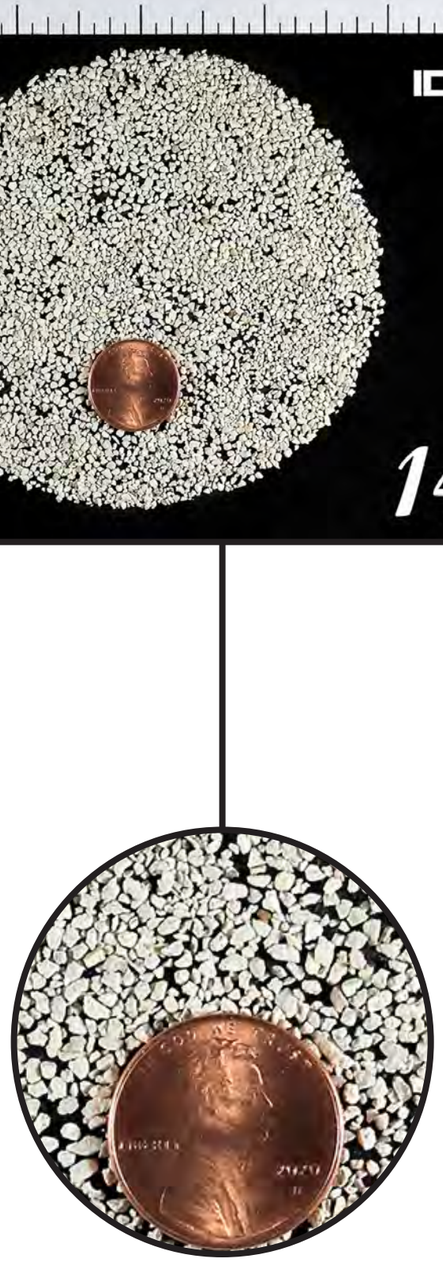
APPENDIX G

Zeolite Product Information

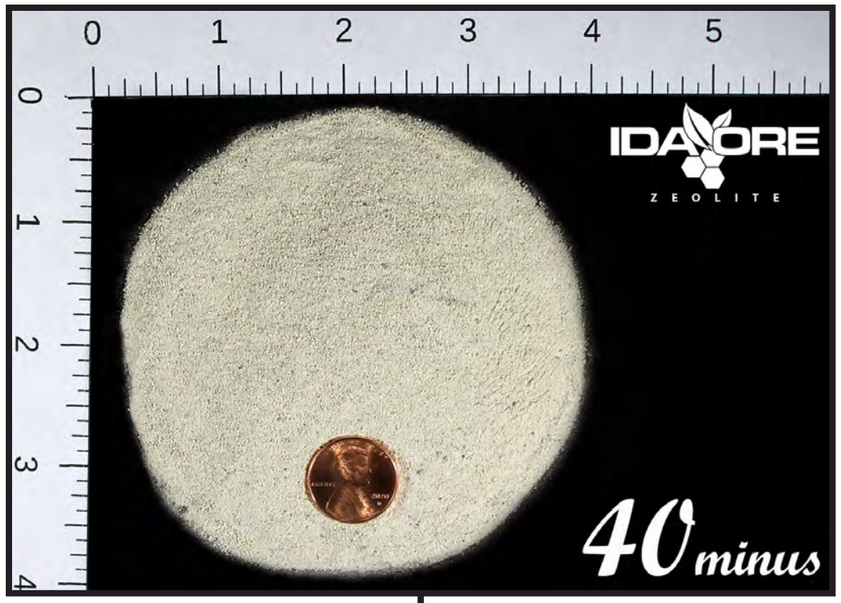


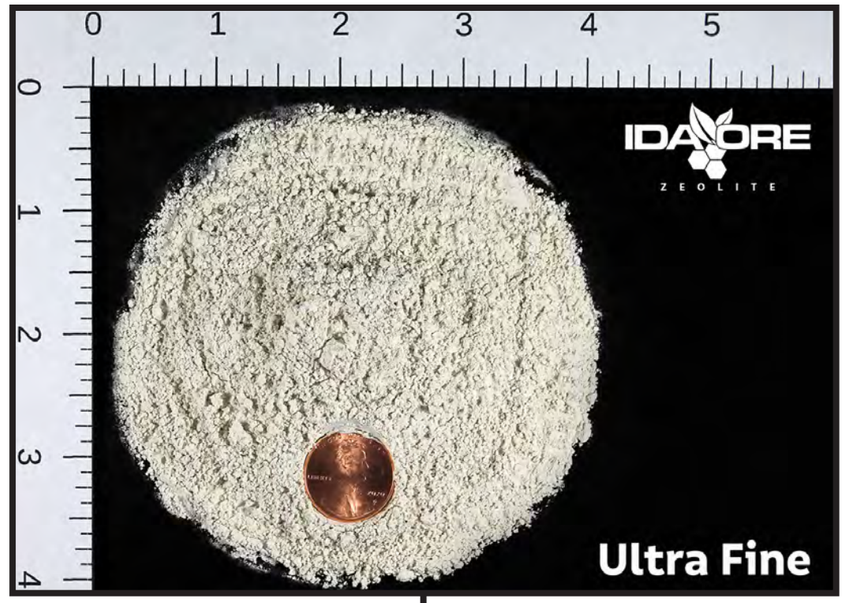






Zeolite Mesh Sizes Page 1





Zeolite Mesh Sizes Page 2

golder.com