STORMWATER SITE PLAN

Proposed Best Parking Lot
2412 Inter Avenue
Puyallup, WA 98371

Parcel Nos. 2105200320, 2105200350,
2105200340 and 2105200361

Prepared for:
Best Parking Lot Cleaning, Inc.
2412 Inter Ave
Puyallup, WA 98372
Contact: Rich Hamilton
rich@bestparkinglot.com

02-10-2022

Revised February 10, 2022
Revised August 31, 2021
February 14, 2020
BCE Job No. 20630

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TABLE OF EXHIBITS

Tab 1.0

1.0 PROJECT OVERVIEW

1.1 Purpose and Scope

The proposed Best Parking Lot project consists of approximately 1.6 acres of land located in Puyallup, Washington. The existing site is currently a gravel parking lot, which will be paved. A new stormwater pond will be constructed to handle runoff from the improved parking lot. Temporary erosion and sediment controls will also be constructed for the site during construction, in accordance with City requirements. The existing site has some vegetation around the perimiter of the gravel lot, comprised primarily of grass. The site is located at 2412 Inter Avenue – within a portion of Section 26, Township 20 North, Range 4 East, Willamette Meridian, City of Puyallup, and Pierce County, Washington. Please see the vicinity map included as Exhibit A.

This report provides the site information and an analysis used to design the stormwater facilities that will provide the detention, water quality, and conveyance for approximately 1.6 acres pursuant to development. An application for a SEPA determination has been submitted for this site to the City of Puyallup. The proposed project site is designed to meet the 2012/2014 Department of Ecology Stormwater Management Manual for Western Washington requirements.

1.2 Pre-Developed Conditions

The proposed project site consists of approximately 1.6 acres of land located between Inter Avenue and the BNRR tracks, west of Shaw Road within the City of Puyallup. The existing site is a gravel parking lot and equipment storage yard. There is a narrow strip of grass around the perimeter of the site.

The existing site gently slopes from south to north. There are existing stormwater conveyance pipes located within the right-of-way north of the property.

Drainage from the site appears to drain north to the street and collect in the existing catch basins within Inter Avenue. The storm system flows west within the right-of-way, eventually discharging to Deer Creek and then the Puyallup River.

1.3 Post Developed Conditions

The proposal for this project is to pave the existing gravel parking lot and construct a detention pond at the east end of the site. Site grades will be revised so the parking lot drains into the pond and to provide adequate storage volume in the pond for detention. The two existing driveways to Inter Avenue will remain but will be improved to meet City requirements.

Tab 2.0

2.0 EXISTING CONDITIONS SUMMARY

2.1 General Requirements

The proposed project site is designed to meet the detention and water quality requirements of the 2012/2014 DOE Stormwater Management Manual for Western Washington and the requirements of the City of Puyallup.

ANALYSIS OF THE MINIMUM REQUIREMENTS

Minimum Requirement No. 1: Preparation of Stormwater Site Plans.

Response: This report submitted with the construction drawings for this site satisfy this requirement.

Minimum Requirement No. 2: Construction Stormwater Pollution Prevention (SWPP).

Response: See Exhibit H for the SWPPP and for the responses for the 13 elements.

Minimum Requirement No. 3: Source Control of Pollution.

Response: Good housekeeping measures will be used to keep the site clean and to reduce the chance that stormwater will come into contact with pollutants.

Minimum Requirement No. 4: Preservation of Natural Drainage Systems and Outfalls.

Response: This site drains to the existing conveyance system north of the site. The drainage will continue to be directed into the right-of-way and then west into Deer Creek and the Puyallup River.

Minimum Requirement No. 5: On-site Stormwater Management.

Response: Post-Construction Soil Quality and Depth will be used for the landscaped areas. typically required for these surfaces. Additional LID best management practices are not proposed for this site. The runoff from the project site will be collected and routed to the detention pond located in the east corner of the site to satisfy this requirement. See Section 4.3 for additional narrative.

Minimum Requirement No. 6: Runoff Treatment.

Response: Because this site is commercial, enhanced water quality is required. A BioPod filter vault is proposed to treat runoff prior to entering the storm pond. The BioPod has received Department of Ecology General Use Level Designation (GULD) for enhanced treatment and will function to satisfy this requirement.

Minimum Requirement No. 7: Flow Control.

Response: Flow control is being provided with the proposed detention pond facility located onsite. The detention system will utilize 6 feet of live storage and will meet duration standards required to satisfy this Minimum Requirement.

Minimum Requirement No. 8: Wetlands Protection.

Response: The site drains to Deer Creek to the west. There are wetlands associated with Deer Creek downstream of the site. Flow control and water quality treatment are being provided onsite.

Minimum Requirement No. 9: Operation and Maintenance

The Operation and Maintenance for the site is provided in Exhibit I to satisfy this requirement.

2.2 Drainage Basin

The proposed project is located in the Shaw Road Basin of Puyallup. A review of available information confirms that runoff from the site flows west within Inter Avenue and discharges into Deer Creek. Deer Creek flows northwest into the Puyallup River and ultimately into the Puget Sound.

2.3 Soil Conditions

The existing soil conditions consist of Briscot loam (Type D as depicted on Exhibit B SCS Soils map). The Geotechnical Evaluation prepared for the site describes the subsurface soils as fill over silty sand (ML and SM). This report also notes that infiltration is not feasible for this site.

The site was conservatively modeled as 'flat, type C, forest' for existing conditions.

2.4 Critical / Sensitive Areas

A review of the critical area map provided by the City of Puyallup show that the site does not include any critical areas. The Critical Area Map is included in Exhibit J.

Tab 3.0

3.0 OFF-SITE ANALYSIS

3.1 Upstream Tributary Area

The project site is bordered on the west by the Best Parking building and parking lot, railroad tracks to the south and Inter Avenue to the north. There is no offsite drainage directed to the site.

3.2 Downstream Analysis

The downstream path from the site is based on the available information including record drawings, GIS maps, and a field visit. Runoff from the site flows north into the right-of-way. The existing underground storm conveyance system in the right-of-way flows west within Inter Avenue approximately 1200 feet before discharging to Deer Creek. Deer Creek flows northwest, eventually joining the Puyallup River which is tributary to the Puget Sound.

Please refer to the attached Downstream Drainage Path Map, Exhibit J.

Tab 4.0

4.0 PERMANENT STORMWATER CONTROL PLAN

4.1 Existing Site Hydrology

The existing 1.6-acre site is an existing gravel parking and equipment storage yard. The site slopes from south to north at approximately 1.5%. There are existing stormwater conveyance pipes located along the south edge of the Inter Avenue, adjacent to the north edge of the site. The site is considered flat till forest for existing conditions. See Exhibit C for the Existing Conditions Basin Map.

4.2 Developed Site Hydrology

Under developed conditions, the existing parking lot will be paved, and a storm detention facility (pond and flow control riser) will be constructed in the east corner of the site. Runoff from approximately 1.6 acres of area will be detained and treated as required. See Exhibit D - Developed Conditions Basin Map.

The TESC facilities will include drainage swales around the site perimeter which will drain to a sediment pond in the east corner. The proposed detention facility will be as a TESC pond during construction. Sediment accumulated during construction will be removed prior to the end of construction. Discharge from the detention facility will be directed to the existing closed conveyance system within City right-of-way. The storm drainage proposal conforms to the requirements of the 2012/2014 Department of Ecology Stormwater Management Manual and City of Puyallup requirements.

4.3 Performance Standards and Goals

Calculations are shown using Western Washington Hydrology Model (WWHM2012) to size the detention system based on the DOE Standards. The detention system, which provides 6 feet of live storage, has the volume capacity to detain the developed flows anticipated from this site, as predicted using the WWHM. Please see the Exhibit E for hydrology calculations.

This project is required to provide enhanced water quality treatment for the runoff from pollution generating surfaces.

This development triggers all of the minimum requirements, including Minimum Requirement #5 – Stormwater Management. In order to meet this requirement, List #2 was evaluated for each surface to determine which LID BMPs could be used on this site. See below for feasibility analysis:

- Lawn and Landscape Areas:
    - Post-Construction Soil Quality and Depth (BMP T5.13)
        - This BMP is feasible and will be used onsite.
- Roof Areas:
        - Not applicable because this project does not include building construction.
- Other Hard Surfaces:
    - Full Dispersion

- This site is not proposing to protect at least 65% of the site in native condition or forest to allow full dispersion onsite.

- Permeable Pavement
  - Infiltration is not recommended for this site.
- Bio Retention
  - Infiltration is not recommended for this site.
- Sheet flow dispersion
  - Infeasible due to site and size constraints.

4.4 Flow Control System

Per the Geotechnical Evaluation, infiltration is not feasible on the project site.

The detention system proposed is an open pond in the east corner of the site that will be lined to prevent the potential in-flow from high groundwater. The detention system is sized to provide the required volume to meet the duration standards of the project.

The calculations to size the detention system are included as Exhibit E Detention Analysis and Design.

4.5 Water Quality System

This project is required to provide enhanced water quality treatment for the runoff from pollution generating surfaces.

This project proposes to utilize a vault/filter-media type water quality unit to provide enhanced treatment for the proposed improvements. The unit has obtained Department of Ecology (DOE) approval for enhanced water quality treatment. Please refer to Exhibit F for water quality calculations and the GULD approval.

This site is not considered a high use site; therefore, oil control is not required.

4.6 Conveyance System Analysis and Design

The conveyance calculations included as Exhibit G to this Report, demonstrate that the proposed system can convey the 25-year, 24-hour storm event without overtopping.

Tab 5.0

5.0 CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A construction stormwater pollution prevention plan (SWPPP) has been prepared and is included as Exhibit H.

Tab 6.0

6.0 SPECIAL REPORTS AND STUDIES

The following report has been prepared for this project site:

- Geotechnical Evaluation, Proposed Parking Lot Redevelopment, 2512 Inter Avenue, Puyallup, Washington by Earth Solutions NW, LLC, dated February 12, 2019

- Groundwater Monitoring Program Summary, Best Parking Lot Cleaning Site Improvements, 2412 Inter Avenue, Puyallup, Washington by Earth Solutions NW, LLC, dated April 27, 2021.

- Detention Pond Liner & Pavement Recommendations, Best Parking Lot Cleaning Site Improvements, 2512 Inter Avenue, Puyallup, Washington by Earth Solutions NW, LLC, dated August 3, 2021

Earth Solutions NW LLC
Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

February 12, 2019
ES-6481

Best Parking Lot Cleaning, Inc.
2412 Inter Avenue
Puyallup, Washington 98372

Attention: Mr. Rich Hamilton

Subject: Geotechnical Evaluation
Proposed Parking Lot Redevelopment
2512 Inter Avenue
Puyallup, Washington

Reference: Timothy J. Walsh
Geologic Map of the South Half of the Tacoma Quadrangle, Washington, 1987

CES NW, Inc.
Topographic Survey, dated May 30, 2018

United States Department of Agriculture
Natural Resources Conservation Service
Online Web Soil Survey (WSS) Resource

Dear Mr. Hamilton:

As requested, Earth Solutions NW, LLC (ESNW) has prepared this geotechnical evaluation for the subject site. We performed our work in general accordance with the scope of services outlined in our proposal dated December 18, 2018 and authorized by you on January 2, 2019. A summary of our subsurface exploration and pertinent geotechnical considerations are provided in this letter.

Project Description

We understand the existing gravel parking lot, in the eastern portion of the site, will be improved. The feasibility of using shallow infiltration facilities to accommodate stormwater runoff from new impervious surfaces was the primary focus of our investigation. Infiltration facilities would likely be installed in the northeastern portion of the site, where feasible.

This letter has been prepared for the exclusive use of Best Parking Lot Cleaning, Inc. and their representatives. A warranty is neither expressed nor implied. The recommendations and conclusions provided in this letter are professional opinions consistent with the level of care and skill that is typical of other members in the profession currently practicing under similar conditions in this area. Variations in the soil and groundwater conditions encountered at the test pit locations may exist and may not become evident until construction. ESNW should reevaluate the contents of this letter if variations are encountered.

Surface Conditions

The subject site is located on the south side of Inter Avenue, about 450 feet east of the intersection with 23rd Street Southeast, in Puyallup, Washington. The approximate location of the property is illustrated on Plate 1 (Vicinity Map). The property is comprised of four tax parcels (Pierce County Parcel Nos. 210520-0320, -0350, -0340, and -0361) totaling approximately 2.79 acres. Two commercial buildings, asphalt parking, gravel parking, and related infrastructure improvements currently occupy the site. The site is surrounded to the north by Inter Avenue, to the south and east by BNSF railroad tracks, and to the west by a commercial development. Site topography is relateively level, with little discernible elevation change across the property. Vegetation primarily consists of scattered trees and grass.

Subsurface Conditions

An ESNW representative observed, logged, and sampled three test pits, excavated within accessible areas of the site, on January 30, 2019 using a trackhoe and operator provided by the client. The approximate locations of the test pits are depicted on Plate 2 (Test Pit Location Plan). Please refer to the attached test pit logs for a more detailed description of subsurface conditions. Representative soil samples collected at the test pit locations were analyzed in accordance with both Unified Soil Classification System (USCS) and United States Department of Agriculture (USDA) methods and procedures.

Topsoil and Fill

Topsoil was not encountered at the test pit locations. Given the existing level of site development, we do no anticipate topsoil will be consequential during the proposed construction.

Fill was encountered at the test pit locations to depths of approximately one to two and one-half feet below the existing ground surface (bgs). The fill was characterized as crushed rock or silty gravel with sand (USCS: GM) and was encountered in a medium dense and moist condition. Where encountered during construction, ESNW can evaluate fill deposits, as necessary.

Native Soil

Underlying fill, native soils at depth were characterized primarily as loose to medium dense silty sand (USCS: SM). The upper two feet was predominately silt (USCS:ML) with various amounts of sand and gravel. The native soils were observed primarily in a moist to wet condition. The maximum exploration depth was approximately 10 feet bgs.

Geologic Setting

The referenced geologic map resource identifies alluvium (Qal) as the primary geologic unit underlying the subject site and surrounding areas. Alluvial deposits are dominant in the Puyallup Valley and typically consist of loose, stratified to massively bedded fluvial silt, sand, and gravel, and locally includes sandy to silty estuarine deposits.

The referenced WSS resource identifies Briscot loam (Map Unit Symbol: 6A) as the primary soil unit underlying the subject site. The Briscot series was formed in flood plains. Based on our field observations, native soils on the subject site are consistent with alluvium, as outlined in this section.

Groundwater

During our subsurface exploration completed on January 30, 2019, groundwater was encountered at the test pit locations between depths of roughly three to eight feet bgs. Our interpretation of field conditions is that groundwater seepage is present in the upper three to four feet bgs, and the groundwater table occurs at about seven to eight feet bgs. Even though our fieldwork occurred during the wet season, our observed groundwater elevations should not be considered representative of the seasonal high without confirmation by a seasonal groundwater monitoring program.

It is our opinion that the contractor should be prepared to manage groundwater during construction, especially within deeper site excavations. Temporary measures to control surface water runoff and groundwater during construction would likely involve interceptor trenches, sumps, and dewatering pumps. It should be noted seepage rates and elevations fluctuate depending on many factors, including precipitation duration and intensity, the time of year, and soil conditions. In general, groundwater flow rates are higher during the winter, spring, and early summer months.

Stormwater Facility Considerations

We understand shallow infiltration facilities are proposed to accommodate stormwater runoff from new impervious surfaces. As indicated in the *Subsurface* section of this letter, native soils encountered during our fieldwork were characterized primarily as loose to medium dense alluvial deposits. Given the relatively high fines content and presence of a shallow groundwater table, it is our opinion infiltration is not feasible from a geotechnical standpoint.

Alternatively, we understand detention may be utilized for stormwater management. At the time of this letter, specific detention plans were not available for review; however, based on our field observations, in general, it is our opinion construction of a detention facility is feasible from a geotechnical standpoint. Design and installation of a detention facility must consider seasonal groundwater elevations, which were estimated at about seven feet bgs (in the northern site area) at the time of our January 2019 fieldwork. Perched groundwater seepage should be anticipated within detention facility excavations. Final detention facility designs must incorporate adequate buffer space from property boundaries such that temporary construction excavations may be successfully completed. ESNW can provide additional recommendations and design parameters to aid with detention facility design, if needed, as project plans develop.

ESNW should have an opportunity to review final project plans with respect to the geotechnical recommendations provided in this letter. ESNW should also be retained to observe the construction of detention facilities on site to provide supplementary testing and recommendations, where necessary.

We trust this letter meets your current needs. If you have questions regarding the content herein, or require additional information, please call.

Sincerely,

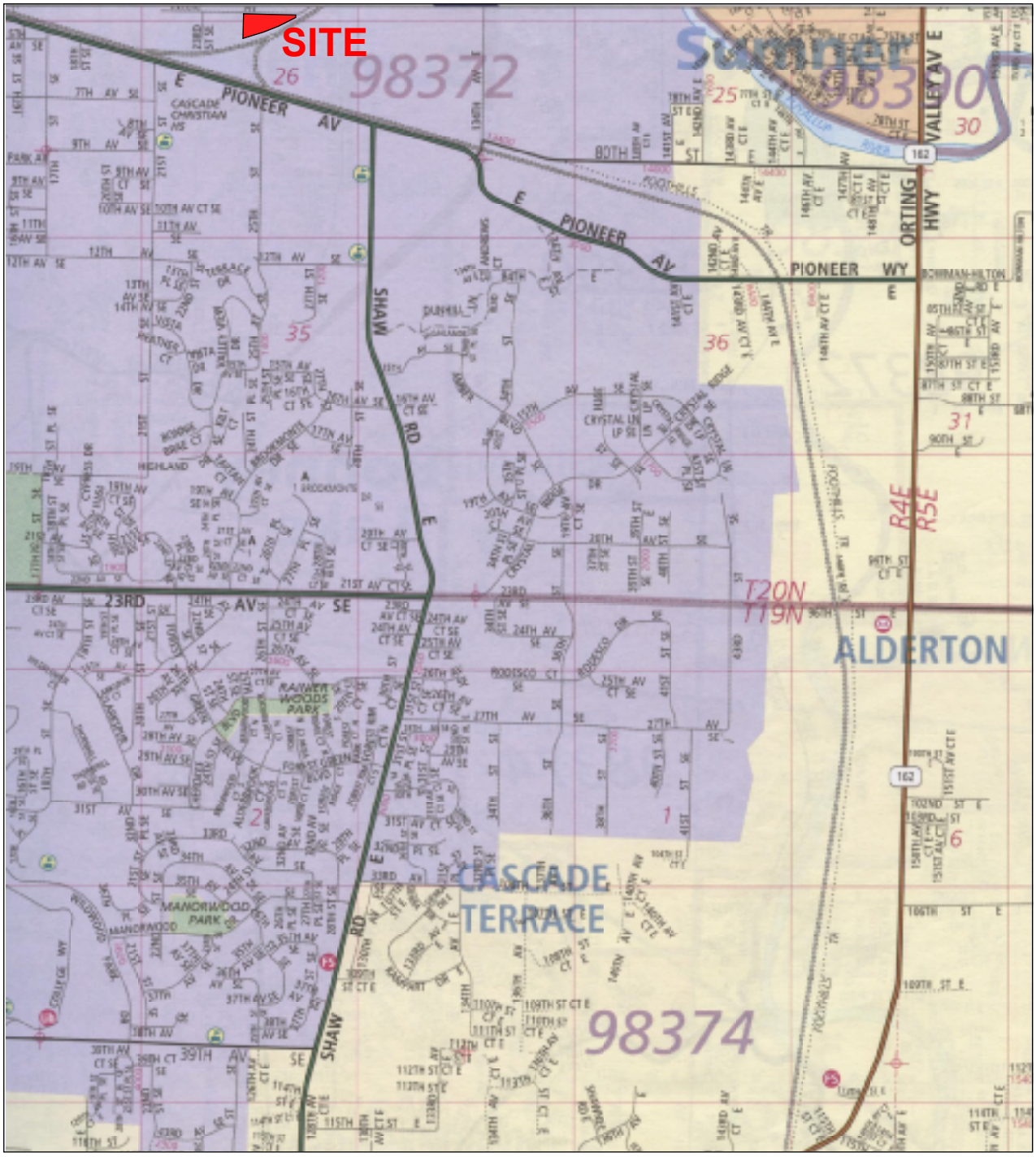
EARTH SOLUTIONS NW, LLC

KEVEN D. HOFFMANN
STATE OF WASHINGTON
53734
REGISTERED
PROFESSIONAL ENGINEER
02/12/2019

Terry J. Dunn
Staff Geologist

Keven D. Hoffmann, P.E.
Senior Project Manager

Attachments: Plate 1 – Vicinity Map
Plate 2 – Test Pit Location Plan
Test Pit Logs
Grain Size Distribution



Reference:
Pierce County, Washington
Map 835
By The Thomas Guide
Rand McNally
32nd Edition

NORTH

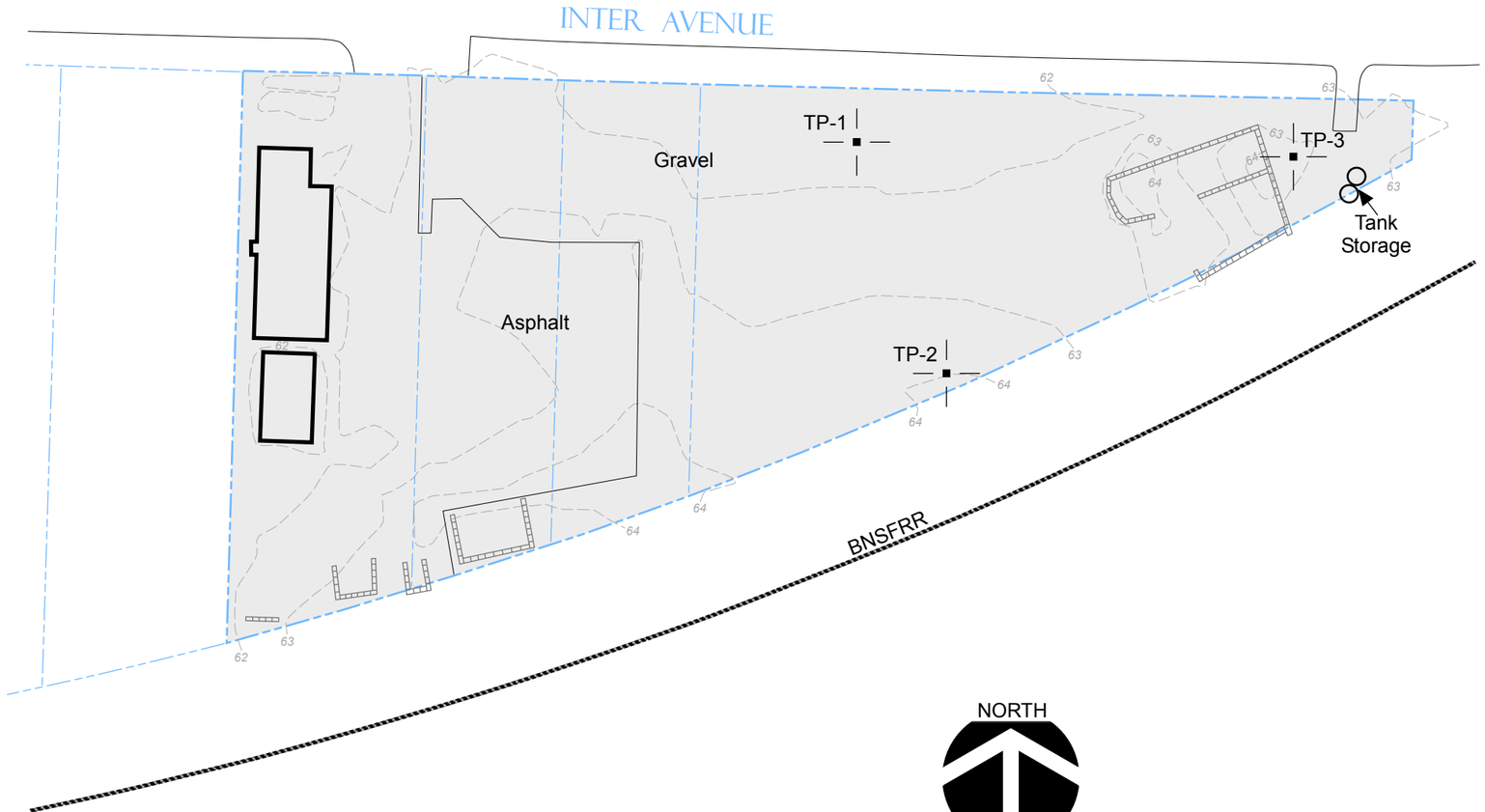
NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Vicinity Map
Best Parking
Puyallup, Washington

Drwn. CAM	Date 02/06/2019	Proj. No. 6481
Checked TJD	Date Feb. 2019	Plate 1



LEGEND

TP-1 — Approximate Location of ESNW Test Pit, Proj. No. ES-6481, Jan. 2019

Subject Site

Existing Building

Existing Concrete Block Wall

NORTH

1"=80'

0 40 80 160

Scale in Feet

NOTE: The graphics shown on this plate are not intended for design purposes or precise scale measurements, but only to illustrate the approximate test locations relative to the approximate locations of existing and / or proposed site features. The information illustrated is largely based on data provided by the client at the time of our study. ESNW cannot be responsible for subsequent design changes or interpretation of the data by others.

NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

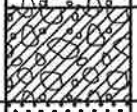
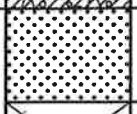
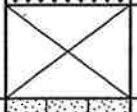
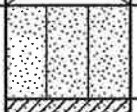
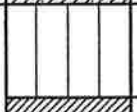
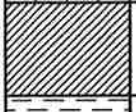
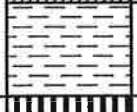
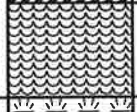
Test Pit Location Plan
Best Parking
Puyallup, Washington

Earth Solutions NW LLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Drwn. By	CAM
Checked By	TJD
Date	02/06/2019
Proj. No.	6481
Plate	2

Earth Solutions NW LLC

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

DUAL SYMBOLS are used to indicate borderline soil classifications.

The discussion in the text of this report is necessary for a proper understanding of the nature of the material presented in the attached logs.

Earth Solutions NW
1805 - 136th Place N.E., Suite 201
Bellevue, Washington 98005
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-1

PROJECT NUMBER ES-6481 **PROJECT NAME** Best Parking

DATE STARTED 1/30/19 **COMPLETED** 1/30/19 **GROUND ELEVATION** 61 ft **TEST PIT SIZE**

EXCAVATION CONTRACTOR Client Provided **GROUND WATER LEVELS:**

EXCAVATION METHOD ▽ **AT TIME OF EXCAVATION** 8.0 ft / Elev 53.0 ft

LOGGED BY TJD **CHECKED BY** KDH **AT END OF EXCAVATION** ---

NOTES Depth of Topsoil & Sod 6": crushed rock minus **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0			FILL	0.5	Crushed rock minus	60.5
			GM		Gray silty GRAVEL with sand, medium dense, moist (Fill)	
				2.0	-increased gravel content	59.0
		MC = 22.20% Fines = 66.70%	ML		Gray gravelly SILT, loose to medium dense, moist [USDA Classification: gravelly LOAM] -caving to 8'	
				4.0	-light groundwater seepage at 4'	57.0
5		MC = 28.80%	SM		Gray silty fine SAND, loose to medium dense, moist to wet -iron oxide staining -moderate to heavy groundwater seepage	
		MC = 25.90%			-increased sand content -becomes black, wet	
					▽ -groundwater table	
10		MC = 26.80% Fines = 12.60%		10.0	[USDA Classification: slightly gravelly SAND]	51.0
					Test pit terminated at 10.0 feet below existing grade. Groundwater table encountered at 8.0 feet and groundwater seepage encountered at 4.0 and 6.0 feet during excavation. Caving observed from 3.0 to 8.0 feet. Bottom of test pit at 10.0 feet.	

Earth Solutions NW
1805 - 136th Place N.E., Suite 201
Bellevue, Washington 98005
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-2

PROJECT NUMBER ES-6481 **PROJECT NAME** Best Parking

DATE STARTED 1/30/19 **COMPLETED** 1/30/19 **GROUND ELEVATION** 63 ft **TEST PIT SIZE**

EXCAVATION CONTRACTOR Client Provided **GROUND WATER LEVELS:**

EXCAVATION METHOD **AT TIME OF EXCAVATION** ---

LOGGED BY TJD **CHECKED BY** KDH **AT END OF EXCAVATION** —

NOTES Depth of Topsoil & Sod 4"-6": crushed rock minus **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0			FILL		0.5 Crushed rock minus	62.5
			GM		Gray silty GRAVEL with sand, medium dense, damp to moist (Fill)	
					2.5	60.5
		MC = 31.70%	ML		Gray SILT with sand, loose to medium dense, moist to wet -iron oxide staining	
		MC = 29.40%			4.5 -light groundwater seepage	58.5
5			SM		Gray silty fine SAND, loose to medium dense, moist to wet -caving from 4.5' to 8'	
		MC = 28.80% Fines = 37.30%			-iron oxide staining [USDA Classification: very fine sandy LOAM] -moderate groundwater seepage -becomes black, wet	
10		MC = 32.50%			10.0	53.0
					Test pit terminated at 10.0 feet below existing grade. Groundwater seepage encountered at 4.0 and 8.0 feet during excavation. Caving observed from 4.5 to 8.0 feet. Bottom of test pit at 10.0 feet.	

Earth Solutions NW
1805 - 136th Place N.E., Suite 201
Bellevue, Washington 98005
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-3

PROJECT NUMBER ES-6481 **PROJECT NAME** Best Parking

DATE STARTED 1/30/19 **COMPLETED** 1/30/19 **GROUND ELEVATION** 63 ft **TEST PIT SIZE**

EXCAVATION CONTRACTOR Client Provided **GROUND WATER LEVELS:**

EXCAVATION METHOD ▽ **AT TIME OF EXCAVATION** 7.0 ft / Elev 56.0 ft

LOGGED BY TJD **CHECKED BY** KDH **AT END OF EXCAVATION** ---

NOTES Depth of Topsoil & Sod 6"-10": 2"-4" quarry spalls **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			FILL		Quarry spalls Crushed rock minus
				0.9	62.1
		MC = 25.30%	ML		Gray SILT with sand, loose to medium dense, moist to wet
		MC = 33.00% Fines = 84.40%		3.0	-light groundwater seepage at 3', caving from 3' to 7'
					60.0
			SM		Gray fine silty SAND, loose to medium dense, wet [USDA Classification: LOAM]
5					-light groundwater seepage -iron oxide staining to 8' -silt lens
		MC = 32.10%			▽ -groundwater table
		MC = 31.60%		9.5	53.5
					Test pit terminated at 9.5 feet below existing grade. Groundwater table encountered at 7.0 feet and groundwater seepage encountered at 3.0 and 5.0 feet during excavation. Caving observed from 3.0 to 7.0 feet. Bottom of test pit at 9.5 feet.

Earth Solutions NW, LLC
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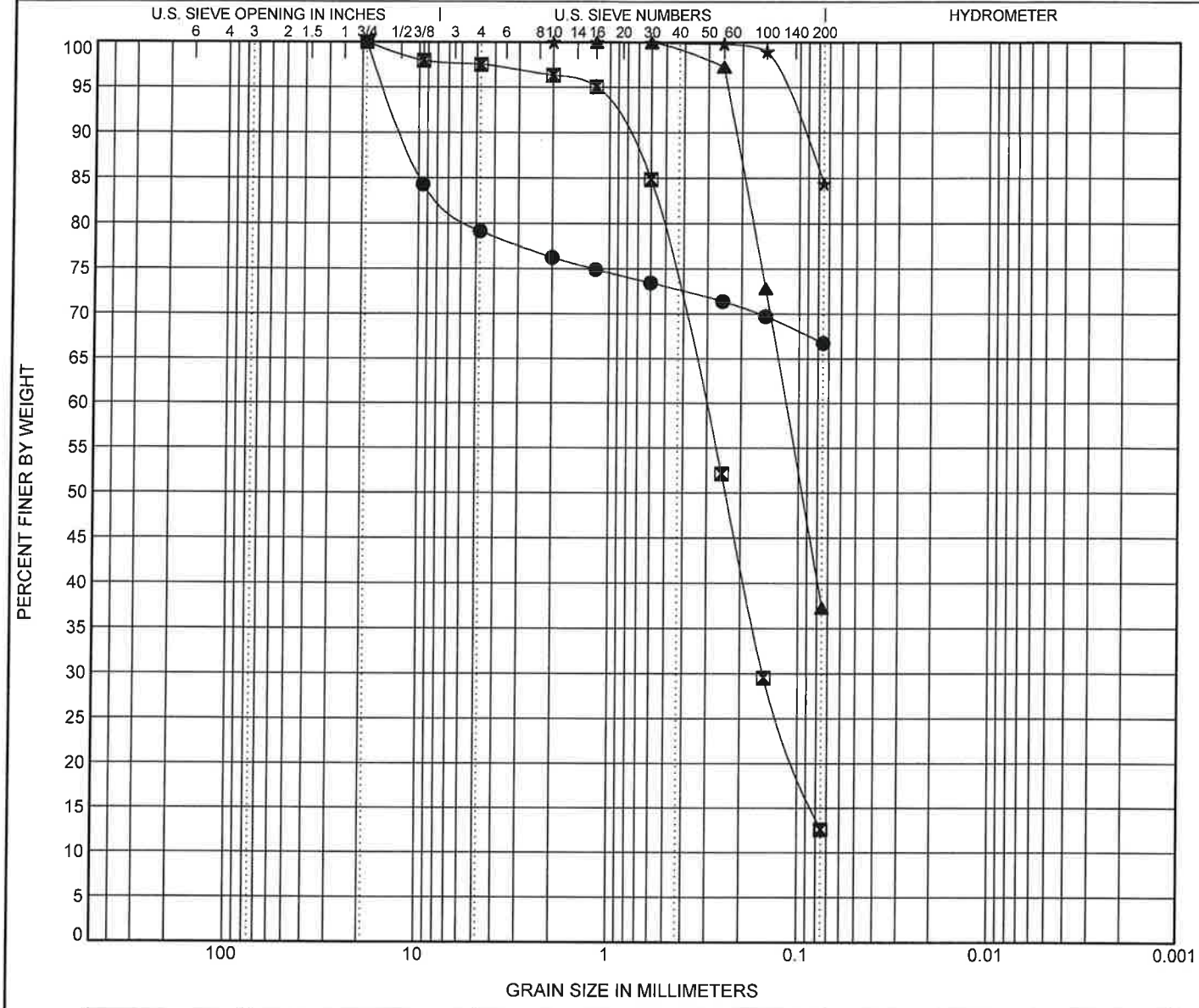
Bellevue, WA 98005
Telephone: 425-449-4704
Fax: 425-449-4711

GRAIN SIZE DISTRIBUTION

PROJECT NUMBER ES-6481 **PROJECT NAME** Best Parking



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	Cc	Cu
● TP-01	2.50ft.	USDA: Gray Gravelly Loam. USCS: Gravelly ML.		
⊠ TP-01	10.00ft.	USDA: Black Slightly Gravelly Sand. USCS: SM.		
▲ TP-02	7.50ft.	USDA: Gray Very Fine Sandy Loam. USCS: SM.		
★ TP-03	3.00ft.	USDA: Gray Loam. USCS: ML with Sand.		

Specimen Identification		D100	D60	D30	D10	LL	PL	PI	%Silt	%Clay
● TP-01	2.5ft.	19							66.7	
⊠ TP-01	10.0ft.	19	0.309	0.152					12.6	
▲ TP-02	7.5ft.	1.18	0.117						37.3	
★ TP-03	3.0ft.	2							84.4	

GRAIN SIZE USDA ES-6481 BEST PARKING.GPJ GINT US LAB.GDT 1/31/19

Earth Solutions NW LLC
Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

April 27, 2021
ES-6481.01

BPLC Properties, LLC
10615 – 438th Street Court East
Eatonville, Washington 98328

Attention: Mr. Rich Hamilton

Subject: Groundwater Monitoring Program Summary
Best Parking Lot Cleaning Site Improvements
2412 Inter Avenue
Puyallup, Washington

Reference: Earth Solutions NW, LLC
Geotechnical Evaluation
Project No. ES-6481, dated February 19, 2019

City of Puyallup, Washington
E-20-0067 Civil Comments 1 Letter, dated March 16, 2020

Dear Mr. Hamilton:

As requested, Earth Solutions NW, LLC (ESNW) has prepared this letter summarizing the results of our seasonal groundwater monitoring program on site.

The monitoring program consisted of installing three groundwater monitoring wells at the approximate locations depicted on Plate 2 (Subsurface Exploration Plan). Since the installation of the groundwater wells on June 8, 2020, daily groundwater levels have been recorded using dataloggers. ESNW personnel visited the site biweekly to download the collected data and perform manual measurements at each borehole using a depth-to-water meter. The table on page 2 summarizes the groundwater data collected during our monitoring program.

Borehole	Depth of Borehole (ft)	Ground Elevation* (ft)	Peak GWT Depth† (ft bgs)	Peak GWT Elevation* (ft)	Peak Date
B-1	21.5	56	0.9	55.1	01/13/2021
B-2	21.5	56	1.6	54.4	01/13/2021
B-3	21.5	54	2.0	52.0	01/13/2021

** Elevations are approximate, based on readily available topographic survey data; monitoring well locations have not been surveyed.*
† Depth measured from existing ground surface.

Monitoring charts are attached to letter, along with boring logs and laboratory analyses from the June 2020 fieldwork. The monitoring period extended before and after the minimum period requested by the City of Puyallup (December 21 to April 1), as outlined in the referenced comments letter. As anticipated, high groundwater readings corresponded with relatively high rainfall events. Based on the data collected during the monitoring period, it is our opinion the peak groundwater table depths listed in the table above are indicative of the seasonal high groundwater elevations.

We trust this letter meets your current needs. Should you have any questions regarding the content herein, or require additional information, please call.

Sincerely,

EARTH SOLUTIONS NW, LLC

04/27/2021

Adam Z. Shier, L.G.
Project Geologist

Keven D. Hoffmann, P.E.
Geotechnical Engineering Services Manager

Attachments: Plate 1 – Vicinity Map
Plate 2 – Subsurface Exploration Plan
Boring Logs
Grain Size Distribution
Seasonal Groundwater Monitoring Charts

cc: Barghausen Consulting Engineers, Inc.
Attention: Mr. Jason Hubbell, P.E. (Email only)

Reference:
Pierce County, Washington
OpenStreetMap.org

NORTH

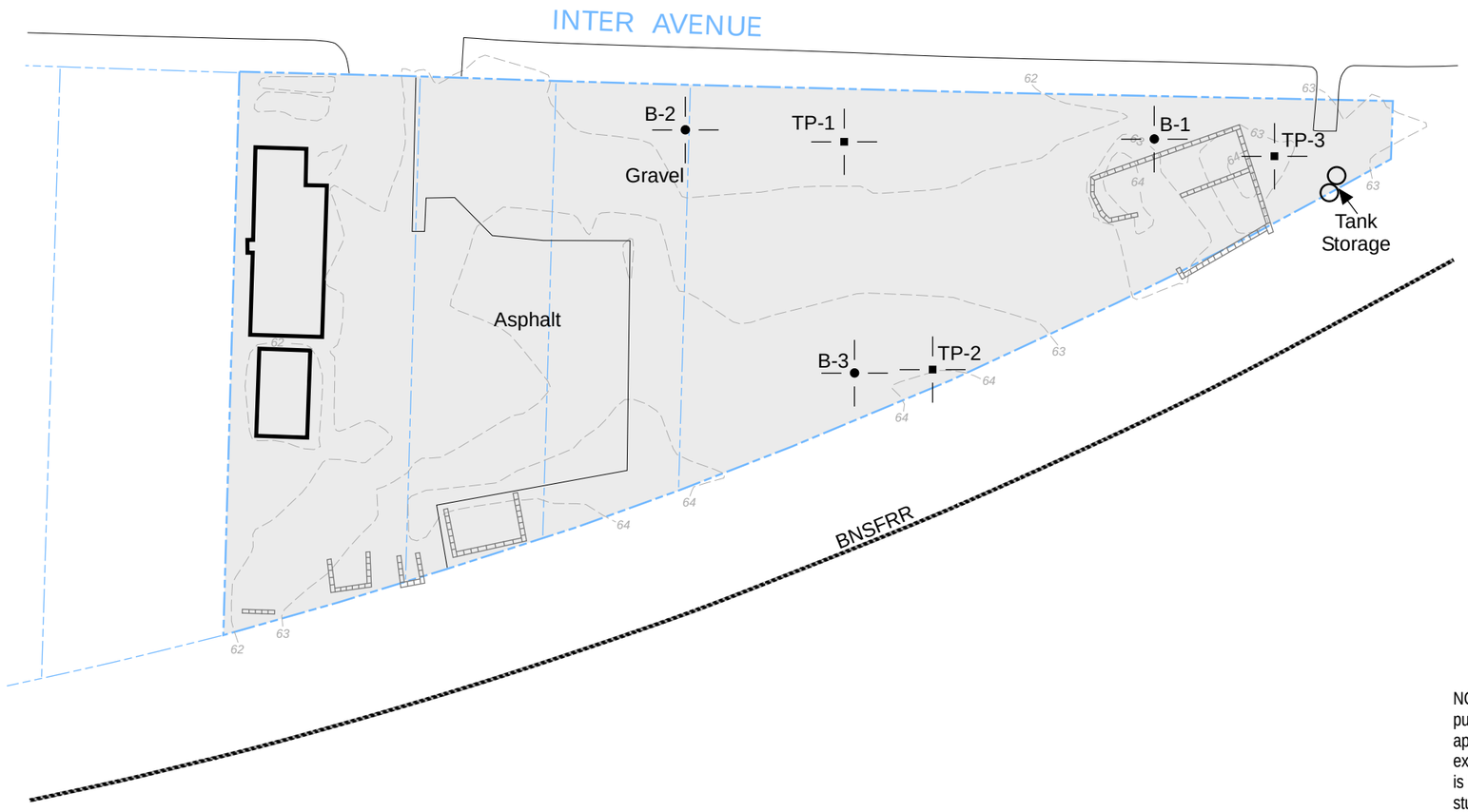
NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Vicinity Map
Best Parking Lot Cleaning Site Improvements
Puyallup, Washington

Drwn. MRS	Date 06/30/2020	Proj. No. 6481.01
Checked KDH	Date June 2020	Plate 1



LEGEND

- B-1 — Approximate Location of ESNW Test Pit, Proj. No. ES-6481.01, June 2020
- TP-1 — Approximate Location of ESNW Test Pit, Proj. No. ES-6481, Jan. 2019
- Subject Site
- Existing Building
- Existing Concrete Block Wall

NORTH

0 40 80 160

1"=80'

Scale in Feet

NOTE: The graphics shown on this plate are not intended for design purposes or precise scale measurements, but only to illustrate the approximate test locations relative to the approximate locations of existing and / or proposed site features. The information illustrated is largely based on data provided by the client at the time of our study. ESNW cannot be responsible for subsequent design changes or interpretation of the data by others.

NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Subsurface Exploration Plan
Best Parking Lot Cleaning Site Improvements
Puyallup, Washington

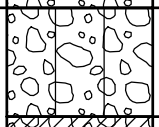
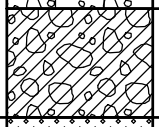
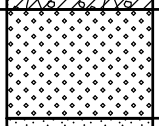
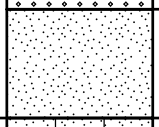
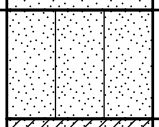
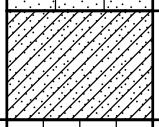
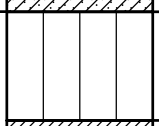
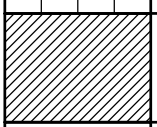
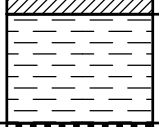
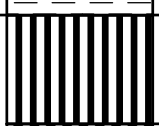
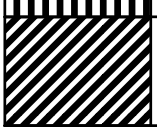
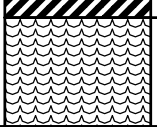
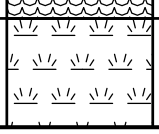
Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Drwn. By	MRS
Checked By	KDH
Date	06/30/2020
Proj. No.	6481.01
Plate	2

Earth Solutions NW LLC

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

DUAL SYMBOLS are used to indicate borderline soil classifications.

The discussion in the text of this report is necessary for a proper understanding of the nature of the material presented in the attached logs.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

BORING NUMBER B-1

PROJECT NUMBER ES-6481.01 **PROJECT NAME** Best Parking Lot Cleaning Site Improvements

DATE STARTED 6/8/20 **COMPLETED** 6/8/20 **GROUND ELEVATION** 63 ft **HOLE SIZE**

DRILLING CONTRACTOR Holocene Drilling **GROUND WATER LEVELS:**

DRILLING METHOD HSA ▽ **AT TIME OF DRILLING** 7.0 ft

LOGGED BY AZS **CHECKED BY** KDH **AT END OF DRILLING** ---

NOTES Surface Conditions: exposed soil **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					SW-SM		Gray well-graded SAND with silt, medium dense, moist
	SS	11	7-8-7 (15)	MC = 10.6%			
5							
	SS	17	1-4-4 (8)	MC = 8.1% Fines = 11.1%			[USDA Classification: gravelly coarse SAND] -becomes loose
							▽ -groundwater table, becomes water bearing
	SS	50	4-2-5 (7)	MC = 40.5%			8.0
10							Gray SILT, medium dense, water bearing
	SS	100	7-8-10 (18)	MC = 29.8%	ML		
15							
	SS	67	3-5-6 (11)	MC = 34.5%			
20							20.0 55.0 43.0

(Continued Next Page)

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BORING NUMBER B-1

PROJECT NUMBER ES-6481.01 **PROJECT NAME** Best Parking Lot Cleaning Site Improvements

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20							
	SS	67	2-3-5 (8)	MC = 31.1%	ML		Gray SILT, loose, water bearing
21.5							41.5

Boring terminated at 21.5 feet below existing grade. Groundwater table encountered at 7.0 feet during drilling. 2" PVC standpipe installed to bottom of boring. Lower 10.0 feet slotted. Well ID: BNF287. Boring backfilled with bentonite/sand.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

BORING NUMBER B-2

PROJECT NUMBER ES-6481.01 **PROJECT NAME** Best Parking Lot Cleaning Site Improvements

DATE STARTED 6/8/20 **COMPLETED** 6/8/20 **GROUND ELEVATION** 62 ft **HOLE SIZE**

DRILLING CONTRACTOR Holocene Drilling **GROUND WATER LEVELS:**

DRILLING METHOD HSA ▽ **AT TIME OF DRILLING** 6.0 ft

LOGGED BY AZS **CHECKED BY** KDH **AT END OF DRILLING** ---

NOTES Surface Conditions: gravel driveway **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0					GM		Gray silty GRAVEL with sand, loose, moist (Fill)	
	SS	6	1-2-5 (7)	MC = 22.3%				
					SP		3.0 Gray poorly graded SAND, loose, moist	59.0
							4.0	58.0
5					ML		Brown SILT with sand, loose, wet	
	SS	67	1-1-2 (3)	MC = 43.5% Fines = 77.1%			[USDA Classification: slightly gravelly LOAM]	
							▽ -iron oxide staining	
							-groundwater table, becomes water bearing	
	SS	100	2-6-7 (13)	MC = 42.8%			8.5	53.5
10					SM		Gray silty fine SAND, medium dense, water bearing	
	SS	100	3-11-16 (27)	MC = 31.3%			-4" wood debris	
15								
	SS	67	6-6-6 (12)	MC = 29.5%				
20							20.0	42.0

(Continued Next Page)

Earth Solutions NW, LLC
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Fax: 425-449-4711

BORING NUMBER B-2

PROJECT NUMBER ES-6481.01 **PROJECT NAME** Best Parking Lot Cleaning Site Improvements

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20							
	SS	100	2-4-8 (12)	MC = 33.5%	SP		Gray poorly graded SAND, medium dense, water bearing 21.0 41.0
					ML		21.5 Gray SILT, medium dense, water bearing -wood debris 40.5

Boring terminated at 21.5 feet below existing grade. Groundwater table encountered at 6.0 feet during drilling. 2" PVC standpipe installed to bottom of boring. Lower 10.0 feet slotted. Well ID: BNF288. Boring backfilled with bentonite/sand.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

BORING NUMBER B-3

PROJECT NUMBER ES-6481.01 **PROJECT NAME** Best Parking Lot Cleaning Site Improvements
DATE STARTED 6/8/20 **COMPLETED** 6/8/20 **GROUND ELEVATION** 64 ft **HOLE SIZE**
DRILLING CONTRACTOR Holocene Drilling **GROUND WATER LEVELS:**
DRILLING METHOD HSA ▽ **AT TIME OF DRILLING** 10.0 ft
LOGGED BY AZS **CHECKED BY** KDH **AT END OF DRILLING** ---
NOTES Surface Conditions: gravel driveway **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0					GM		Gray silty GRAVEL with sand, loose, moist (Fill)	
								2.5 61.5
	SS	67	4-3-4 (7)	MC = 34.5% Fines = 98.3%	ML		Gray SILT, loose, moist [USDA Classification: slightly gravelly LOAM] -iron oxide staining	
5							-becomes sandy silt	
	SS	11	4-4-5 (9)	MC = 25.2% Fines = 60.4%			[USDA Classification: slightly gravelly LOAM]	
								7.5 56.5
	SS	33	3-4-6 (10)	MC = 21.8%	SM		Gray silty fine SAND with gravel, medium dense, moist to wet	
10							▽ -groundwater table, becomes water bearing, no recovery	
	SS		4-4-6 (10)					
15								15.5 48.5
	SS	67	2-4-7 (11)	MC = 28.6%	SP		Gray poorly graded SAND, medium dense, water bearing	
20								20.0 44.0

(Continued Next Page)

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

BORING NUMBER B-3

PROJECT NUMBER ES-6481.01 **PROJECT NAME** Best Parking Lot Cleaning Site Improvements

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20							
	SS	67	4-4-3 (7)	MC = 22.6%	SP		Gray poorly graded SAND, loose, water bearing
21.5							42.5

Boring terminated at 21.5 feet below existing grade. Groundwater table encountered at 10.0 feet during drilling. 2" PVC standpipe installed to bottom of boring. Lower 10.0 feet slotted. Well ID: BNF289. Boring backfilled with bentonite/sand.

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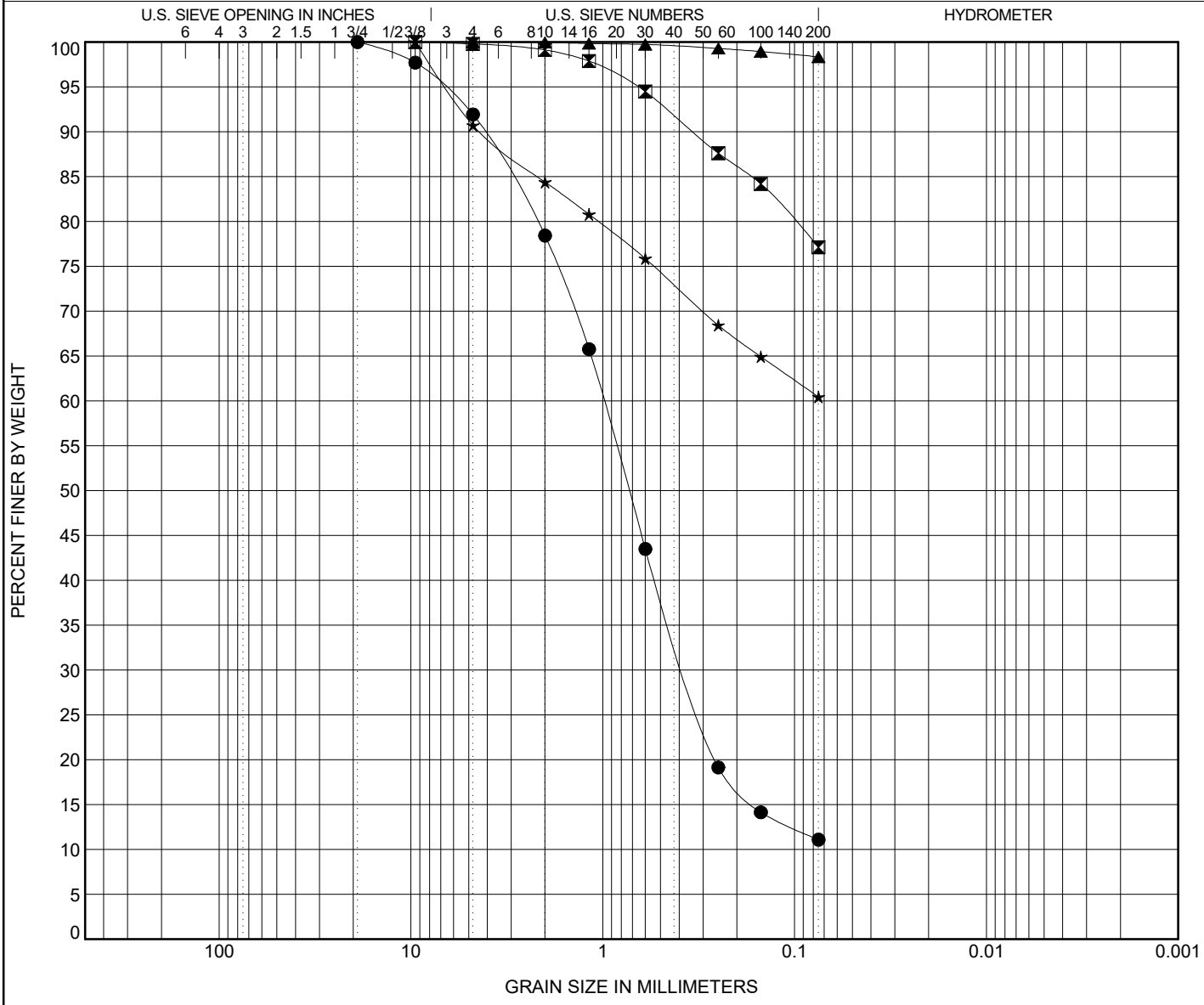
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

GRAIN SIZE DISTRIBUTION

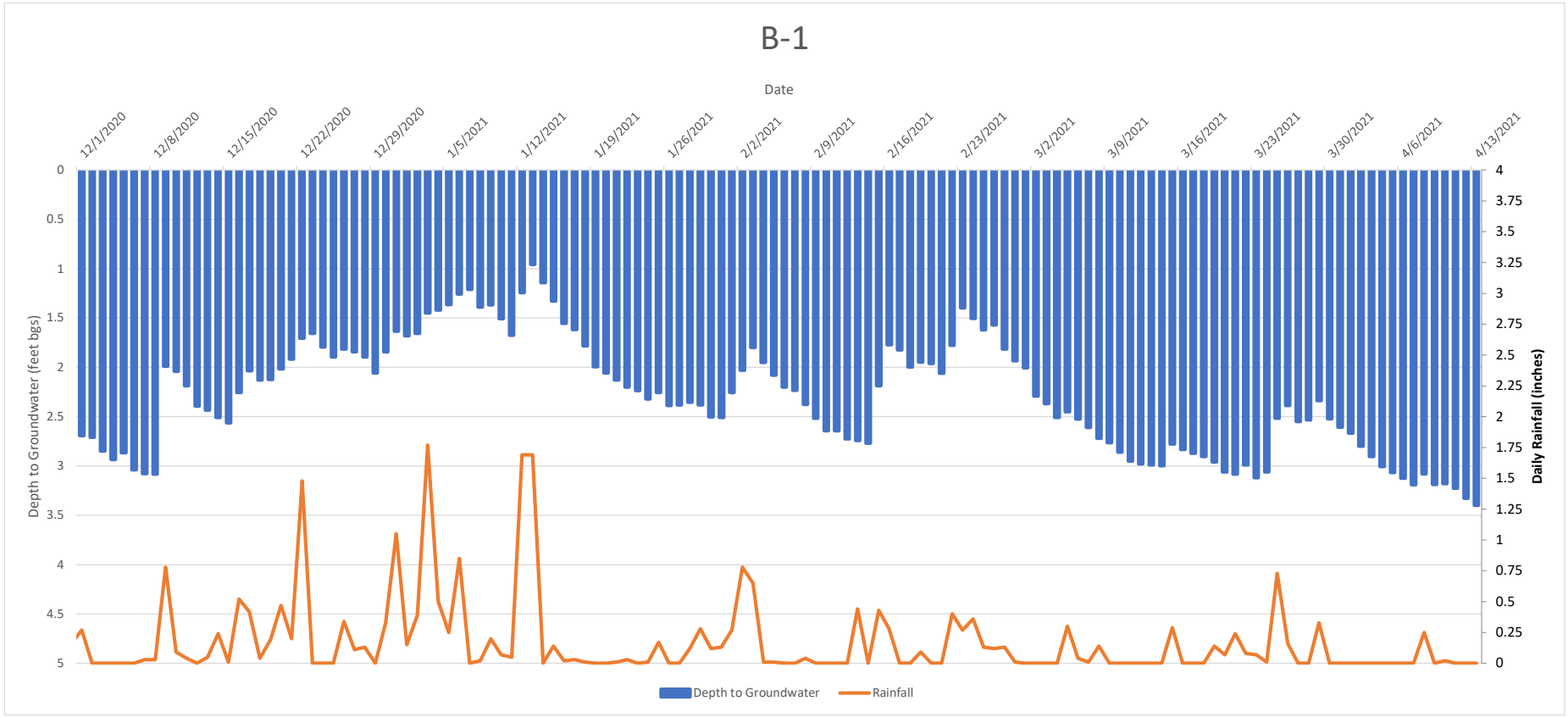
PROJECT NUMBER ES-6481.01 **PROJECT NAME** Best Parking Lot Cleaning Site Improvements

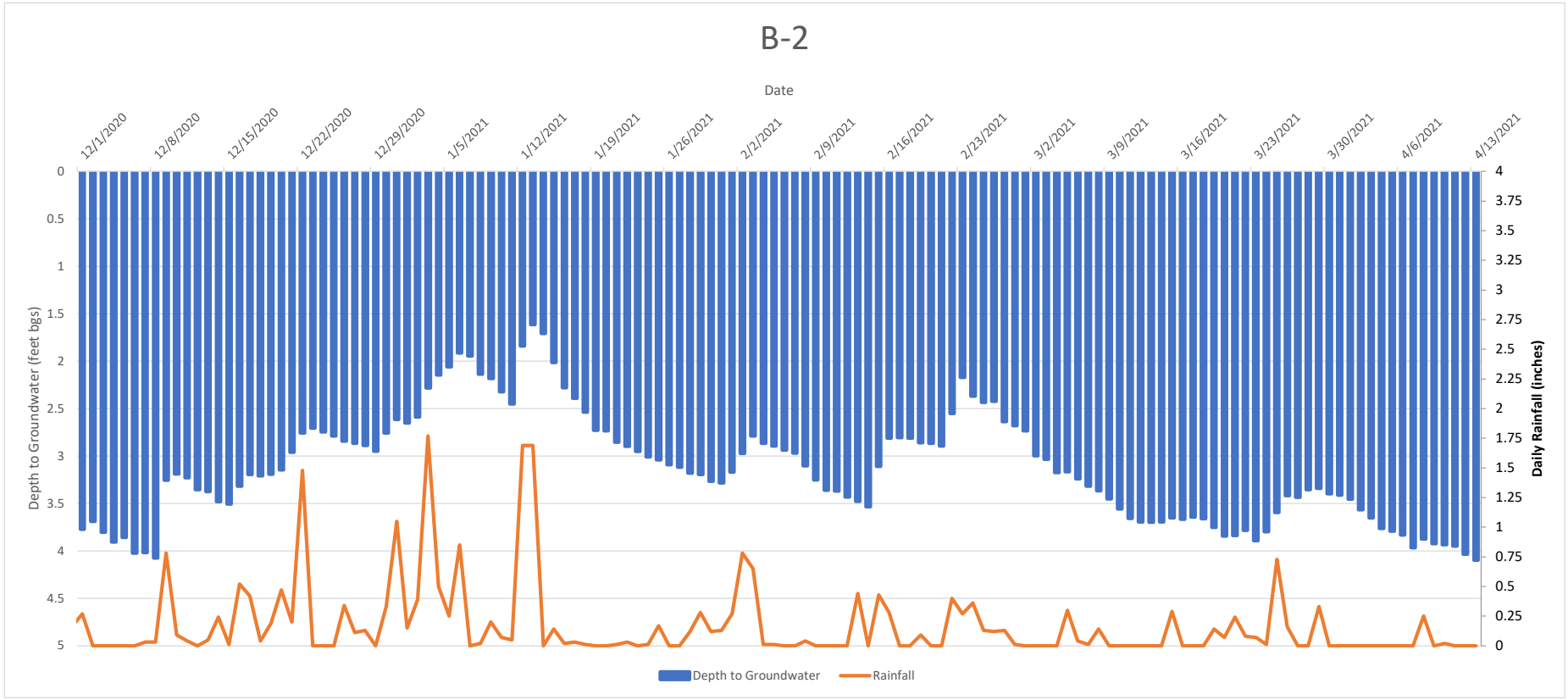


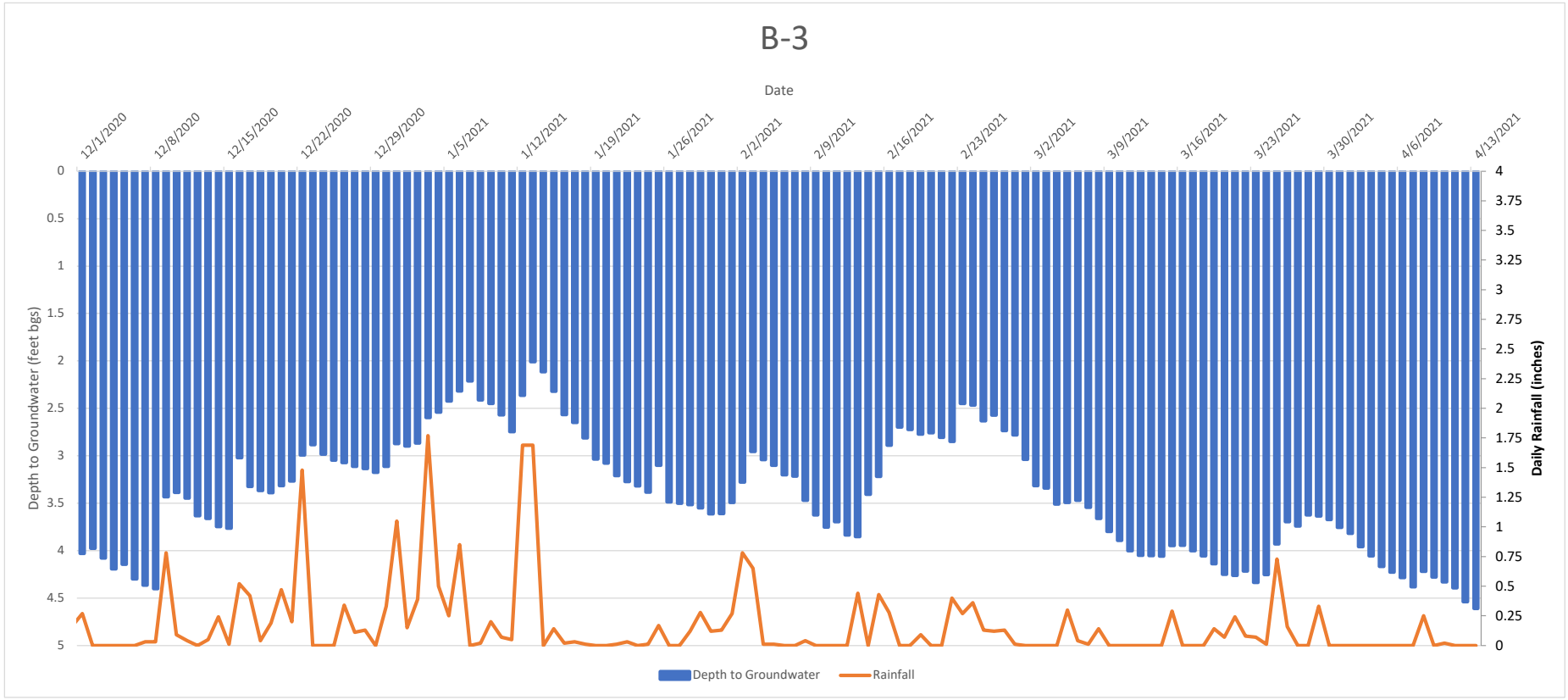
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	Cc	Cu
●	**B-01**	**5.00ft.**	**USDA: Gray Gravelly Coarse Sand. USCS: SW-SM.**	**2.35**	**16.92**
⊠	**B-02**	**5.00ft.**	**USDA: Brown Slightly Gravelly Loam. USCS: ML with Sand.**		
▲	**B-03**	**2.50ft.**	**USDA: Gray Slightly Gravelly Loam. USCS: ML.**		
★	**B-03**	**5.00ft.**	**USDA: Gray Slightly Gravelly Loam. USCS: Sandy ML.**		

	Specimen Identification		D100	D60	D30	D10	LL	PL	PI	%Silt	%Clay
●	**B-01**	**5.0ft.**	**19**	**0.991**	**0.369**					**11.1**	
⊠	**B-02**	**5.0ft.**	**9.5**							**77.1**	
▲	**B-03**	**2.5ft.**	**4.75**							**98.3**	
★	**B-03**	**5.0ft.**	**9.5**							**60.4**	


B-1
Date
12/1/2020
12/8/2020
12/15/2020
12/22/2020
12/29/2020
1/5/2021
1/12/2021
1/19/2021
1/26/2021
2/2/2021
2/9/2021
2/16/2021
2/23/2021
3/2/2021
3/9/2021
3/16/2021
3/23/2021
3/30/2021
4/6/2021
4/13/2021
Depth to Groundwater (feet bgs)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Daily Rainfall (inches)
4
3.75
3.5
3.25
3
2.75
2.5
2.25
2
1.75
1.5
1.25
1
0.75
0.5
0.25
0
Depth to Groundwater
Rainfall


B-2
Date
12/1/2020
12/8/2020
12/15/2020
12/22/2020
12/29/2020
1/5/2021
1/12/2021
1/19/2021
1/26/2021
2/2/2021
2/9/2021
2/16/2021
2/23/2021
3/2/2021
3/9/2021
3/16/2021
3/23/2021
3/30/2021
4/6/2021
4/13/2021
Depth to Groundwater (feet bgs)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Daily Rainfall (inches)
4
3.75
3.5
3.25
3
2.75
2.5
2.25
2
1.75
1.5
1.25
1
0.75
0.5
0.25
0
Depth to Groundwater
Rainfall


B-3
Date
12/1/2020
12/8/2020
12/15/2020
12/22/2020
12/29/2020
1/5/2021
1/12/2021
1/19/2021
1/26/2021
2/2/2021
2/9/2021
2/16/2021
2/23/2021
3/2/2021
3/9/2021
3/16/2021
3/23/2021
3/30/2021
4/6/2021
4/13/2021
Depth to Groundwater (feet bgs)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Daily Rainfall (inches)
4
3.75
3.5
3.25
3
2.75
2.5
2.25
2
1.75
1.5
1.25
1
0.75
0.5
0.25
0
Depth to Groundwater
Rainfall

Earth Solutions NW LLC
Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

August 3, 2021
ES-6481.01

BPLC Properties, LLC
10615 – 438th Street Court East
Eatonville, Washington 98328

Attention: Mr. Rich Hamilton

Subject: Detention Pond Liner & Pavement Section Recommendations
Best Parking Lot Cleaning Site Improvements
2512 Inter Avenue
Puyallup, Washington

Reference: Earth Solutions NW, LLC
Geotechnical Evaluation
Project No. ES-6481, dated February 19, 2019

Earth Solutions NW, LLC
Groundwater Monitoring Program Summary
Project No. ES-6481.01, dated April 27, 2021

Barghausen Consulting Engineers, Inc.
Civil Plans, dated February 2020

Greetings, Mr. Hamilton:

As requested by Barghausen Consulting Engineers, Inc., Earth Solutions NW, LLC (ESNW) has prepared this letter for the subject project. Recommendations provided herein concern lining the proposed detention pond and a pavement section for the heavier (truck) traffic anticipated on the new asphalt.

Detention Pond Liner

Per the referenced civil plans, a detention pond is proposed within the northeast site area. Because the detention pond will be constructed below the seasonal high groundwater table (GWT), a liner will be installed to resist hydrostatic uplift. Based on the pond sections depicted in the referenced plans as well as the results of our groundwater monitoring program through the 2020–2021 wet season (as summarized in the referenced letter), the following is a summary of the design parameters for the detention pond

- Top of pond elevation 64.5 feet
- Maximum water surface elevation 63.5 feet
- Static water surface elevation 57.5 feet
- Bottom of pond elevation 57.0 feet
- Seasonal high GWT elevation 62.2 feet

The seasonal high GWT elevation was based on the monitoring completed at boring B-1, which was installed within the detention pond area. It is noted that the seasonal high GWT elevation obtained at B-1 was the shallowest groundwater level obtained across the site; readings at B-2 and B-3 were 0.7 feet and 1.1 feet deeper, respectively.

The design parameters outlined in this section were incorporated into an equation to determine the required liner thickness to resist hydrostatic uplift. A calculation sheet is attached to this letter. Based on the computation results, the following recommendations are offered for the detention pond liner:

- A 40-mil PVC or HDPE liner should be placed continuously over the pond bottom.
- Atop the liner, at least four-and-one-half feet of ballast should be placed. If desired and/or required, the upper 12 inches of the ballast may be substituted as amended soil.
- An ESNW representative should be contacted to observe and document installation of the pond liner. Supplementary recommendations may be provided at the time of construction, where necessary.

The above recommendations incorporate a safety factor of about 1.1 with respect to hydrostatic uplift resistance. In our opinion, this safety factor is appropriate for the pond liner design from a geotechnical standpoint.

Pavement Section Recommendations

The performance of site pavements is largely related to the condition of the underlying subgrade. To ensure adequate pavement performance, the subgrade should be in a firm and unyielding condition when subjected to proofrolling with a loaded dump truck. Soft, wet, or otherwise unsuitable subgrade areas may still exist after base grading activities. Areas of unsuitable or yielding subgrade conditions may require remedial measures, such as overexcavation and replacement with structural fill or thicker crushed rock sections, prior to pavement.

In our opinion, the following pavement sections for heavier traffic (occasional truck traffic) areas may be considered:

- Three inches of hot-mix asphalt (HMA) placed over six inches of crushed rock base (CRB).
- Three inches of HMA placed over four-and-one-half inches of asphalt-treated base (ATB).

The HMA, ATB, and CRB materials should conform to WSDOT and/or City of Puyallup specifications, where applicable. All soil base material should be compacted to a relative compaction of 95 percent, based on the laboratory maximum dry density as determined by ASTM D1557. Road standards utilized by the City of Puyallup may supersede the recommendations provided in this section.

We trust this letter meets your current needs. Please call if you have any questions about this letter or if we can be of further assistance.

Sincerely,

EARTH SOLUTIONS NW, LLC

08/03/2021
Keven D. Hoffmann, P.E.
Geotechnical Engineering Services Manager

Attachment: Calculation Sheet

cc: Barghausen Consulting Engineers, Inc.
Attention: Mr. Jason Hubbell, P.E. (Email only)

Earth Solutions NW LLC
CALCULATION SHEET

Name: KDH
Date: 07/27/2021
Project Number: 6481.01
Project Name: BPLC Improvements (Puyallup)

Detention Pond Liner Evaluation:
Req'd Amended Soil Thickness to resist Uplift

Assumptions / Design Parameters

(ref. Barghausen Consulting Engr., Storm Drainage Plan/Sections, Feb. 2020)

Top of pond = El. 64.5

Max. W.S. = El. 63.5

Static W.S. = El. 57.5

Bottom of pond = El. 57.0

Seasonal high GWE = El. 62.2

*NEED: Liner thickness/elevation req'd to resist uplift * ("x")

NOTE: Pond liner assumed as ballast + amended soil, $\gamma = 135$ pcf

Solve the imbalance equation, need to resist uplift

Imbalance = [(Seasonal high GWE) − (Liner elevation)] (Unit wt. H_2O)

Resistance to uplift = Dead Storage

= [(Static W.S.) − (Bottom of pond)] (Unit wt. H_2O) +

(Liner thickness) (Unit wt. liner)

Where Imbalance = Resistance to uplift, FOS = 1.0. Solve equation...

$(62.2 - 57.0 + x)(62.4) = (57.5 - 57.0)(62.4) + (x)(135)$

$\Rightarrow x = 4.04'$, so 4.04' liner req'd for resistance.

Use min. FOS = 1.1 for design and round up: $4.04(1.1) = 4.44 \triangleq$ **4.5'**

→ **Use 4.5' Liner thickness** ←

Tab 7.0

7.0 Other permits

City of Puyallup approval will be required for the proposed Civil Permit for parking lot construction.

A Construction Stormwater General Permit (Department of Ecology) will be obtained prior to any soil disturbance onsite and will be maintained throughout construction.

Tab 8.0

8.0 OPERATIONS AND MAINTENANCE MANUAL

Operations and Maintenance information for the site can be found in Exhibit I.

Tab 9.0

9.0 BOND QUANTITIES

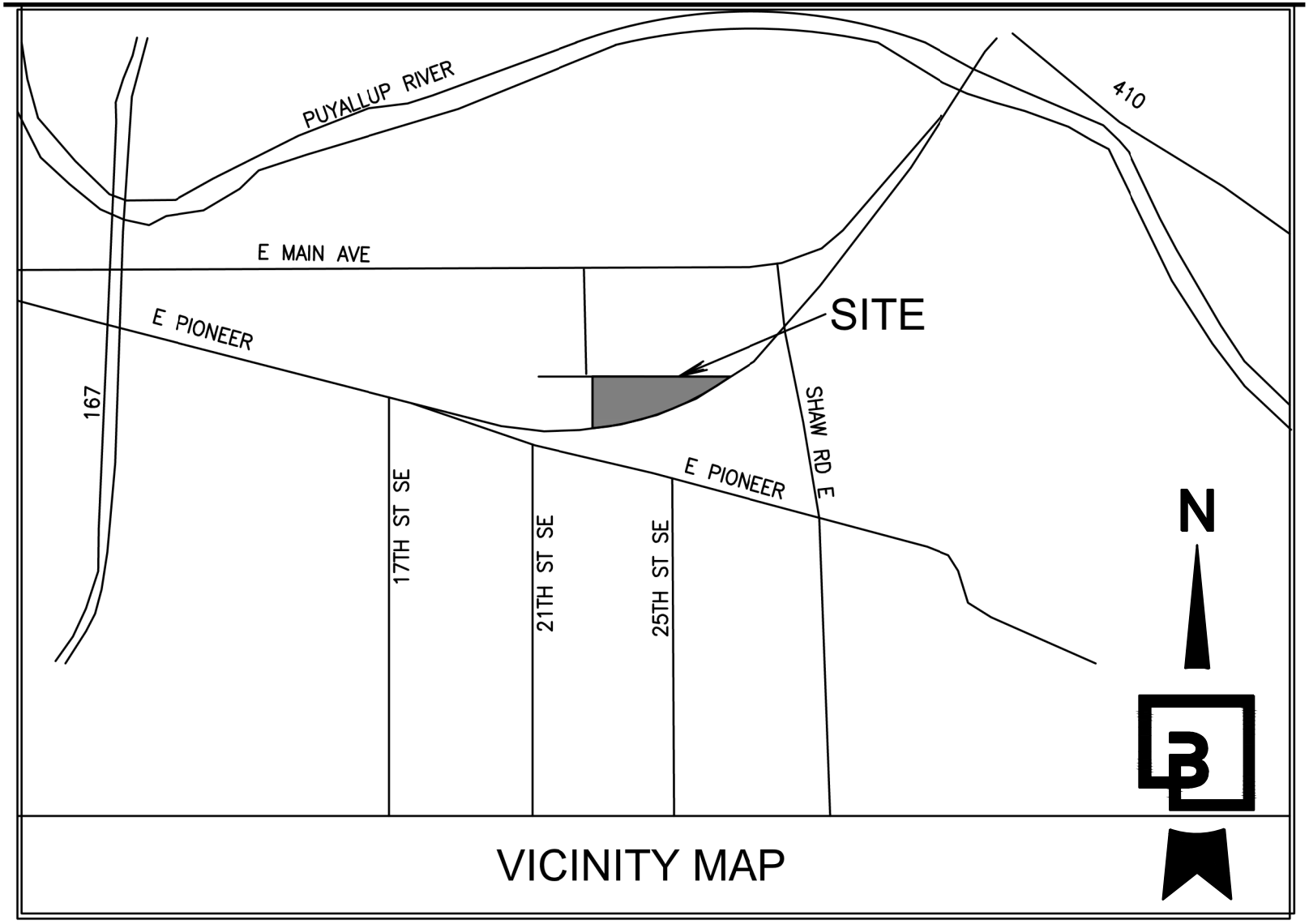
Bond quantities will be prepared and submitted along with final design plans, as required by the City.

Tab 10.0

10.0 CONCLUSION

This Technical Information Report shows the design for this site to meet the minimum requirements of the 2012/2014 Department of Ecology Stormwater Management Manual for Western Washington and the City of Puyallup.

Exhibit A
Vicinity Map



VICINITY MAP

Exhibit B
SCS Soils Map

Map Scale: 1:937 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 45 90 180 270

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Pierce County Area, Washington
Survey Area Data: Version 15, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 29, 2018—Jul 22, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6A	Briscot loam	2.7	100.0%
Totals for Area of Interest		**2.7**	**100.0%**

III-2.3.2 Runoff Parameters

All storm event hydrograph methods require input of parameters that describe physical drainage basin characteristics. These parameters provide the basis from which the runoff hydrograph is developed. This section describes only the key parameter of curve number that is used to estimate the runoff from the water quality design storm.

Curve Number

The NRCS (formerly SCS) has, for many years, conducted studies of the runoff characteristics for various land types. After gathering and analyzing extensive data, NRCS has developed relationships between land use, soil type, vegetation cover, interception, infiltration, surface storage, and runoff. The relationships have been characterized by a single runoff coefficient called a "curve number." The National Engineering Handbook - Section 4: Hydrology (NEH-4, SCS, August 1972) contains a detailed description of the development and use of the curve number method.

NRCS has developed "curve number" (CN) values based on soil type and land use. They can be found in *Urban Hydrology for Small Watersheds*, Technical Release 55 (TR-55), June 1986, published by the NRCS. The combination of these two factors is called the "soil-cover complex." The soil-cover complexes have been assigned to one of four hydrologic soil groups, according to their runoff characteristics. NRCS has classified over 4,000 soil types into these four soil groups. Table III-2.3.1 Hydrologic Soil Series for Selected Soils in Washington State shows the hydrologic soil group of most soils in the state of Washington and provides a brief description of the four groups. For details on other soil types refer to the NRCS publication mentioned above (TR-55, 1986).

Table III-2.3.1 Hydrologic Soil Series for Selected Soils in Washington State

Soil Type	Hydrologic Soil Group	Soil Type	Hydrologic Soil Group	Soil Type	Hydrologic Soil Group
Agnew	C	Hoogdal	C	Raught	B
Ahl	B	Hoypus	A	Reed	D
Aits	C	Huel	A	Reed, Drained or Protected	C
Alderwood	C	Indianoloa	A	Renton	D
Arents, Alderwood	B	Jonas	B	Republic	B
Arents, Everett	B	Jumpe	B	Riverwash	variable
Ashoe	B	Kalaloch	C	Rober	C
Baldhill	B	Kapowsin	C/D	Salal	C
Barneston	C	Kilchis	C	Salkum	B
Baumgard	B	Kitsap	C	Sammamish	D
Beausite	B	Klaus	C	San Juan	A
Belfast	C	Klone	B	Scamman	D
Bellingham	D	Lates	C	Schneider	B
Bellingham varient	C	Lebam	B	Seattle	D
Boistfort	B	Lummi	D	Sekiu	D
Bow	D	Lynwood	A	Semiahmoo	D
Bristcot	D	Lystair	B	Shalcar	D
Buckley	C	Mal	C	Shano	B
Bunker	B	Manley	B	Shelton	C
Cagey	C	Mashel	B	Si	C
Carlsborg	A	Maytown	C	Sinclair	C
Casey	D	McKenna	D	Skipopa	D
Cassolary	C	McMurray	D	Skykomish	B
Cathcard	B	Melbourne	B	Snahopish	B
Centralia	B	Menzel	B	Snohomish	D
Chehalis	B	Mized Alluvial	variable	Solduc	B

Soil Type	Hydrologic Soil Group	Soil Type	Hydrologic Soil Group	Soil Type	Hydrologic Soil Group
Chesaw	A	Molson	B	Solleks	C
Cinebar	B	Mukilteo	C/D	Spana	D
Calallam	C	Naff	B	Spanaway	A/B
Clayton	B	Nargar	A	Springdale	B
Coastal beaches	variable	National	B	Sulavar	B
Colter	C	Neilton	A	Sultan	C
Custer	D	Newberg	B	Sultan variant	B
Custer, Drained	C	Nisqually	B	Sumas	C
Dabob	C	Nooksak	C	Swantown	D
Datula	C	Norma	C/D	Tacoma	D
Delphi	D	Ogarty	C	Tanwax	D
Dick	A	Olete	C	Tanwax, Drained	C
Dimal	D	Olomount	C	Tealwhit	D
Dupont	D	Olympic	B	Tenino	C
Earlmont	C	Orcas	D	Tisch	D
Edgewick	C	Oridia	D	Tokul	C
Eld	B	Orting	D	Townsend	C
Elwell	B	Oso	C	Trition	D
Esquatzel	B	Ovall	C	Tukwila	D
Everett	A	Pastik	C	Tukey	C
Everson	D	Pheeney	C	Urbana	C
Galvin	D	Phelan	D	Vailton	B
Getchell	A	Pilchuck	C	Verlot	C
Giles	B	Potchub	C	Wapato	D
Godfrey	D	Poulsbo	C	Warden	B
Greenwater	A	Prather	C	Whidbey	C
Grove	C	Puget	D	Wilkeson	B
Harstine	C	Puyallup	B	Winston	A
Hartnit	C	Queets	B	Woodinville	B
Hoh	B	Quilcene	C	Yelm	C
Holo	C	Ragnar	B	Zynbar	B
Hoodsport	C	Rainier	C		

Notes:

Hydrologic Soil Group Classifications, as defined by the Soil Conservation Service:

A= (Low runoff potential). Soils having low runoff potential and high infiltration rates, even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands or gravels and have a high rate of water transmission (greater than 0.30 in/hr.).

B =(Moderately low runoff potential). Soils having moderate infiltration rates when thoroughly wetted and consist chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission (0.15-0.3 in/hr.).

C = (Moderately high runoff potential). Soils having low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine textures. These soils have a low rate of water transmission (0.05-0.15 in/hr.).

D = (High runoff potential). Soils having high runoff potential. They have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a hardpan

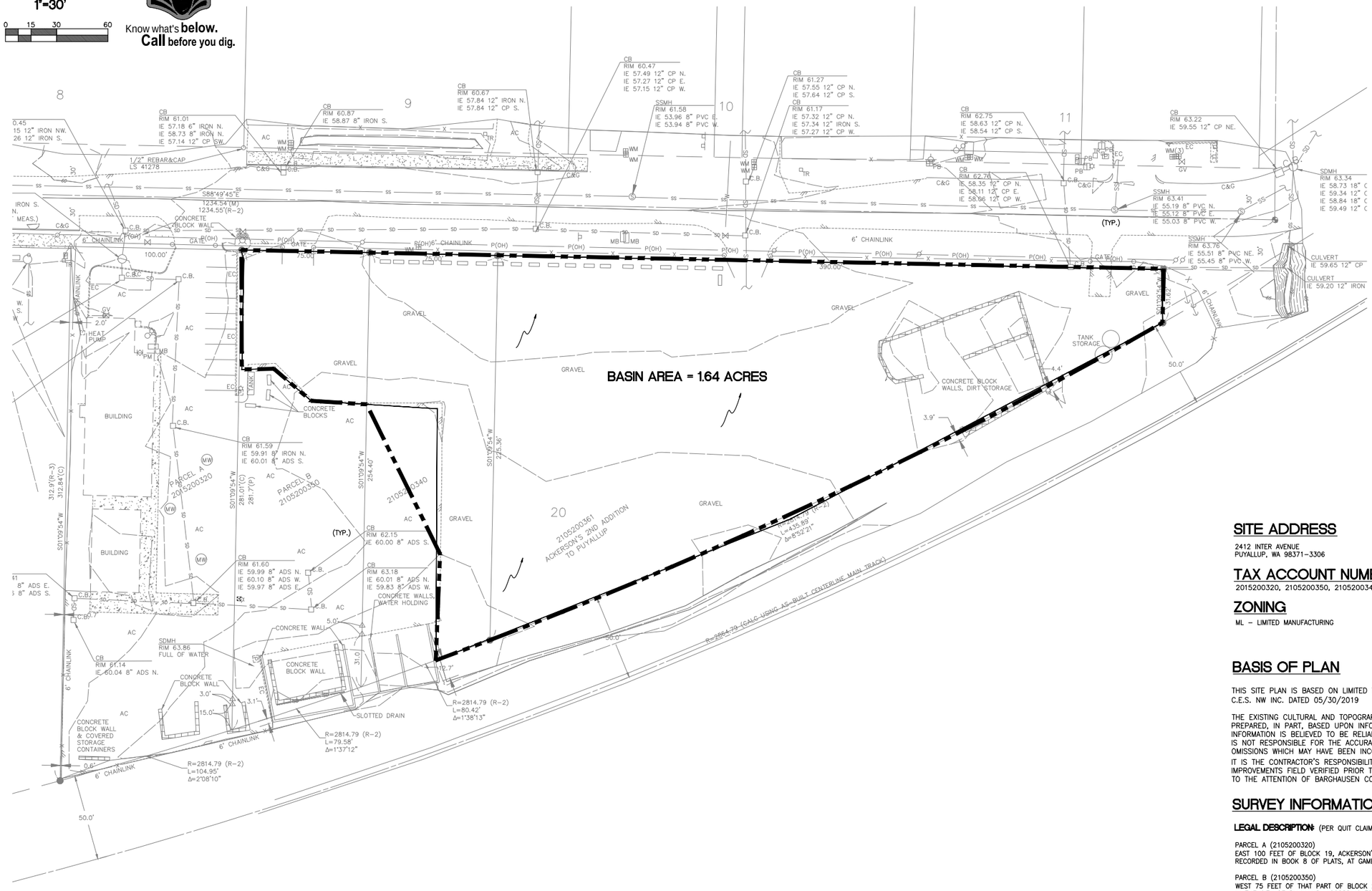
Exhibit C
Existing Conditions
Basin Map

EXISTING CONDITIONS MAP

1"=30'

0 15 30 60

811 Know what's **below.** **Call** before you dig.



SITE ADDRESS

2412 INTER AVENUE
PUYALLUP, WA 98371-3306

TAX ACCOUNT NUMBERS

2015200320, 2105200350, 2105200340, 2105200361

ZONING

ML – LIMITED MANUFACTURING

BASIS OF PLAN

THIS SITE PLAN IS BASED ON LIMITED TOPOGRAPHIC AND BOUNDARY SURVEY, PREPARED BY C.E.S. NW INC. DATED 05/30/2019

THE EXISTING CULTURAL AND TOPOGRAPHIC DATA SHOWN ON THESE DRAWINGS HAS BEEN PREPARED, IN PART, BASED UPON INFORMATION FURNISHED BY OTHERS. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, BCE, INC. CANNOT ENSURE ACCURACY AND THUS IS NOT RESPONSIBLE FOR THE ACCURACY OF THAT INFORMATION OR FOR ANY ERRORS OR OMISSIONS WHICH MAY HAVE BEEN INCORPORATED INTO THESE DRAWINGS AS A RESULT.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE OWNER TO HAVE ALL IMPROVEMENTS FIELD VERIFIED PRIOR TO CONSTRUCTION. DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF BARGHAUSEN CONSULTING ENGINEERS, INC. PRIOR TO WORK.

SURVEY INFORMATION

LEGAL DESCRIPTION: (PER QUIT CLAIM DEED FILED UNDER RECORDING NUMBER 200105070774)

PARCEL A (2105200320)
EAST 100 FEET OF BLOCK 19, ACKERSON'S SECOND ADDITION TO PUYALLUP, ACCORDING TO PLAT RECORDED IN BOOK 8 OF PLATS, AT GAME 25, IN PIERCE COUNTY, WASHINGTON.

PARCEL B (2105200350)
WEST 75 FEET OF THAT PART OF BLOCK 20, ACKERSON'S SECOND ADDITION TO PUYALLUP, SITUATED IN THE CITY OF PUYALLUP, ACCORDING TO PLAT RECORDED IN BOOK 8 OF PLATS, AT PAGE 25, IN PIERCE COUNTY, WASHINGTON.
(PER ALTA COMMITMENT FOR TITLE INSURANCE ISSUED BY CHICAGO TITLE COMMITMENT NUMBER 0012400-TC DATED MARCH 25, 2014)

2105200361
BLOCK 20, ACKERSON'S SECOND ADDITION TO PUYALLUP. ACCORDING TO PLAT RECORDED IN VOLUME 8 OF PLATS, PAGE 25, RECORDS OF PIERCE COUNTY AUDITOR.
EXCEPT THE WEST 150 FEET THEREOF.
SITUATE IN THE CITY OF PUYALLUP, COUNTY OF PIERCE, STATE OF WASHINGTON.
(PER REAL ESTATE EXCISE TAX AFFIDAVIT FILED UNDER RECORDING NUMBER 4337181)

(2105200340)
THE EAST 75 FEET OF THE WEST 150 FEET OF BLOCK 20, ACKERSON'S SECOND ADDITION TO PUYALLUP, ACCORDING TO PLAT THEREOF RECORDED IN VOLUME 9 OF PLATS, AT PAGE 25, RECORDS OF PIERCE COUNTY AUDITOR.
SITUATE IN THE CITY OF PUYALLUP, COUNTY OF PIERCE, STATE OF WASHINGTON

BASIS OF BEARINGS:
NAD 83-2011 (EPOCH 2010.00), WASHINGTON STATE PLACE, SOUTH ZONE, (PER THE WASHINGTON STATE REFERENCE NETWORK).

No.	Date	By	Ckd.	Appr.	Revision

Title: EXISTING CONDITIONS PLAN

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUBER — STATE OF WASHINGTON — 38950 — REGISTERED PROFESSIONAL ENGINEER
02/14/2020

Scale: Horizontal 1"=30' Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 barghausen.com

Job Number 20630

Sheet 1 of 1

Exhibit D
Developed Conditions Basin Map

DEVELOPED CONDITIONS BASIN MAP

1"=30'

0 15 30 60

CONNECT TO EXISTING 12" SD

INTER AVE

CONTROL STRUCTURE

W.Q. VAULT

CB #1

CB #2

CB #3

CB #4

CB #5

STORMWATER DETENTION FACILITY

STATIC = 57.5
MAX WS =63.5

NEW ASPHALT PAVING

BNSFRR

R=2814.79 (GALC USING AS-BUILT CENTERLINE MAIN TRACK)

No.	Date	By	Ckd.	Appr.	Revision

Title: DEVELOPED CONDITIONS BASIN MAP

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

Scale: Horizontal 1"=30' Vertical N/A

Designed DL Drawn DL Checked DL Approved JGH Date 2018.12.21

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 barghausen.com

Job Number 20631

Sheet 1 of 1

Exhibit E
Detention Analysis and Design

SIZE THE EMERGENCY OVERFLOW SPILLWAY

Length = $(Q_{100}/(3.21H^{3/2})) - 2.4\ H$

Let H = 0.3 feet

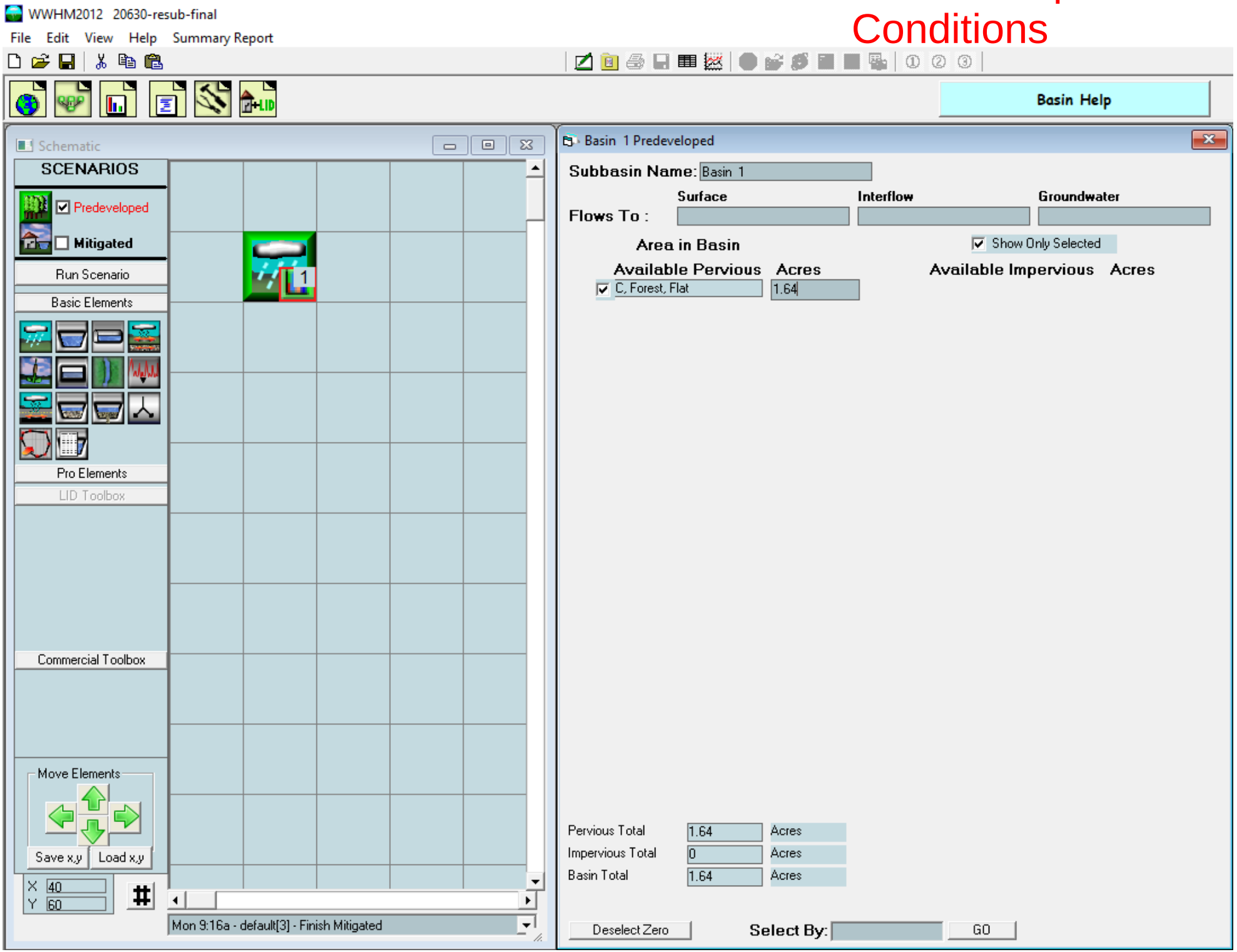
Q_{100} = 1.25 cfs

So Length = $(1.25/(3.21(0.3^{3/2})) - 2.4\ (0.3)$

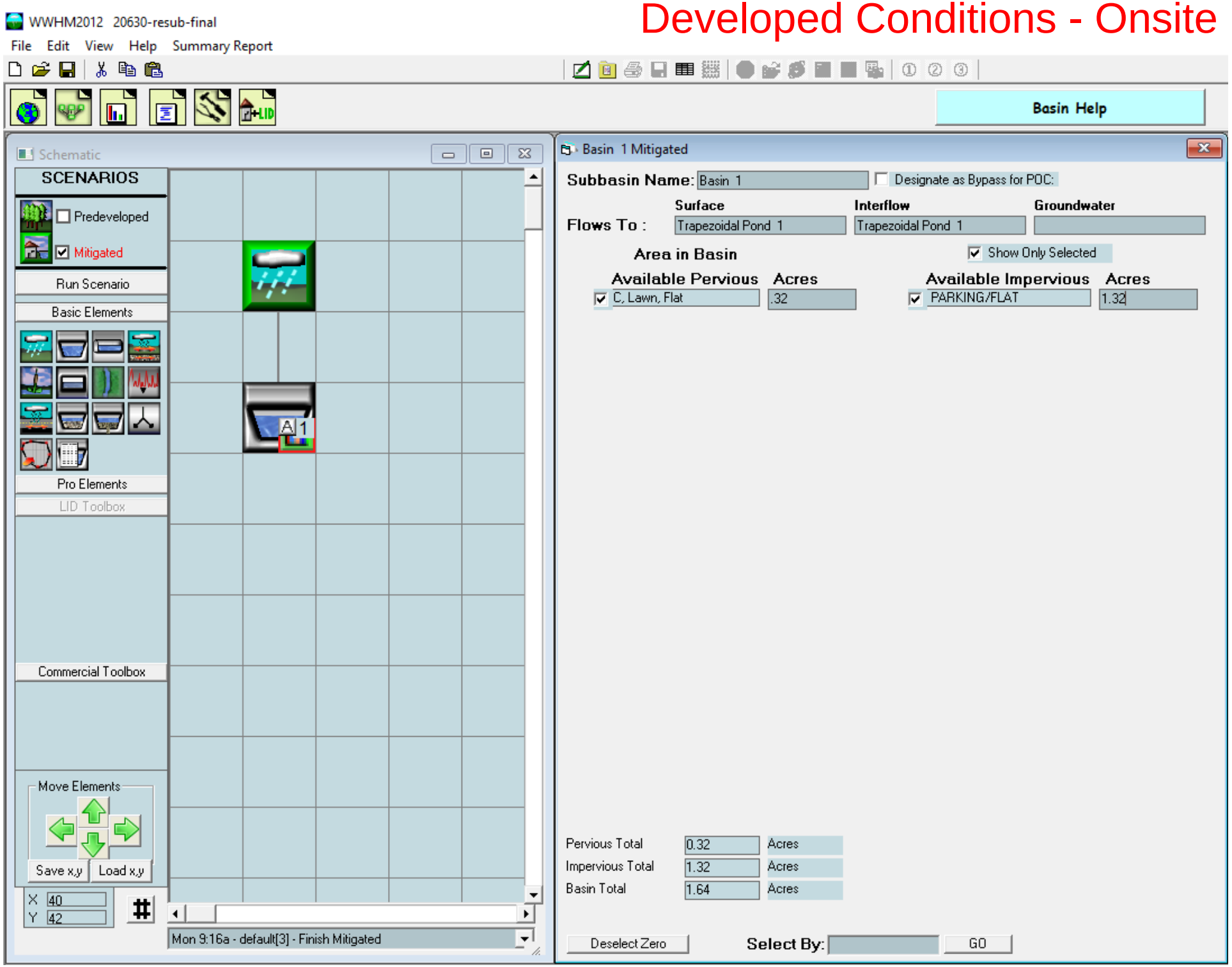
Length = 1.65 feet

Use 6 feet

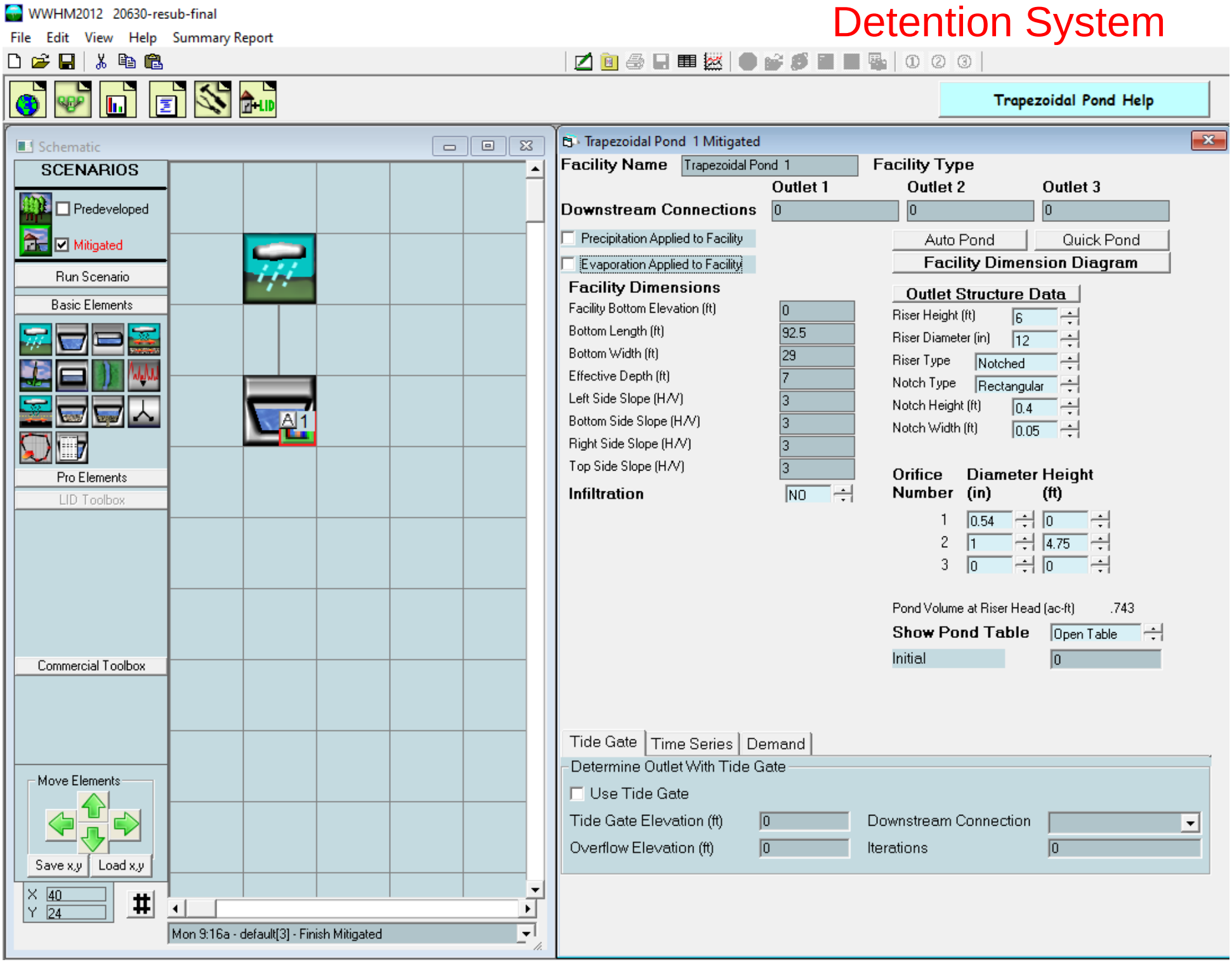
Pre-developed Conditions



Developed Conditions - Onsite



Detention System

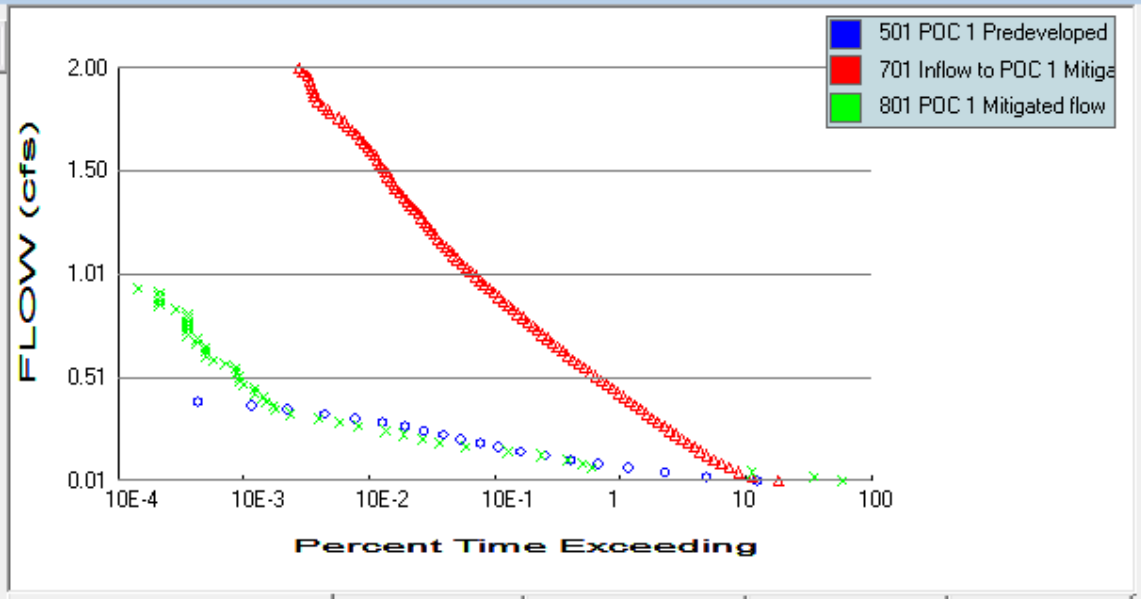


WWHM2012 20630-resub-final

File Edit View Help Summary Report

Analysis Help

Analysis



Stream Protection Duration | LID Duration | Flow Frequency | Water Quality | Hydrograph

Wetland Input Volumes | LID Report | Recharge Duration | Recharge Predeveloped | Recharge Mitigated

Analyze datasets Compact WDM Delete Selected

1 158 YR EVAP TIMESERIES, 40 IN EAST, 24 HR
2 158 YR PRECIP TIMESERIES, 40 IN EAST, 15 MIN
501 POC 1 Predeveloped flow
701 Inflow to POC 1 Mitigated
801 POC 1 Mitigated flow
1000 Trapezoidal Pond 1 ALL OUTLETS Mitigated
1001 Trapezoidal Pond 1 STAGE Mitigated

All Datasets | Flow | Stage | Precip | Evap | POC 1

Monthly FF

Duration Bounds

0.01 Minimum 2 Maximum

Seasonal Durations (mm/dd)

Start Date

End Date

Flood Frequency Method

- (•) Log Pearson Type III 17B
- ( ) Weibull
- ( ) Cunnane
- ( ) Gringorten

Custom Flows

Flow(cfs)	0501 15m	0701 15m	0801 15m
0.0100	170218	253458	825747
0.0301	66910	155814	486972
0.0502	31495	122380	157061
0.0703	16122	102145	8306
0.0904	9155	87935	6906
0.1105	5566	76771	5289
0.1306	3508	67741	3266
0.1507	2246	60110	1783
0.1708	1481	53600	821
0.1909	1057	47935	507
0.2110	739	42755	367
0.2311	538	38337	261
0.2512	377	34445	188
0.2713	267	30955	114
0.2914	177	27756	81
0.3115	106	24958	56
0.3316	62	22423	33
0.3517	31	20207	25
0.3718	16	18241	24
0.3919	6	16509	21
0.4120	0	14778	20
0.4321	0	13328	17
0.4522	0	12045	17
0.4723	0	10857	14
0.4924	0	9791	13
0.5125	0	8817	13
0.5326	0	7954	12
0.5527	0	7165	12
0.5728	0	6447	10
0.5929	0	5830	8
0.6130	0	5294	7
0.6331	0	4805	7
0.6532	0	4379	7
0.6733	0	4003	6
0.6934	0	3625	6
0.7135	0	3309	5

elevation	area	volume	sum volume	
57.5	2543	0	0	
58	2926	1367.25	1367.25	
59	3761	3343.5	4710.75	
60	4691	4226	8936.75	
61	5791	5241	14177.75	
62	6931	6361	20538.75	
63	8209	7570	28108.75	
63.5	8901	4277.5	32386.25	0.743486
64	9641	4635.5	37021.75	
64.5	10438	5019.75	42041.5	

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	20630-resub-final
Site Name:	
Site Address:	
City:	
Report Date:	8/2/2021
Gage:	40 IN EAST
Data Start:	10/01/1901
Data End:	09/30/2059
Timestep:	Hourly
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
C, Forest, Flat	1.64
Pervious Total	1.64
Impervious Land Use	acre
Impervious Total	0
Basin Total	1.64

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	0.32
Pervious Total	0.32

Impervious Land Use	acre
PARKING FLAT	1.32
Impervious Total	1.32
Basin Total	1.64

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	92.50 ft.
Bottom Width:	29.00 ft.
Depth:	7 ft.
Volume at riser head:	0.7431 acre-feet.
Side slope 1:	3 To 1
Side slope 2:	3 To 1
Side slope 3:	3 To 1
Side slope 4:	3 To 1
Discharge Structure	
Riser Height:	6 ft.
Riser Diameter:	12 in.
Notch Type:	Rectangular
Notch Width:	0.050 ft.
Notch Height:	0.400 ft.
Orifice 1 Diameter:	0.54 in. Elevation:0 ft.
Orifice 2 Diameter:	1 in. Elevation:4.75 ft.
Element Flows To:	
Outlet 1	Outlet 2

Pond Hydraulic Table

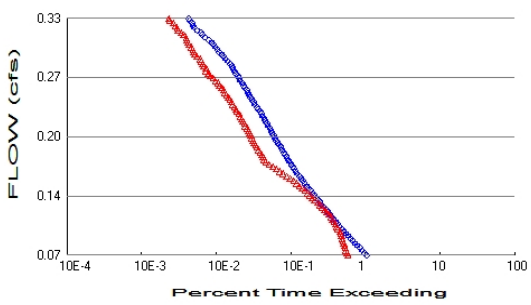
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.061	0.000	0.000	0.000
0.0778	0.062	0.004	0.002	0.000
0.1556	0.064	0.009	0.003	0.000
0.2333	0.065	0.014	0.003	0.000
0.3111	0.066	0.020	0.004	0.000
0.3889	0.068	0.025	0.004	0.000
0.4667	0.069	0.030	0.005	0.000
0.5444	0.070	0.036	0.005	0.000
0.6222	0.072	0.041	0.006	0.000
0.7000	0.073	0.047	0.006	0.000
0.7778	0.075	0.053	0.007	0.000
0.8556	0.076	0.059	0.007	0.000
0.9333	0.077	0.065	0.007	0.000
1.0111	0.079	0.071	0.008	0.000
1.0889	0.080	0.077	0.008	0.000
1.1667	0.082	0.083	0.008	0.000
1.2444	0.083	0.090	0.008	0.000
1.3222	0.085	0.096	0.009	0.000
1.4000	0.086	0.103	0.009	0.000
1.4778	0.088	0.110	0.009	0.000
1.5556	0.089	0.117	0.009	0.000
1.6333	0.091	0.124	0.010	0.000
1.7111	0.092	0.131	0.010	0.000
1.7889	0.094	0.138	0.010	0.000
1.8667	0.095	0.145	0.010	0.000
1.9444	0.097	0.153	0.011	0.000
2.0222	0.098	0.161	0.011	0.000
2.1000	0.100	0.168	0.011	0.000
2.1778	0.101	0.176	0.011	0.000
2.2556	0.103	0.184	0.011	0.000
2.3333	0.105	0.192	0.012	0.000

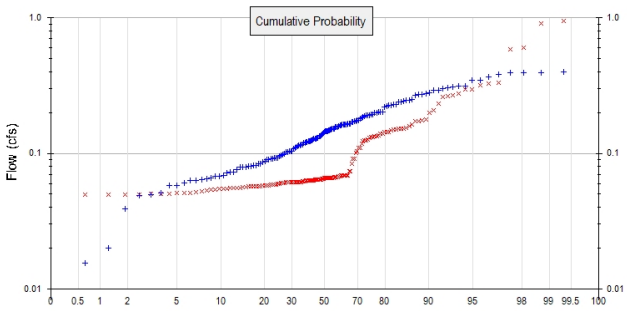
2.4111	0.106	0.201	0.012	0.000
2.4889	0.108	0.209	0.012	0.000
2.5667	0.110	0.217	0.012	0.000
2.6444	0.111	0.226	0.012	0.000
2.7222	0.113	0.235	0.013	0.000
2.8000	0.114	0.244	0.013	0.000
2.8778	0.116	0.253	0.013	0.000
2.9556	0.118	0.262	0.013	0.000
3.0333	0.120	0.271	0.013	0.000
3.1111	0.121	0.280	0.014	0.000
3.1889	0.123	0.290	0.014	0.000
3.2667	0.125	0.300	0.014	0.000
3.3444	0.126	0.309	0.014	0.000
3.4222	0.128	0.319	0.014	0.000
3.5000	0.130	0.329	0.014	0.000
3.5778	0.132	0.340	0.015	0.000
3.6556	0.133	0.350	0.015	0.000
3.7333	0.135	0.360	0.015	0.000
3.8111	0.137	0.371	0.015	0.000
3.8889	0.139	0.382	0.015	0.000
3.9667	0.141	0.393	0.015	0.000
4.0444	0.142	0.404	0.015	0.000
4.1222	0.144	0.415	0.016	0.000
4.2000	0.146	0.426	0.016	0.000
4.2778	0.148	0.438	0.016	0.000
4.3556	0.150	0.449	0.016	0.000
4.4333	0.152	0.461	0.016	0.000
4.5111	0.153	0.473	0.016	0.000
4.5889	0.155	0.485	0.017	0.000
4.6667	0.157	0.497	0.017	0.000
4.7444	0.159	0.510	0.017	0.000
4.8222	0.161	0.522	0.024	0.000
4.9000	0.163	0.535	0.028	0.000
4.9778	0.165	0.547	0.030	0.000
5.0556	0.167	0.560	0.032	0.000
5.1333	0.169	0.573	0.034	0.000
5.2111	0.171	0.587	0.036	0.000
5.2889	0.173	0.600	0.038	0.000
5.3667	0.175	0.614	0.039	0.000
5.4444	0.177	0.627	0.041	0.000
5.5222	0.179	0.641	0.042	0.000
5.6000	0.181	0.655	0.043	0.000
5.6778	0.183	0.669	0.048	0.000
5.7556	0.185	0.684	0.056	0.000
5.8333	0.187	0.698	0.065	0.000
5.9111	0.189	0.713	0.075	0.000
5.9889	0.191	0.728	0.086	0.000
6.0667	0.193	0.743	0.271	0.000
6.1444	0.195	0.758	0.663	0.000
6.2222	0.197	0.773	1.137	0.000
6.3000	0.199	0.789	1.602	0.000
6.3778	0.201	0.804	1.972	0.000
6.4556	0.204	0.820	2.208	0.000
6.5333	0.206	0.836	2.395	0.000
6.6111	0.208	0.852	2.558	0.000
6.6889	0.210	0.868	2.711	0.000
6.7667	0.212	0.885	2.855	0.000
6.8444	0.214	0.901	2.993	0.000

6.9222	0.217	0.918	3.124	0.000
7.0000	0.219	0.935	3.250	0.000
7.0778	0.221	0.952	3.371	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.64
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.32
Total Impervious Area: 1.32

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.146539
5 year	0.221902
10 year	0.26357
25 year	0.307089
50 year	0.333744
100 year	0.356269

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.078322
5 year	0.136665
10 year	0.194349
25 year	0.297061
50 year	0.401666
100 year	0.536949

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1902	0.119	0.066
1903	0.090	0.054
1904	0.129	0.062
1905	0.075	0.110
1906	0.039	0.049
1907	0.229	0.064
1908	0.163	0.057
1909	0.160	0.066
1910	0.226	0.064
1911	0.148	0.063

1912	0.393	0.091
1913	0.230	0.152
1914	0.058	0.049
1915	0.096	0.131
1916	0.146	0.061
1917	0.050	0.058
1918	0.158	0.176
1919	0.122	0.062
1920	0.149	0.063
1921	0.163	0.091
1922	0.165	0.064
1923	0.131	0.124
1924	0.063	0.059
1925	0.081	0.058
1926	0.141	0.061
1927	0.104	0.063
1928	0.112	0.068
1929	0.225	0.125
1930	0.145	0.063
1931	0.139	0.066
1932	0.104	0.103
1933	0.117	0.066
1934	0.302	0.327
1935	0.137	0.159
1936	0.124	0.074
1937	0.195	0.062
1938	0.123	0.063
1939	0.010	0.049
1940	0.134	0.101
1941	0.081	0.050
1942	0.202	0.294
1943	0.103	0.065
1944	0.200	0.140
1945	0.163	0.065
1946	0.096	0.056
1947	0.068	0.059
1948	0.314	0.066
1949	0.273	0.154
1950	0.079	0.060
1951	0.103	0.057
1952	0.394	0.164
1953	0.368	0.318
1954	0.131	0.069
1955	0.114	0.055
1956	0.060	0.055
1957	0.195	0.130
1958	0.392	0.914
1959	0.244	0.331
1960	0.071	0.051
1961	0.245	0.277
1962	0.134	0.069
1963	0.064	0.050
1964	0.067	0.057
1965	0.277	0.207
1966	0.080	0.061
1967	0.119	0.057
1968	0.129	0.069
1969	0.121	0.064

1970	0.188	0.066
1971	0.292	0.174
1972	0.190	0.068
1973	0.248	0.145
1974	0.126	0.063
1975	0.308	0.601
1976	0.164	0.066
1977	0.072	0.049
1978	0.271	0.233
1979	0.079	0.060
1980	0.157	0.063
1981	0.143	0.067
1982	0.068	0.051
1983	0.245	0.119
1984	0.110	0.061
1985	0.175	0.062
1986	0.147	0.069
1987	0.280	0.178
1988	0.175	0.144
1989	0.162	0.061
1990	0.185	0.064
1991	0.149	0.068
1992	0.191	0.173
1993	0.199	0.064
1994	0.291	0.067
1995	0.065	0.062
1996	0.313	0.266
1997	0.130	0.056
1998	0.156	0.063
1999	0.016	0.057
2000	0.117	0.084
2001	0.063	0.050
2002	0.172	0.064
2003	0.180	0.066
2004	0.158	0.065
2005	0.191	0.069
2006	0.092	0.062
2007	0.097	0.065
2008	0.156	0.064
2009	0.104	0.062
2010	0.090	0.134
2011	0.082	0.058
2012	0.123	0.062
2013	0.093	0.051
2014	0.064	0.053
2015	0.125	0.059
2016	0.051	0.058
2017	0.222	0.150
2018	0.398	0.586
2019	0.381	0.296
2020	0.124	0.058
2021	0.202	0.153
2022	0.083	0.057
2023	0.169	0.069
2024	0.267	0.063
2025	0.152	0.066
2026	0.241	0.137
2027	0.093	0.061

2028	0.080	0.052
2029	0.164	0.149
2030	0.303	0.133
2031	0.099	0.054
2032	0.058	0.054
2033	0.091	0.055
2034	0.088	0.059
2035	0.345	0.949
2036	0.182	0.073
2037	0.049	0.056
2038	0.146	0.139
2039	0.020	0.044
2040	0.086	0.061
2041	0.115	0.056
2042	0.344	0.269
2043	0.165	0.151
2044	0.221	0.144
2045	0.149	0.126
2046	0.172	0.198
2047	0.128	0.109
2048	0.170	0.062
2049	0.152	0.066
2050	0.108	0.062
2051	0.152	0.067
2052	0.092	0.065
2053	0.163	0.262
2054	0.202	0.148
2055	0.084	0.052
2056	0.073	0.057
2057	0.114	0.068
2058	0.136	0.124
2059	0.241	0.134

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	**Predeveloped**	**Mitigated**
1	0.3980	0.9490
2	0.3937	0.9143
3	0.3931	0.6012
4	0.3918	0.5857
5	0.3811	0.3309
6	0.3684	0.3268
7	0.3453	0.3183
8	0.3442	0.2962
9	0.3141	0.2943
10	0.3132	0.2768
11	0.3077	0.2686
12	0.3034	0.2656
13	0.3019	0.2620
14	0.2919	0.2332
15	0.2911	0.2066
16	0.2804	0.1977
17	0.2768	0.1782
18	0.2730	0.1760
19	0.2711	0.1736
20	0.2669	0.1731
21	0.2481	0.1636
22	0.2450	0.1589

23	0.2446	0.1541
24	0.2436	0.1528
25	0.2410	0.1515
26	0.2407	0.1512
27	0.2299	0.1502
28	0.2290	0.1492
29	0.2256	0.1478
30	0.2253	0.1447
31	0.2223	0.1439
32	0.2208	0.1436
33	0.2025	0.1400
34	0.2023	0.1389
35	0.2019	0.1367
36	0.2003	0.1344
37	0.1992	0.1343
38	0.1949	0.1328
39	0.1946	0.1313
40	0.1914	0.1302
41	0.1908	0.1256
42	0.1901	0.1248
43	0.1881	0.1241
44	0.1848	0.1235
45	0.1817	0.1186
46	0.1795	0.1098
47	0.1750	0.1090
48	0.1747	0.1030
49	0.1721	0.1014
50	0.1721	0.0913
51	0.1697	0.0910
52	0.1693	0.0836
53	0.1654	0.0740
54	0.1653	0.0733
55	0.1644	0.0689
56	0.1640	0.0689
57	0.1635	0.0687
58	0.1631	0.0687
59	0.1627	0.0687
60	0.1626	0.0686
61	0.1617	0.0683
62	0.1605	0.0679
63	0.1581	0.0678
64	0.1578	0.0678
65	0.1572	0.0671
66	0.1562	0.0669
67	0.1561	0.0665
68	0.1524	0.0665
69	0.1523	0.0662
70	0.1516	0.0661
71	0.1494	0.0659
72	0.1490	0.0659
73	0.1487	0.0659
74	0.1480	0.0657
75	0.1466	0.0657
76	0.1461	0.0656
77	0.1459	0.0655
78	0.1451	0.0654
79	0.1434	0.0654
80	0.1412	0.0652

81	0.1387	0.0649
82	0.1375	0.0648
83	0.1357	0.0642
84	0.1340	0.0642
85	0.1336	0.0640
86	0.1307	0.0640
87	0.1306	0.0639
88	0.1300	0.0639
89	0.1289	0.0638
90	0.1288	0.0637
91	0.1280	0.0634
92	0.1260	0.0634
93	0.1251	0.0632
94	0.1241	0.0630
95	0.1236	0.0630
96	0.1231	0.0630
97	0.1227	0.0629
98	0.1216	0.0628
99	0.1214	0.0628
100	0.1191	0.0624
101	0.1189	0.0622
102	0.1168	0.0621
103	0.1167	0.0617
104	0.1150	0.0616
105	0.1143	0.0616
106	0.1135	0.0616
107	0.1117	0.0616
108	0.1100	0.0615
109	0.1083	0.0615
110	0.1044	0.0614
111	0.1038	0.0612
112	0.1037	0.0611
113	0.1029	0.0610
114	0.1025	0.0609
115	0.0988	0.0607
116	0.0974	0.0606
117	0.0962	0.0602
118	0.0956	0.0598
119	0.0929	0.0592
120	0.0926	0.0591
121	0.0923	0.0588
122	0.0918	0.0587
123	0.0907	0.0584
124	0.0902	0.0580
125	0.0900	0.0580
126	0.0879	0.0578
127	0.0860	0.0576
128	0.0837	0.0575
129	0.0833	0.0574
130	0.0820	0.0571
131	0.0808	0.0568
132	0.0807	0.0568
133	0.0800	0.0568
134	0.0796	0.0566
135	0.0793	0.0562
136	0.0789	0.0558
137	0.0753	0.0558
138	0.0725	0.0556

139	0.0723	0.0554
140	0.0712	0.0551
141	0.0684	0.0546
142	0.0681	0.0544
143	0.0673	0.0541
144	0.0654	0.0537
145	0.0645	0.0529
146	0.0644	0.0523
147	0.0633	0.0517
148	0.0630	0.0512
149	0.0603	0.0511
150	0.0581	0.0510
151	0.0577	0.0505
152	0.0513	0.0505
153	0.0498	0.0499
154	0.0487	0.0495
155	0.0390	0.0494
156	0.0201	0.0493
157	0.0155	0.0492
158	0.0102	0.0443

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0733	14557	8028	55	Pass
0.0759	13475	7845	58	Pass
0.0785	12496	7654	61	Pass
0.0812	11631	7464	64	Pass
0.0838	10807	7288	67	Pass
0.0864	10057	7125	70	Pass
0.0891	9377	6968	74	Pass
0.0917	8762	6810	77	Pass
0.0943	8183	6661	81	Pass
0.0969	7608	6507	85	Pass
0.0996	7123	6307	88	Pass
0.1022	6681	6003	89	Pass
0.1048	6282	5731	91	Pass
0.1075	5900	5507	93	Pass
0.1101	5548	5282	95	Pass
0.1127	5228	5041	96	Pass
0.1154	4940	4780	96	Pass
0.1180	4644	4489	96	Pass
0.1206	4361	4195	96	Pass
0.1233	4118	3946	95	Pass
0.1259	3866	3662	94	Pass
0.1285	3636	3409	93	Pass
0.1312	3428	3165	92	Pass
0.1338	3234	2893	89	Pass
0.1364	3055	2684	87	Pass
0.1390	2878	2492	86	Pass
0.1417	2720	2327	85	Pass
0.1443	2548	2145	84	Pass
0.1469	2402	1987	82	Pass
0.1496	2274	1810	79	Pass
0.1522	2126	1656	77	Pass
0.1548	2003	1515	75	Pass
0.1575	1907	1361	71	Pass
0.1601	1795	1220	67	Pass
0.1627	1688	1090	64	Pass
0.1654	1602	976	60	Pass
0.1680	1533	884	57	Pass
0.1706	1465	799	54	Pass
0.1732	1404	707	50	Pass
0.1759	1342	642	47	Pass
0.1785	1274	612	48	Pass
0.1811	1217	590	48	Pass
0.1838	1170	566	48	Pass
0.1864	1112	536	48	Pass
0.1890	1066	517	48	Pass
0.1917	1028	486	47	Pass
0.1943	966	468	48	Pass
0.1969	924	449	48	Pass
0.1996	878	432	49	Pass
0.2022	842	419	49	Pass
0.2048	812	402	49	Pass
0.2075	776	385	49	Pass
0.2101	751	375	49	Pass

0.2127	725	360	49	Pass
0.2153	694	341	49	Pass
0.2180	669	333	49	Pass
0.2206	636	317	49	Pass
0.2232	612	304	49	Pass
0.2259	584	294	50	Pass
0.2285	559	280	50	Pass
0.2311	538	260	48	Pass
0.2338	511	256	50	Pass
0.2364	489	244	49	Pass
0.2390	461	233	50	Pass
0.2417	440	221	50	Pass
0.2443	419	212	50	Pass
0.2469	400	202	50	Pass
0.2496	384	192	50	Pass
0.2522	370	182	49	Pass
0.2548	354	174	49	Pass
0.2574	335	165	49	Pass
0.2601	322	154	47	Pass
0.2627	309	147	47	Pass
0.2653	294	135	45	Pass
0.2680	282	127	45	Pass
0.2706	269	115	42	Pass
0.2732	256	109	42	Pass
0.2759	247	102	41	Pass
0.2785	233	101	43	Pass
0.2811	224	94	41	Pass
0.2838	211	91	43	Pass
0.2864	198	88	44	Pass
0.2890	186	85	45	Pass
0.2916	173	76	43	Pass
0.2943	164	72	43	Pass
0.2969	152	69	45	Pass
0.2995	143	68	47	Pass
0.3022	137	65	47	Pass
0.3048	126	60	47	Pass
0.3074	120	58	48	Pass
0.3101	111	56	50	Pass
0.3127	98	55	56	Pass
0.3153	90	51	56	Pass
0.3180	86	47	54	Pass
0.3206	77	43	55	Pass
0.3232	71	42	59	Pass
0.3259	69	39	56	Pass
0.3285	66	37	56	Pass
0.3311	62	33	53	Pass
0.3337	59	32	54	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.1523 acre-feet
On-line facility target flow:	0.1985 cfs.
Adjusted for 15 min:	0.1985 cfs.
Off-line facility target flow:	0.1148 cfs.
Adjusted for 15 min:	0.1148 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
Trapezoidal Pond 1 POC	☐	568.36			☐	0.00			
Total Volume Infiltrated		568.36	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.

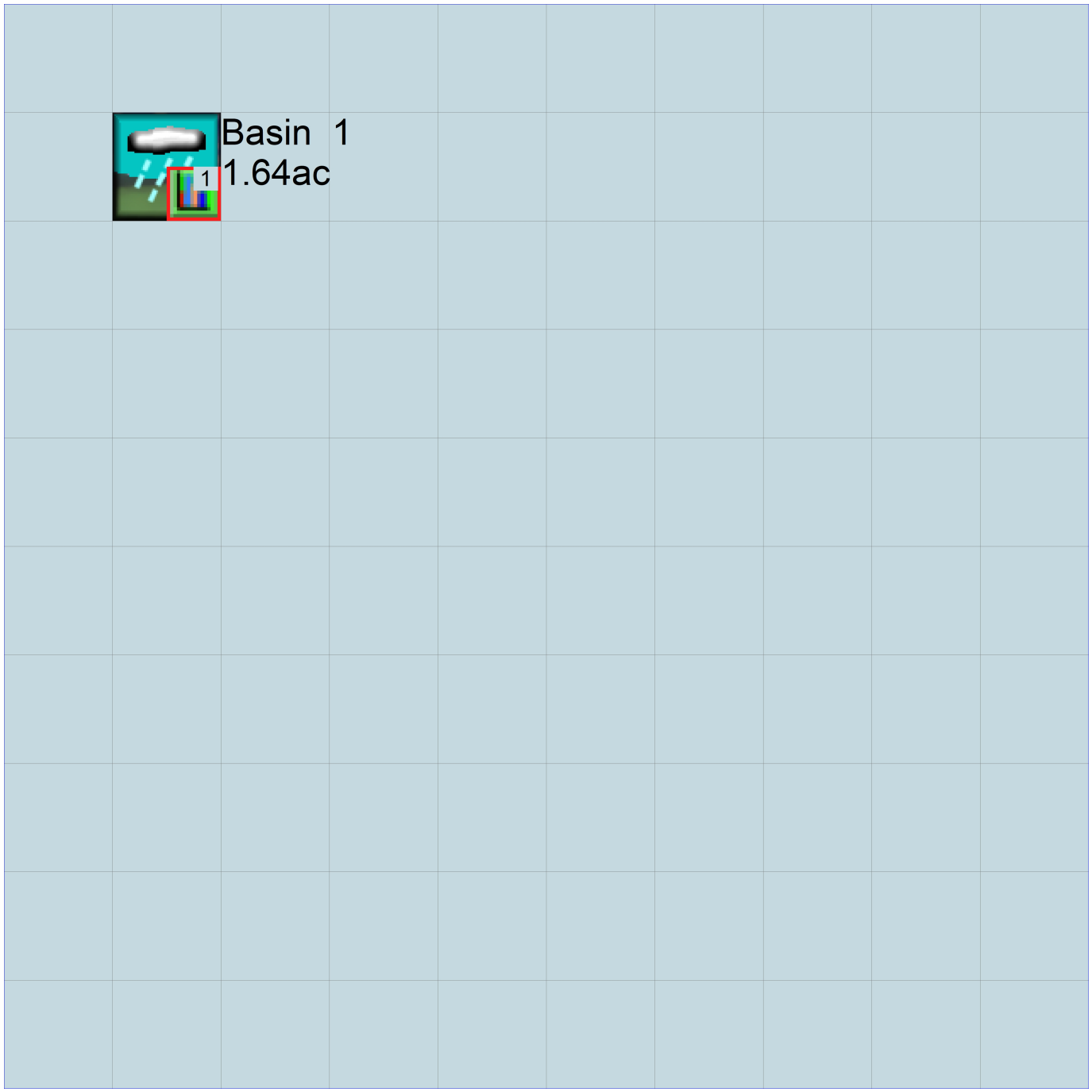
PERLND Changes

No PERLND changes have been made.

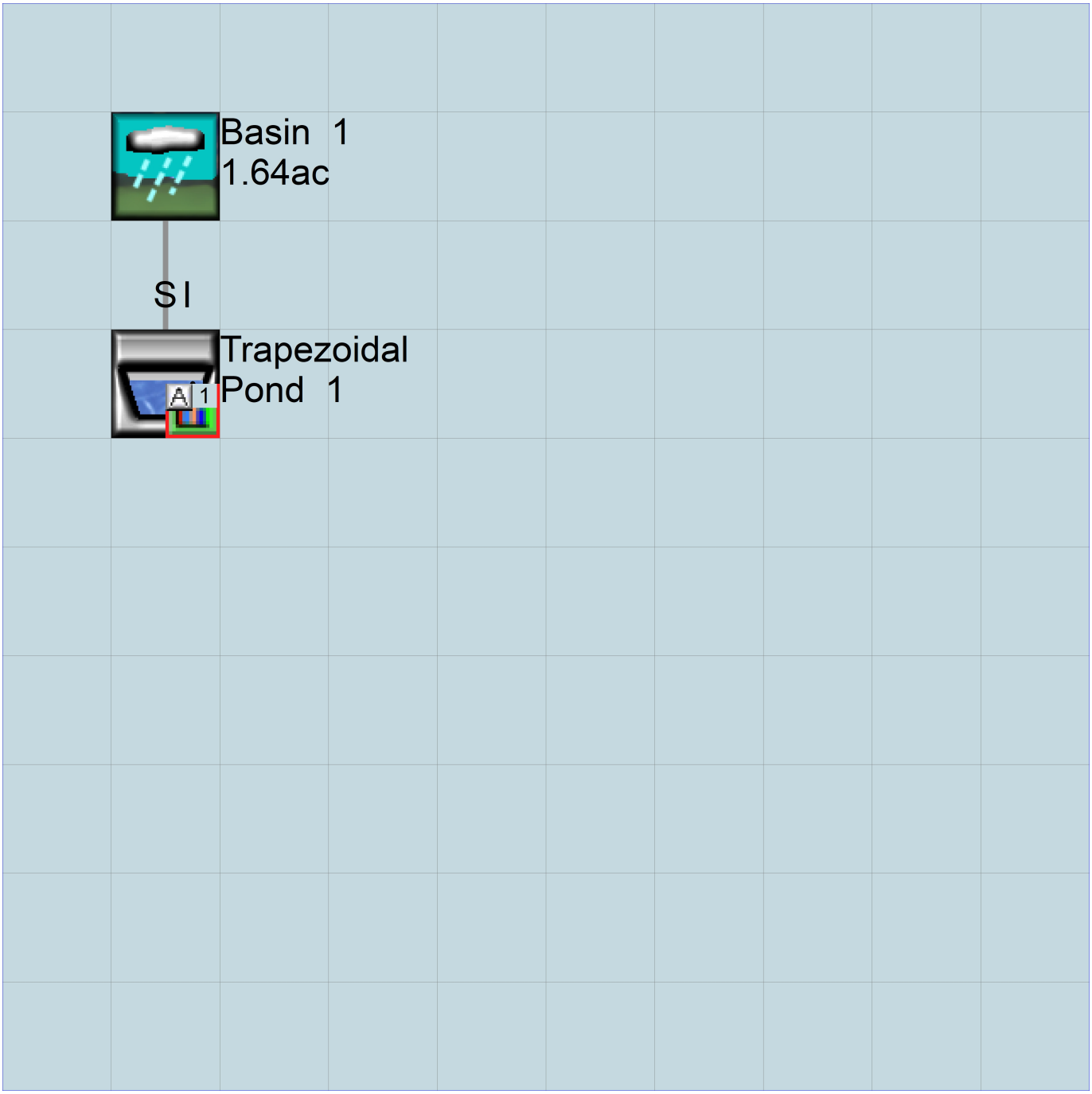
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

Mitigated UCI File

Predeveloped HSPF Message File

Mitigated HSPF Message File

Disclaimer

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

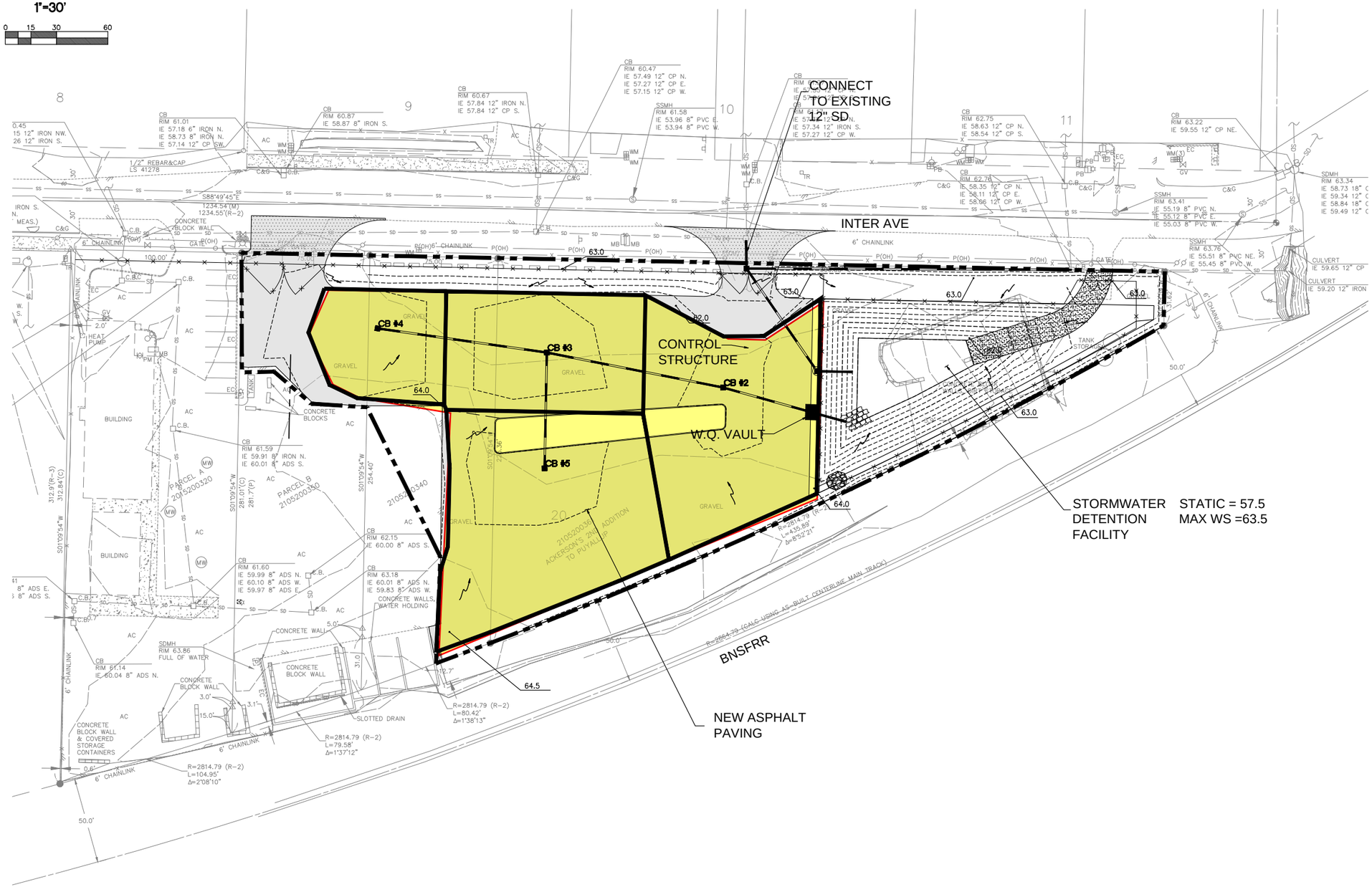
www.clearcreeksolutions.com

Exhibit F
Water Quality Calculations

DEVELOPED CONDITIONS BASIN MAP

1"=30'

0 15 30 60



No.	Date	By	Ckd.	Appr.	Revision

Title: DEVELOPED CONDITIONS BASIN MAP

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

Scale: Horizontal 1"=30' Vertical N/A

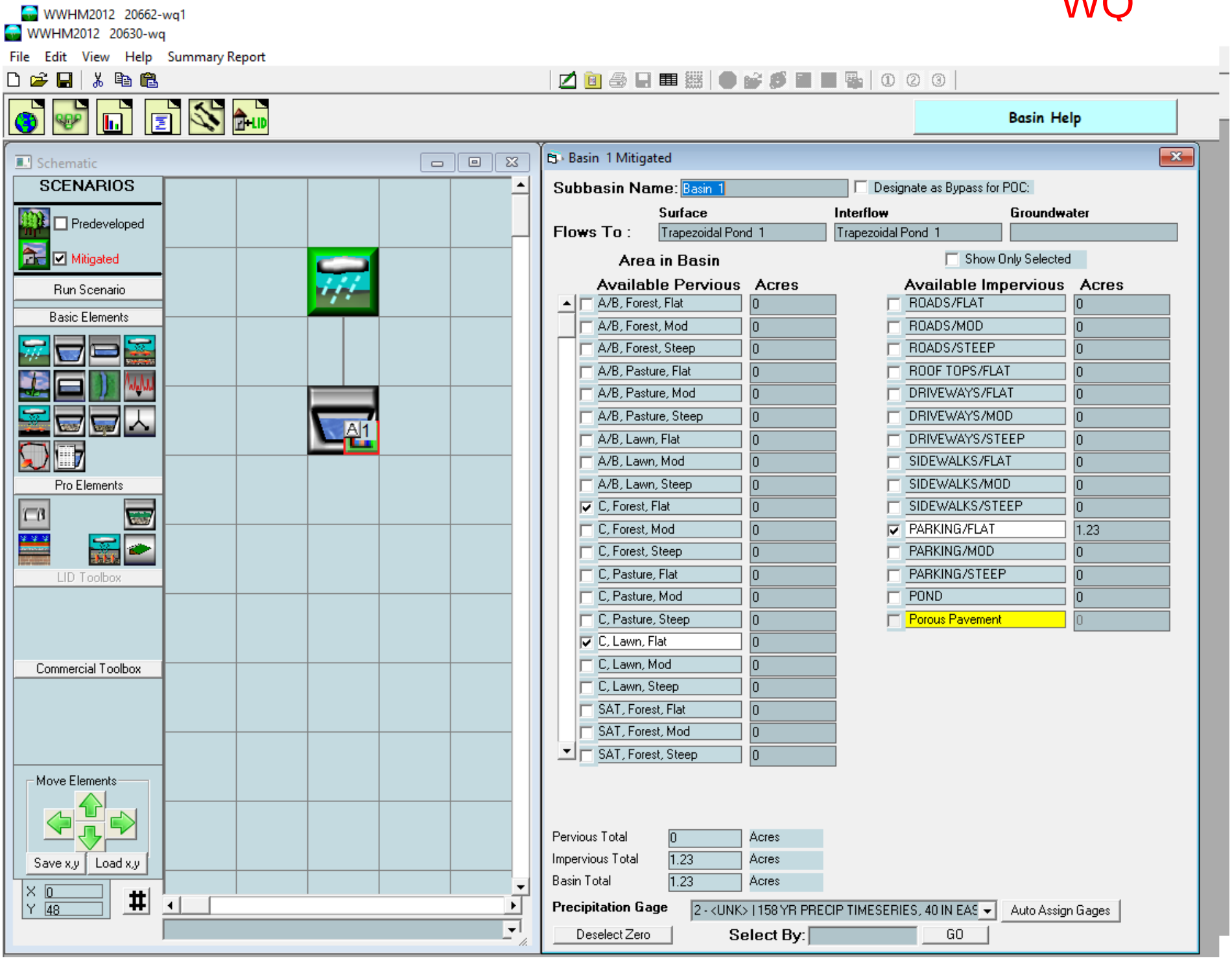
Designed DL Drawn DL Checked DL Approved JGH Date 2018.12.21

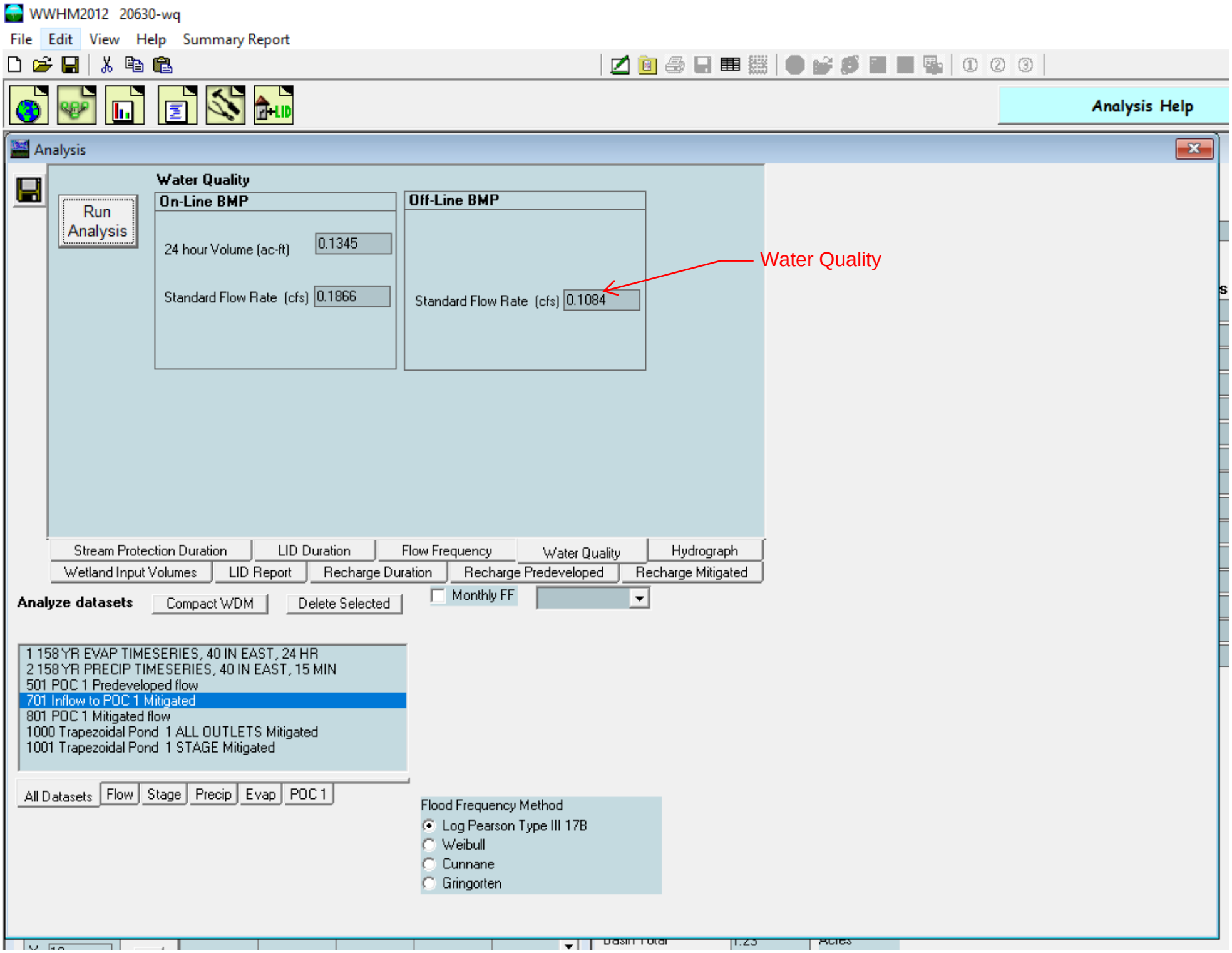
Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 barghausen.com

Job Number 20631

Sheet 1 of 1

WQ


WWHM2012 20662-wq1
WWHM2012 20630-wq
File Edit View Help Summary Report
Basin Help
Schematic
SCENARIOS
Predeveloped
Mitigated
Run Scenario
Basic Elements
Pro Elements
LID Toolbox
Commercial Toolbox
Move Elements
Save x,y
Load x,y
X 0
Y 48
A1
Basin 1 Mitigated
Subbasin Name: Basin 1
Designate as Bypass for POC:
Flows To :
Surface
Interflow
Groundwater
Trapezoidal Pond 1
Trapezoidal Pond 1
Area in Basin
Show Only Selected
Available Pervious
Acres
A/B, Forest, Flat 0
A/B, Forest, Mod 0
A/B, Forest, Steep 0
A/B, Pasture, Flat 0
A/B, Pasture, Mod 0
A/B, Pasture, Steep 0
A/B, Lawn, Flat 0
A/B, Lawn, Mod 0
A/B, Lawn, Steep 0
C, Forest, Flat 0
C, Forest, Mod 0
C, Forest, Steep 0
C, Pasture, Flat 0
C, Pasture, Mod 0
C, Pasture, Steep 0
C, Lawn, Flat 0
C, Lawn, Mod 0
C, Lawn, Steep 0
SAT, Forest, Flat 0
SAT, Forest, Mod 0
SAT, Forest, Steep 0
Available Impervious
Acres
ROADS/FLAT 0
ROADS/MOD 0
ROADS/STEEP 0
ROOF TOPS/FLAT 0
DRIVEWAYS/FLAT 0
DRIVEWAYS/MOD 0
DRIVEWAYS/STEEP 0
SIDEWALKS/FLAT 0
SIDEWALKS/MOD 0
SIDEWALKS/STEEP 0
PARKING/FLAT 1.23
PARKING/MOD 0
PARKING/STEEP 0
POND 0
Porous Pavement 0
Pervious Total 0 Acres
Impervious Total 1.23 Acres
Basin Total 1.23 Acres
Precipitation Gage
2 - <UNK> | 158 YR PRECIP TIMESERIES, 40 IN EAS
Auto Assign Gages
Deselect Zero
Select By:
GO

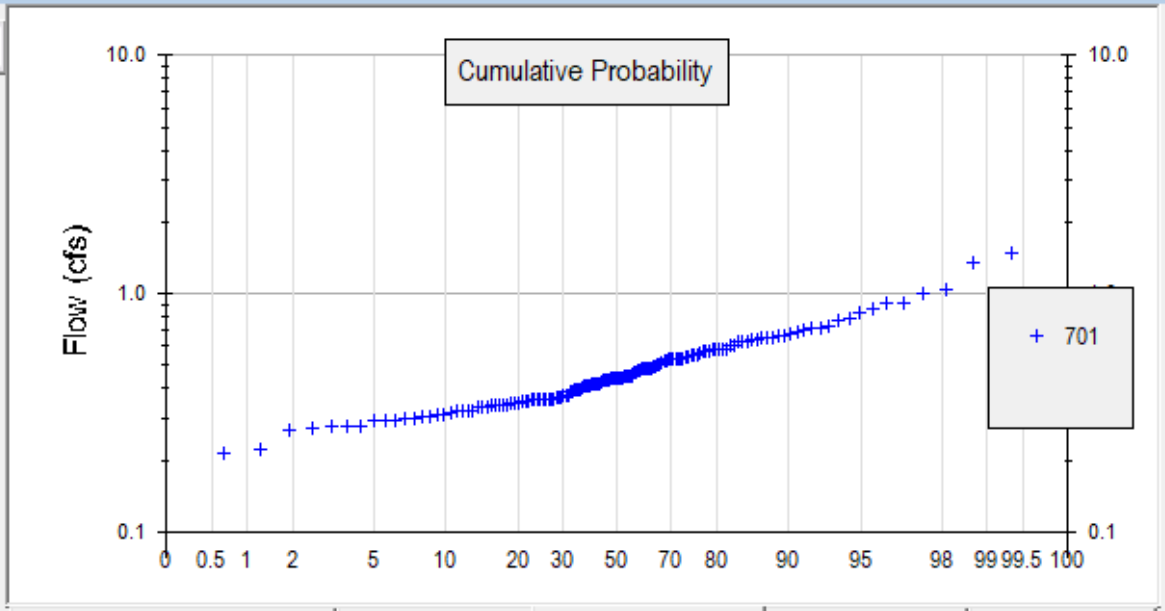

WWHM2012 20630-wq
File Edit View Help Summary Report
Analysis Help
Analysis
Water Quality
Run Analysis
On-Line BMP
24 hour Volume (ac-ft) 0.1345
Standard Flow Rate (cfs) 0.1866
Off-Line BMP
Standard Flow Rate (cfs) 0.1084
Water Quality
Stream Protection Duration
LID Duration
Flow Frequency
Water Quality
Hydrograph
Wetland Input Volumes
LID Report
Recharge Duration
Recharge Predeveloped
Recharge Mitigated
Analyze datasets
Compact WDM
Delete Selected
Monthly FF
1 158 YR EVAP TIMESERIES, 40 IN EAST, 24 HR
2 158 YR PRECIP TIMESERIES, 40 IN EAST, 15 MIN
501 POC 1 Predeveloped flow
701 Inflow to POC 1 Mitigated
801 POC 1 Mitigated flow
1000 Trapezoidal Pond 1 ALL OUTLETS Mitigated
1001 Trapezoidal Pond 1 STAGE Mitigated
All Datasets
Flow
Stage
Precip
Evap
POC 1
Flood Frequency Method
Log Pearson Type III 17B
Weibull
Cunnane
Gringorten

WWHM2012 20630-wq

File Edit View Help Summary Report

Analysis Help

Analysis



Stream Protection Duration | LID Duration | Flow Frequency | Water Quality | Hydrograph

Wetland Input Volumes | LID Report | Recharge Duration | Recharge Predeveloped | Recharge Mitigated

Analyze datasets Compact WDM Delete Selected Monthly FF

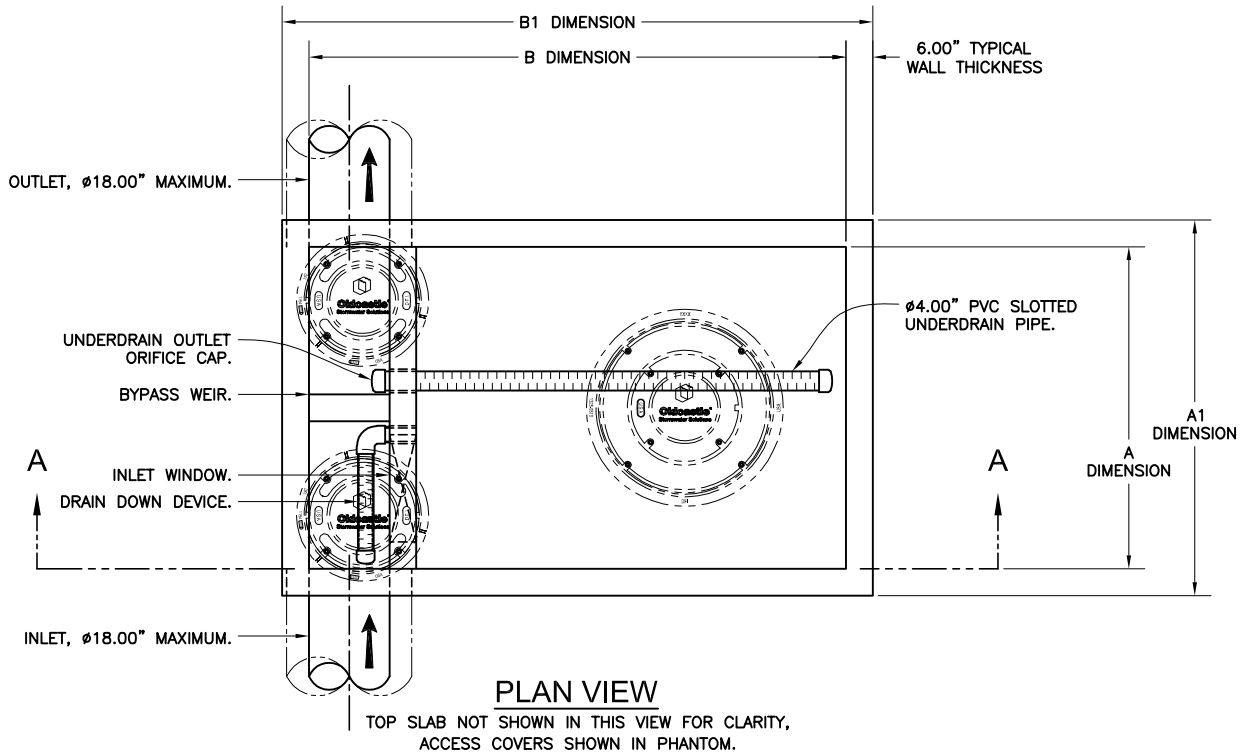
1 158 YR EVAP TIMESERIES, 40 IN EAST, 24 HR
2 158 YR PRECIP TIMESERIES, 40 IN EAST, 15 MIN
501 POC 1 Predeveloped flow
701 Inflow to POC 1 Mitigated
801 POC 1 Mitigated flow
1000 Trapezoidal Pond 1 ALL OUTLETS Mitigated
1001 Trapezoidal Pond 1 STAGE Mitigated

All Datasets | Flow | Stage | Precip | Evap | POC 1

Flood Frequency Method
- (•) Log Pearson Type III 17B
- ( ) Weibull
- ( ) Cunnane
- ( ) Gringorten

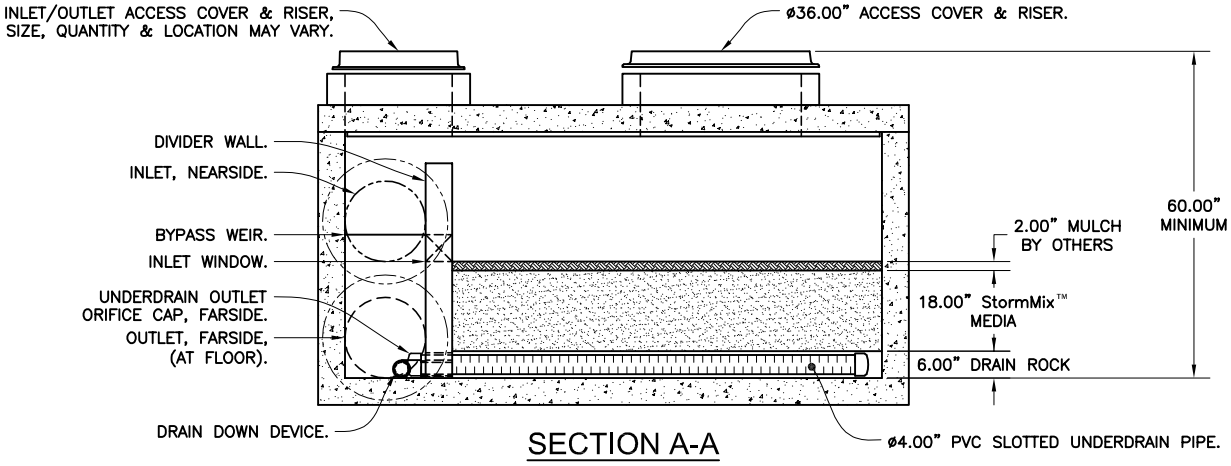
```
Flow Frequency
Flow(cfs)  0701 15m
2 Year   =    0.4411
5 Year   =    0.5917
10 Year  =    0.7011
25 Year  =    0.8508
50 Year  =    0.9709
100 Year =    1.0986

Annual Peaks
 1902          0.5220
 1903          0.5780
 1904          0.6534
 1905          0.2937
 1906          0.3331
 1907          0.4382
 1908          0.3611
 1909          0.4441
 1910          0.4248
 1911          0.4782
 1912          0.7891
 1913          0.3427
 1914          1.4688
 1915          0.2974
 1916          0.5540
 1917          0.2199
 1918          0.4411
 1919          0.2772
 1920          0.3636
 1921          0.3109
 1922          0.4870
 1923          0.3385
 1924          0.6412
 1925          0.2702
 1926          0.5208
 1927          0.4456
 1928          0.3156
 1929          0.6297
```



PLAN VIEW

TOP SLAB NOT SHOWN IN THIS VIEW FOR CLARITY, ACCESS COVERS SHOWN IN PHANTOM.



SECTION A-A

MODEL	VAULT SIZE [1] (ID)		VAULT FOOTPRINT [1] (OD)		TREATMENT FLOW CAPACITY [2] (GPM/CFS)	TREATMENT FLOW CAPACITY [3] (GPM/CFS)
	A DIM	B DIM	A1 DIM	B1 DIM		
BPU-IB-46	4'	6'	5'	7'	25.6 / 0.057	28.8 / 0.064
BPU-IB-48	4'	8'	5'	9'	38.4 / 0.086	43.2 / 0.096
BPU-IB-412	4'	12'	5'	13'	64.0 / 0.143	72.0 / 0.160
BPU-IB-66	6'	6'	7'	7'	38.4 / 0.086	43.2 / 0.096
BPU-IB-68	6'	8'	7'	9'	57.6 / 0.128	64.8 / 0.144
BPU-IB-612	6'	12'	7'	13'	96.0 / 0.214	108.0 / 0.241
BPU-IB-816	8'	16'	9'	17'	179.2 / 0.399	201.6 / 0.449

[1] All Dimensions Are Nominal
[2] Based on an WA Ecology GULD Approval for Basic, Enhanced & Phosphorus. At 1.60 gpm/sf Media Surface Area.
[3] Based on an NJCAT Verification & NJ DEP Certification. At 1.80 gpm/sf Media Surface Area.

US Patents Pending

Bioretention/ Biofiltration

BioPod™ Biofilter Underground

Vault with Internal Bypass

Oldcastle® INFRASTRUCTURE

Ph: 800.579.8819 | oldcastlestormwater.com

DRAWING NO.	REV	ECO	DATE	
BPU-IB	NR	ECO-0156 NEW 10/4/18	JPR 10/4/18	SHEET 1 OF 2

WASHINGTON STATE DEPARTMENT OF ECOLOGY

July 2018

GENERAL USE LEVEL DESIGNATION FOR BASIC (TSS), DISSOLVED METALS (ENHANCED), AND PHOSPHORUS TREATMENT

For

Oldcastle Infrastructure, Inc.'s
The BioPod™ Biofilter
(Formerly the TreePod Biofilter)

Ecology's Decision:

Based on Oldcastle Infrastructure, Inc. application submissions for the The BioPod™ Biofilter (BioPod), Ecology hereby issues the following use level designation:

1. **General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus Treatment:**
   - **Sized at a hydraulic loading rate of 1.6 gallons per minute (gpm) per square foot (sq ft) of media surface area.**

2. **Ecology approves the BioPod at the hydraulic loading rate listed above, to achieve the maximum water quality design flow rate. The water quality design flow rates are calculated using the following procedures:**

   - **Western Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.**
   - **Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.**
   - **Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.**

3. **The GULD has no expiration date, but may be amended or revoked by Ecology.**

Ecology's Conditions of Use:

The BioPod shall comply with these conditions:

1) **Oldcastle Infrastructure, Inc. shall design, assemble, install, operate, and maintain the BioPod installations in accordance with Oldcastle Infrastructure, Inc.'s applicable manuals and the Ecology Decision.**

2) **BioPod media shall conform to the specifications submitted to and approved by Ecology**

3) **Maintenance: The required inspection/maintenance interval for stormwater treatment devices is often dependent on the efficiency of the device and the degree of pollutant loading from a particular drainage basin. Therefore, Ecology does not endorse or recommend a "one size fits all" maintenance cycle for a particular model/size of manufactured filter treatment device.**

   - **The BioPod is designed for a target maintenance interval of 1 year. Maintenance includes replacing the mulch, assessing plant health, removal of trash, and raking the top few inches of engineered media.**
   - **A BioPod system tested at the Lake Union Ship Canal Test Facility in Seattle, WA required maintenance after 1.5 months, or 6.3% of a water year. Monitoring personnel observed similar maintenance issues with other systems evaluated at the Test Facility. The runoff from the Test Facility may be unusual and maintenance requirements of systems installed at the Test Facility may not be indicative of maintenance requirements for all sites.**
   - **Test results provided to Ecology from a BioPod System evaluated in a lab following New Jersey Department of Environmental Protection Laboratory Protocol for Filtration MTDs have indicated the BioPod System is capable of longer maintenance intervals.**
   - **Owners/operators must inspect BioPod systems for a minimum of twelve months from the start of post-construction operation to determine site-specific inspection/maintenance schedules and requirements. Owners/operators must conduct inspections monthly during the wet season, and every other month during the dry season. (According to the SWMMWW, the wet season in western Washington is October 1 to April 30. According to the SWMMEW, the wet season in eastern Washington is October 1 to June 30.) After the first year of operation, owners/operators must conduct inspections based on the findings during the first year of inspections.**
   - **Conduct inspections by qualified personnel, follow manufacturer's guidelines, and use methods capable of determining either a decrease in treated effluent flow rate and/or a decrease in pollutant removal ability.**

4) **Install the BioPod in such a manner that you bypass flows exceeding the maximum operating rate and you will not resuspend captured sediment.**

5) Discharges from the BioPod shall not cause or contribute to water quality standards violations in receiving waters.

Applicant: Oldcastle Infrastructure, Inc.

Applicant's Address: 360 Sutton Place
Santa Rosa, CA 95407

Application Documents:

Technical Evaluation Report TreePod™ BioFilter System Performance Certification Project, Prepared for Oldcastle, Inc., Prepared by Herrera Environmental Consultants, Inc. February 2018

Technical Memorandum: Response to Board of External Reviewers' Comments on the Technical Evaluation Report for the TreePod™ Biofilter System Performance Certification Project, Oldcastle, Inc. and Herrera Environmental Consultants, Inc., February 2018

Technical Memorandum: Response to Board of External Reviewers' Comments on the Technical Evaluation Report for the TreePod™ Biofilter System Performance Certification Project, Oldcastle, Inc. and Herrera Environmental Consultants, Inc., January 2018

Application for Pilot Use Level Designation, TreePod™ Biofilter – Stormwater Treatment System, Oldcastle Stormwater Solutions, May 2016

Emerging Stormwater Treatment Technologies Application for Certification: The TreePod™ Biofilter, Oldcastle Stormwater Solutions, April 2016

Applicant's Use Level Request:

- General Use Level Designation as a Basic, Enhanced, and Phosphorus Treatment device in accordance with Ecology's *Stormwater Management Manual for Western Washington*

Applicant's Performance Claims:

Based on results from laboratory and field-testing, the applicant claims the BioPod™ Biofilter operating at a hydraulic loading rate of 153 inches per hour is able to remove:

- 80% of Total Suspended Solids (TSS) for influent concentrations greater than 100 mg/L and achieve a 20 mg/L effluent for influent concentrations less than 100 mg/L.
- 60% dissolved zinc for influent concentrations 0.02 to 0.3 mg/L.
- 30% dissolved copper for influent concentrations 0.005 to 0.02 mg/L.
- 50% or greater total phosphorus for influent concentrations 0.1 to 0.5 mg/L.

Ecology's Recommendations:

Ecology finds that:

- Oldcastle Infrastructure, Inc. has shown Ecology, through laboratory and field testing, that the BioPod™ Biofilter is capable of attaining Ecology's Basic, Total Phosphorus, and Enhanced treatment goals.

Findings of Fact:

Field Testing

1. Herrera Environmental Consultants, Inc. conducted monitoring of the BioPod™ Biofilter at the Lake Union Ship Canal Test Facility in Seattle Washington between November 2016 and April 2018. Herrera collected flow-weight composite samples during 14 separate storm events and peak flow grab samples during 3 separate storm events. The system was sized at an infiltration rate of 153 inches per hour or a hydraulic loading rate of 1.6 gpm/ft^2.
2. The D_{50} of the influent PSD ranged from 3 to 292 microns, with an average D_{50} of 28 microns.
3. Influent TSS concentrations ranged from 17 mg/L to 666 mg/L, with a mean concentration of 98 mg/L. For all samples (influent concentrations above and below 100 mg/L) the bootstrap estimate of the lower 95 percent confidence limit (LCL 95) of the mean TSS reduction was 84% and the bootstrap estimate of the upper 95 percent confidence limit (UCL95) of the mean TSS effluent concentration was 8.2 mg/L.
4. Dissolved copper influent concentrations from the 17 events ranged from 9.0 µg/L to 21.1 µg/L. The 21.1 µg/L data point was reduced to 20.0 µg/L, the upper limit to the TAPE allowed influent concentration range, prior to calculating the pollutant removal. A bootstrap estimate of the LCL95 of the mean dissolved copper reduction was 35%.
5. Dissolved zinc influent concentrations from the 17 events ranged from 26.1 µg/L to 43.3 µg/L. A bootstrap estimate of the LCL95 of the mean dissolved zinc reduction was 71%.
6. Total phosphorus influent concentrations from the 17 events ranged from 0.064 mg/L to 1.56 mg/L. All influent data greater than 0.5 mg/L were reduced to 0.5 mg/L, the upper limit to the TAPE allowed influent concentration range, prior to calculating the pollutant removal. A bootstrap estimate of the LCL95 of the mean total phosphorus reduction was 64%.
7. The system experienced rapid sediment loading and needed to be maintained after 1.5 months. Monitoring personnel observed similar sediment loading issues with other systems evaluated at the Test Facility. The runoff from the Test Facility may not be indicative of maintenance requirements for all sites.

Laboratory Testing

1. Good Harbour Laboratories (GHL) conducted laboratory testing at their site in Mississauga, Ontario in October 2017 following the New Jersey Department of Environmental Protection Laboratory Protocol for Filtration MTDs. The testing evaluated a 4-foot by 6-foot standard biofiltration chamber and inlet contour rack with bypass weir. The test sediment used during the testing was custom blended by GHL using various commercially available silica sands, which had an average d_{50} of 69 µm. Based on the lab test results:

a. GHL evaluated removal efficiency over 15 events at a Maximum Treatment Flow Rate (MTFR) of 37.6 gpm, which corresponds to a MTFR to effective filtration treatment area ratio of 1.80 gpm/ft^2. The system, operating at 100% of the MTFR with an average influent concentration of 201.3 mg/L, had an average removal efficiency of 99 percent.
b. GHL evaluated sediment mass loading capacity over an additional 16 events using an influent SSC concentration of 400 mg/L. The first 11 runs were evaluated at 100% of the MTFR. The BioPod began to bypass, so the remaining 5 runs were evaluated at 90% of the MTFR. The total mass of the sediment captured was 245.0 lbs and the cumulative mass removal efficiency was 96.3%.

2. Herrera Environmental Consultants Inc. conducted laboratory testing in September 2014 at the Seattle University Engineering Laboratory. The testing evaluated the flushing characteristics, hydraulic conductivity, and pollutant removal ability of twelve different media blends. Based on this testing, Oldcastle Infrastructure, Inc. selected one media blend, Mix 8, for inclusion in their TAPE evaluation of the BioPod™ Biofilter.
   a. Herrera evaluated Mix 8 in an 8-inch diameter by 36-inch tall polyvinyl chloride (PVC) column. The column contained 18-inches of Mix 8 on top of 6-inches of pea gravel. The BioPod will normally include a 3-inch mulch layer on top of the media layer; however, this was not included in the laboratory testing.
   b. Mix 8 has a hydraulic conductivity of 218 inches per hour; however, evaluation of the pollutant removal ability of the media was based on an infiltration rate of 115 inches per hour. The media was tested at 75%, 100%, and 125% of the infiltration rate. Based on the lab test results:
      - The system was evaluated using natural stormwater. The dissolved copper and dissolved zinc concentrations in the natural stormwater were lower than the TAPE influent standards; therefore, the stormwater was spiked with 66.4 mL of 100 mg/L Cu solution and 113.6 mL of 1,000 mg/L Zn solution.
      - The BioPod removed an average of 81% of TSS, with a mean influent concentration of 48.4 mg/L and a mean effluent concentration of 9.8 mg/L.
      - The BioPod removed an average of 94% of dissolved copper, with a mean influent concentration of 10.6 µg/L and a mean effluent concentration of 0.6 µg/L.
      - The BioPod removed an average of 97% of dissolved zinc, with a mean influent concentration of 117 µg/L and a mean effluent concentration of 4 µg/L.
      - The BioPod removed an average of 97% of total phosphorus, with a mean influent concentration of 2.52 mg/L and a mean effluent concentration of 0.066 mg/L. When total phosphorus influent concentrations were capped at the TAPE upper limit of 0.5 mg/L, calculations showed an average removal of 87%.

Other BioPod Related Issues to be Addressed By the Company:

1. Conduct hydraulic testing to obtain information about maintenance requirements on a site with runoff that is more typical of the Pacific Northwest.

Technology Description: Download at https://oldcastleprecast.com/stormwater/bioretention-biofiltration-applications/bioretention-biofiltration-solutions/

Contact Information:

Applicant: Chris Demarest
Oldcastle Infrastructure, Inc.
(925) 667-7100
Chris.demarest@oldcastle.com

Applicant website: https://oldcastleprecast.com/stormwater/

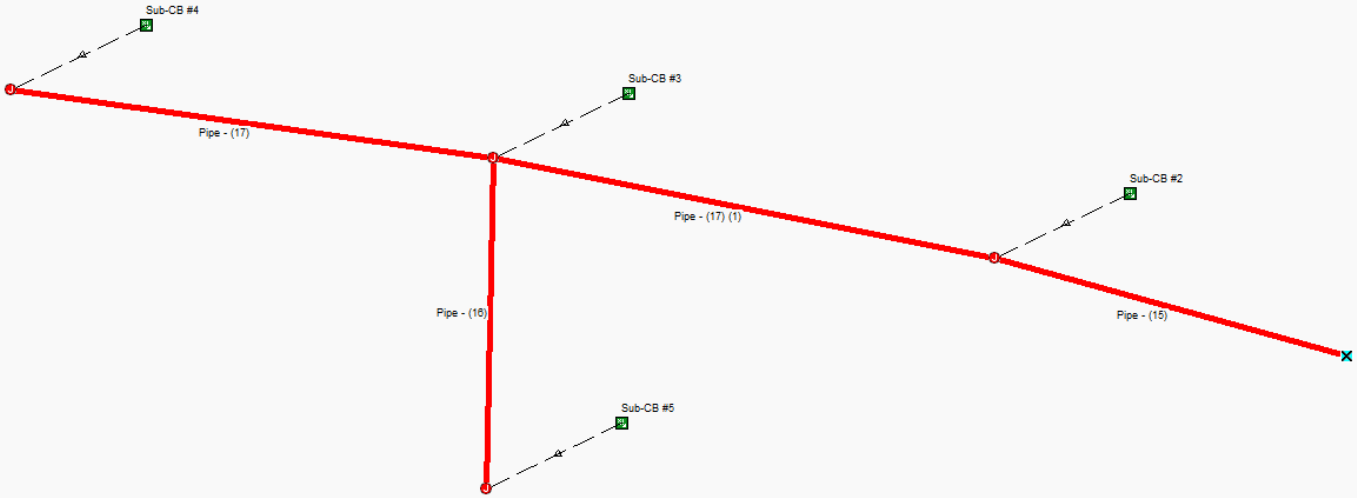
Ecology web link: https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies

Ecology: Douglas C. Howie, P.E.
Department of Ecology
Water Quality Program
(360) 407-6444
douglas.howie@ecy.wa.gov

Revision History

Date	Revision
March 2018	GULD granted for Basic Treatment
March 2018	Provisional GULD granted for Enhanced and Phosphorus Treatment
June 2016	PULD Granted
April 2018	GULD for Basic and Provisional GULD for Enhanced and Phosphorus granted, changed name to BioPod from TreePod
July 2018	GULD for Enhanced and Phosphorus granted

Exhibit G
Conveyance Analysis


Sub-CB #4
Sub-CB #3
Pipe - (17)
Sub-CB #2
Pipe - (17) (1)
Pipe - (16)
Pipe - (15)
Sub-CB #5

Autodesk® Storm and Sanitary Analysis 2016 - Version 12.0.42 (Build 0)

****
Project Description
****
File Name 20630-conveyance.SPF

****
Analysis Options
****
Flow Units ..... cfs
Subbasin Hydrograph Method. Santa Barbara UH
Time of Concentration..... SCS TR-55
Link Routing Method ..... Hydrodynamic
Storage Node Exfiltration.. None
Starting Date FEB-13-2020 00:00:00
Ending Date FEB-14-2020 00:00:00
Report Time Step 00:00:10

****
Element Count
****
Number of rain gages 1
Number of subbasins 4
Number of nodes 5
Number of links 4

****
Raingage Summary
****

Gage ID	Data Source	Data Type	Recording Interval min
Rain Gage-01	TS-25 yr	CUMULATIVE	6.00

****
Subbasin Summary
****

Subbasin ID	Total Area acres	Imperv. Area %	Raingage
Sub-CB #2	0.27	100.00	Rain Gage-01
Sub-CB #3	0.19	100.00	Rain Gage-01
Sub-CB #4	0.11	100.00	Rain Gage-01
Sub-CB #5	0.33	100.00	Rain Gage-01

****
Node Summary
****

Node ID	Element Type	Invert Elevation ft	Maximum Elev. ft	Ponded Area ft²	External Inflow
CB #2	JUNCTION	59.85	63.50	0.00	
CB #3	JUNCTION	60.20	63.50	0.00	
CB #4	JUNCTION	60.50	63.50	0.00	
CB #5	JUNCTION	60.50	63.50	0.00	
Out-1Pipe - (15)	OUTFALL	58.50	59.50	0.00	

****
Link Summary
****

Link ID	From Node	To Node	Element Type	Length ft	Slope %	Manning's Roughness
Pipe - (15)	CB #2	Out-1Pipe - (15)	CONDUIT	74.8	1.8049	0.0120
Pipe - (16)	CB #5	CB #3	CONDUIT	67.8	0.4427	0.0120
Pipe - (17)	CB #4	CB #3	CONDUIT	100.0	0.3000	0.0120
Pipe - (17) (1)	CB #3	CB #2	CONDUIT	105.1	0.3331	0.0120

****
Cross Section Summary
****

Link ID	Shape	Depth/ Diameter ft	Width ft	No. of Barrels	Cross Sectional Area ft²	Full Flow Hydraulic Radius ft	Design Flow Capacity cfs
Pipe - (15)	CIRCULAR	1.00	1.00	1	0.79	0.25	5.19
Pipe - (16)	CIRCULAR	1.00	1.00	1	0.79	0.25	2.57
Pipe - (17)	CIRCULAR	1.00	1.00	1	0.79	0.25	2.11
Pipe - (17) (1)	CIRCULAR	1.00	1.00	1	0.79	0.25	2.23

Runoff Quantity Continuity	Volume acre-ft	Depth inches
Total Precipitation	0.256	3.444
Surface Runoff	0.239	3.207
Continuity Error (%)	0.000	

Flow Routing Continuity	Volume acre-ft	Volume Mgallons
External Inflow	0.000	0.000
External Outflow	0.227	0.074
Initial Stored Volume	0.001	0.000
Final Stored Volume	0.006	0.002
Continuity Error (%)	0.025	

****
Composite Curve Number Computations Report
****

Subbasin Sub-CB #2

Soil/Surface Description	Area (acres)	Soil Group	CN
Composite Area & Weighted CN	0.27		98.00

Subbasin Sub-CB #3

Soil/Surface Description	Area (acres)	Soil Group	CN
Composite Area & Weighted CN	0.19		98.00

Subbasin Sub-CB #4

Soil/Surface Description	Area (acres)	Soil Group	CN
Composite Area & Weighted CN	0.11		98.00

Subbasin Sub-CB #5

Soil/Surface Description	Area (acres)	Soil Group	CN
Composite Area & Weighted CN	0.33		98.00

****
Runoff Coefficient Computations Report
****

Subbasin Sub-CB #2

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.27	-	0.50
Composite Area & Weighted Runoff Coeff.	0.27		0.50

Subbasin Sub-CB #3

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.19	-	0.50
Composite Area & Weighted Runoff Coeff.	0.19		0.50

Subbasin Sub-CB #4

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.11	-	0.50
Composite Area & Weighted Runoff Coeff.	0.11		0.50

Subbasin Sub-CB #5

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.33	-	0.50
Composite Area & Weighted Runoff Coeff.	0.33		0.50

****

SCS TR-55 Time of Concentration Computations Report
****

Sheet Flow Equation

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where:

Tc = Time of Concentration (hrs)
n = Manning's Roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's Roughness

Subbasin Sub-CB #2

User-Defined TOC override (minutes): 5.00

Subbasin Sub-CB #3

User-Defined TOC override (minutes): 5.00

Subbasin Sub-CB #4

User-Defined TOC override (minutes): 5.00

Subbasin Sub-CB #5

User-Defined TOC override (minutes): 5.00

****
Subbasin Runoff Summary
****

Subbasin ID	Total Precip in	Total Runoff in	Peak Runoff cfs	Weighted Curve Number	Time of Concentration days	Time of Concentration hh:mm:ss
Sub-CB #2	3.44	3.21	0.22	98.000	0	00:06:00
Sub-CB #3	3.44	3.21	0.15	98.000	0	00:06:00
Sub-CB #4	3.44	3.21	0.09	98.000	0	00:06:00
Sub-CB #5	3.44	3.21	0.26	98.000	0	00:06:00

****
Node Depth Summary
****

Node ID	Average Depth Attained ft	Maximum Depth Attained ft	Maximum HGL Attained ft	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume acre-in	Total Time Flooded minutes	Retention Time hh:mm:ss
CB #2	2.89	3.27	63.12	0	07:54	0	0	0:00:00
CB #3	2.56	2.94	63.14	0	07:54	0	0	0:00:00
CB #4	2.28	2.64	63.14	0	07:54	0	0	0:00:00
CB #5	2.28	2.65	63.15	0	07:54	0	0	0:00:00
Out-1Pipe - (15)	4.58	4.58	63.08	0	00:00	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow cfs	Peak Inflow cfs	Time of Peak Inflow Occurrence days	Time of Peak Inflow Occurrence hh:mm	Maximum Flooding Overflow cfs	Time of Peak Flooding Occurrence days	Time of Peak Flooding Occurrence hh:mm
CB #2	JUNCTION	0.22	0.71	0	07:55	0.00		
CB #3	JUNCTION	0.15	0.49	0	07:55	0.00		
CB #4	JUNCTION	0.09	0.09	0	07:54	0.00		
CB #5	JUNCTION	0.26	0.26	0	07:54	0.00		
Out-1Pipe - (15)	OUTFALL	0.00	0.71	0	07:55	0.00		

****
Outfall Loading Summary
****

Outfall Node ID	Flow	Average	Peak

	Frequency (%)	Flow cfs	Inflow cfs
Out-1Pipe - (15)	85.43	0.13	0.71
System	85.43	0.13	0.71

****
Link Flow Summary
****

Link ID	Element Type	Time of Peak Flow Occurrence days hh:mm	Maximum Velocity Attained ft/sec	Length Factor	Peak Flow during Analysis cfs	Design Flow Capacity cfs	Ratio of Maximum /Design Flow	Ratio of Maximum Flow	Total Time Surcharged minutes	Reported Condition
Pipe - (15)	CONDUIT	0 07:55	0.91	1.00	0.71	5.19	0.14	1.00	1304	SURCHARGED
Pipe - (16)	CONDUIT	0 07:55	0.65	1.00	0.26	2.57	0.10	1.00	1272	SURCHARGED
Pipe - (17)	CONDUIT	0 07:55	0.26	1.00	0.09	2.11	0.04	1.00	1272	SURCHARGED
Pipe - (17) (1)	CONDUIT	0 07:55	0.63	1.00	0.49	2.23	0.22	1.00	1283	SURCHARGED

****
Highest Flow Instability Indexes
****
All links are stable.

Analysis began on: Mon Aug 02 10:12:48 2021
Analysis ended on: Mon Aug 02 10:12:49 2021
Total elapsed time: 00:00:01

Exhibit H
Stormwater Pollution Prevention Plan

Construction Stormwater General Permit (CSWGP)

Stormwater Pollution Prevention Plan (SWPPP)

for

Best Parking Lot

Prepared for:

Washington State Department of Ecology

3190 160th Avenue S.E., Bellevue, WA 98008-5452

Permittee / Owner	Developer	Operator / Contractor
Best Parking Lot Cleaning, Inc. 2412 Inter Ave Puyallup, WA 98372 Contact: Rich Hamilton rich@bestparkinglot.com	Same as Owner	TBD

Site Location

2412 Inter Avenue

Puyallup, WA

Certified Erosion and Sediment Control Lead (CESCL)

Name	Organization	Contact Phone Number
TBD	TBD	TBD

SWPPP Prepared By

Name	Organization	Contact Phone Number
David Fillmore, P.E.	Barghausen Consulting Engineers, Inc. 18215 72nd Avenue South Kent, WA 98032	425-251-6222

SWPPP Preparation Date

February 14, 2020

Project Construction Dates

Activity / Phase	Start Date	End Date
Parking Lot Construction	August 2021	October 2021

Table of Contents

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List of Acronyms and Abbreviations

Acronym / Abbreviation	Explanation
303(d)	Section of the Clean Water Act pertaining to Impaired Waterbodies
BFO	Bellingham Field Office of the Department of Ecology
BMP(s)	Best Management Practice(s)
CESCL	Certified Erosion and Sediment Control Lead
CO_2	Carbon Dioxide
CRO	Central Regional Office of the Department of Ecology
CSWGP	Construction Stormwater General Permit
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved Oxygen
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
ERO	Eastern Regional Office of the Department of Ecology
ERTS	Environmental Report Tracking System
ESC	Erosion and Sediment Control
GULD	General Use Level Designation
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
NWRO	Northwest Regional Office of the Department of Ecology
pH	Power of Hydrogen
RCW	Revised Code of Washington
SPCC	Spill Prevention, Control, and Countermeasure
su	Standard Units
SWMMEW	Stormwater Management Manual for Eastern Washington
SWMMWW	Stormwater Management Manual for Western Washington
SWPPP	Stormwater Pollution Prevention Plan
TESC	Temporary Erosion and Sediment Control
SWRO	Southwest Regional Office of the Department of Ecology
TMDL	Total Maximum Daily Load
VFO	Vancouver Field Office of the Department of Ecology
WAC	Washington Administrative Code
WSDOT	Washington Department of Transportation
WWHM	Western Washington Hydrology Model

1 Project Information

Project/Site Name: Best Parking Lot
Street/Location: 2412 Inter Avenue, Puyallup

Receiving waterbody: Deer Creek, Puyallup River and Puget Sound

1.1 Existing Conditions

Total acreage: 1.6 acres

Disturbed acreage: 1.6 acres

Existing structures: There are no existing structures on the project site.

Landscape topography: The site is a flat gravel parking lot. There is a narrow strip of grass around the parking lot.

Drainage patterns: The site is very flat but generally drains to the existing right-of-way north of the site.

Existing Vegetation: There is a narrow strip of grass around the parking lot.

Critical Areas (wetlands, streams, high erosion risk, steep or difficult to stabilize slopes):

There are no critical areas onsite.

List of known impairments for 303(d) listed or Total Maximum Daily Load (TMDL) for the receiving waterbody: The Puyallup River downstream of the site is listed for temperature and Mercury.

Table 1 includes a list of suspected and/or known contaminants associated with the construction activity.

Table 1 – Summary of Site Pollutant Constituents

Constituent (Pollutant)	Location	Depth	Concentration
None			

1.2 Proposed Construction Activities

Description of site development (example: subdivision):
The existing gravel parking lot is being paved and a storm pond is being constructed.

Description of construction activities (example: site preparation, demolition, excavation):
Grade the site, excavate and install utilities, pave the site.

Description of site drainage including flow from and onto adjacent properties. Must be consistent with Site Map in Appendix A:
Runoff from the site flows west to Deer Creek within the Inter Avenue right-of-way.

Description of final stabilization (example: extent of revegetation, paving, landscaping):
The disturbed areas will be stabilized with impervious surfaces and landscaping.

Contaminated Site Information:
Proposed activities regarding contaminated soils or groundwater (example: on-site treatment system, authorized sanitary sewer discharge):
No contaminated soils or groundwater are believed to be onsite.

2 Construction Stormwater Best Management Practices (BMPs)

The SWPPP is a living document reflecting current conditions and changes throughout the life of the project. These changes may be informal (i.e. hand-written notes and deletions). Update the SWPPP when the CESCL has noted a deficiency in BMPs or deviation from original design.

2.1 The 12 Elements

2.1.1 Element 1: Preserve Vegetation / Mark Clearing Limits

To protect adjacent properties and to reduce the area of soil exposed to construction, the limits of construction will be clearly marked before land-disturbing activities begin. Trees that are to be preserved, as well as all sensitive areas and their buffers, shall be clearly delineated, both in the field and on the plans. In general, natural vegetation and native topsoil shall be retained in an undisturbed state to the maximum extent possible.

List and describe BMPs:

- **Silt Fence (BMP C233)**
  - Clearly mark the construction limits with fencing

Installation Schedules: Prior to commencement of any construction activity

Inspection and Maintenance plan: **Inspect weekly and after storm events**. Repair any damaged silt fence immediately. Remove sediment or install additional fence when sediment accumulates to height of 1/3rd of the fence.

Responsible Staff: CESCL Lead

2.1.2 Element 2: Establish Construction Access

Construction access or activities occurring on unpaved areas shall be minimized, yet where necessary, access points shall be stabilized to minimize the tracking of sediment onto public roads, street sweeping, and street cleaning shall be employed to prevent sediment from entering state waters.

List and describe BMPs:

- **Stabilized Construction Entrance/Exit (BMP C105)**
  - Install stabilized construction entrances at locations needed for construction vehicle access to site.

Installation Schedules: ASAP after project start

Inspection and Maintenance plan: **Inspect weekly and after storm events**. Vacuum as needed to prevent tracking of sediments onto pavement.

Responsible Staff: CESCL Lead

2.1.3 Element 3: Control Flow Rates

In general, discharge rates of stormwater from the site will be controlled where increases in impervious area or soil compaction during construction could lead to downstream erosion, or where necessary to meet local agency stormwater discharge requirements (e.g. discharge to combined sewer systems).

Will you construct stormwater retention and/or detention facilities?
☒ Yes ☐ No

Will you use permanent infiltration ponds or other low impact development (example: rain gardens, bio-retention, porous pavement) to control flow during construction?
☐ Yes ☒ No

List and describe BMPs:

- **Check Dams (BMP C207)**
  - Temporary V-Ditches shall have rock check dams installed to reduce runoff velocities.
- **Outlet Protection (BMP C209)**
  - All outlet pipes shall have protection in the form of riprap pads.
- **Sediment Trap (BMP C240)**
  - A Sediment Trap will be used during construction.

Installation Schedules: TBD

Inspection and Maintenance plan: **Inspect weekly**. **Daily after storm events**. Clean/remove sediments that have accumulated to a depth of 1-foot. Repair damaged pond embankments.

Responsible Staff: CESCL Lead

2.1.4 Element 4: Install Sediment Controls

All stormwater runoff from disturbed areas shall pass through an appropriate sediment removal BMP before leaving the construction site.

In addition, sediment will be removed from paved areas in and adjacent to construction work areas manually or using mechanical vacuums, as needed, to minimize tracking of sediments on vehicle tires away from the site and to minimize wash off of sediments from adjacent streets in runoff.

Whenever possible, sediment laden water shall be discharged into onsite, relatively level, vegetated areas (BMP C240 paragraph 5, page 4-102).

In some cases, sediment discharge in concentrated runoff can be controlled using permanent stormwater BMPs (e.g., infiltration swales, ponds, trenches). Sediment loads can limit the effectiveness of some permanent stormwater BMPs, such as those used for infiltration or bio-filtration; however, those BMPs designed to remove solids by settling (wet ponds or detention ponds) can be used during the construction phase. When permanent stormwater BMPs will be used to control sediment discharge during construction, the structure will be protected from excessive sedimentation with adequate erosion and sediment control BMPs. Any accumulated sediment shall be removed after construction is complete and the permanent stormwater BMP will be re-stabilized with vegetation per applicable design requirements once the remainder of the site has been stabilized.

List and describe BMPs:

- **Silt Fence (BMP C233)**
  - Silt fence is to be installed along the perimeter of the site, wherever onsite grades are higher than the adjacent properties.
- **Storm Drain Inlet Protection (BMP C220)**
  - Catch basin inlet protection is to be installed on all new and existing catch basins within the construction limits until the site is fully stabilized. Within the right of way, catch basins may only be protected with a catch basin insert.

The following BMPs will be implemented as end-of-pipe sediment controls as required to meet permitted turbidity limits in the site discharge(s). Prior to the implementation of these technologies, sediment sources and erosion control and soil stabilization BMP efforts will be maximized to reduce the need for end-of-pipe sedimentation controls.

- **Sediment Trap (BMP C240)**

Installation Schedules: Install Silt Fences and Storm Drain Protection as one of the first things after construction starts.

Inspection and Maintenance plan: **Inspect weekly. Daily after storm events**. Repair damaged fence or inlet protection immediately. Clean sediments according to manufacturer recommendations.

Responsible Staff: CESCL Lead

2.1.5 Element 5: Stabilize Soils

Exposed and unworked soils shall be stabilized with the application of effective BMPs to prevent erosion throughout the life of the project.

All areas disturbed by construction activities shall be hydro-seeded upon completion of grading activities or if they will be unworked for more than 2 days in the wet season or 7 days in the dry season.

In general, cut and fill slopes will be stabilized as soon as possible and soil stockpiles will be temporarily covered with plastic sheeting. All stockpiled soils shall be stabilized from erosion, protected with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways, and drainage channels.

West of the Cascade Mountains Crest

Season	Dates	Number of Days Soils Can be Left Exposed
During the Dry Season	May 1 – September 30	7 days
During the Wet Season	October 1 – April 30	2 days

Soils must be stabilized at the end of the shift before a holiday or weekend if needed based on the weather forecast.

Anticipated project dates: Start date: TBD End date: TBD

Will you construct during the wet season?
☒ Yes ☐ No

List and describe BMPs:

- **Temporary and Permanent Seeding (BMP C120)**
  - Use to reduce erosion from any unworked, exposed areas or to stabilize areas that have reached final grade.
- **Dust Control (BMP C140)**
  - Use to limit wind transport of dust onto roadway and other areas.

Installation Schedules: Installed as needed to any soils unworked per the schedule.

Inspection and Maintenance plan: **Inspect weekly. Daily during storm events**. Repair eroded soils immediately.

Responsible Staff: CESCL Lead

2.1.6 Element 6: Protect Slopes

All cut and fill slopes will be designed, constructed, and protected in a manner than minimizes erosion.

Steep slopes will be protected from erosion by not directing runoff toward them. When necessary, such as where the interceptor ditches enter the detention pond, riprap is to be used to limit the bank erosion.

Will steep slopes be present at the site during construction?
☒ Yes ☐ No

List and describe BMPs:

- **Temporary and Permanent Seeding (BMP C120)**
  - Use to limit slope erosion.
- **Interceptor Dike and Swale (BMPC200)**
  - Use temporary v-ditches as necessary to protect slopes.
- **Check Dams (BMPC207)**
  - Use to slow velocities in temporary v-ditches.

Installation Schedules: Install as needed during construction.

Inspection and Maintenance plan: **Inspect weekly. Daily during storm events**. Repair eroded slopes immediately.

Responsible Staff: CESCL Lead

2.1.7 Element 7: Protect Drain Inlets

All storm drain inlets and culverts made operable during construction shall be protected to prevent unfiltered or untreated water from entering the drainage conveyance system. However, the first priority is to keep all access roads clean of sediment and keep street wash water separate from entering storm drains until treatment can be provided. Storm Drain Inlet Protection (BMP C220) will be implemented for all drainage inlets and culverts that could potentially be impacted by sediment-laden runoff on and near the project site.

List and describe BMPs:

- **Storm Drain Inlet Protection (BMPC220)**
  - This site will primarily entail the use catch basin filters. Additional measures such as culvert sediment traps, excavated inlet protection, or wooden weirs or block and gravel protection may also be necessary. Within the right of way only catch basin filters may be used as storm inlet protection.

Installation Schedules: At start of construction for existing inlets and upon installation for new inlets.

Inspection and Maintenance plan: **Inspect weekly. Inspect daily during storm events**. Clean and remove/replace any devices that have filled to 1/3 or as specified by manufacturer. Culvert sediment traps are expected to last approximately 18 months but shall be inspected weekly.

Responsible Staff: CESCL Lead

2.1.8 Element 8: Stabilize Channels and Outlets

Where site runoff is to be conveyed in channels, or discharged to a stream or some other natural drainage point, efforts will be taken to prevent downstream erosion.

Stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches shall be provided at the outlets of all conveyance systems.

Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches, will be installed at the outlets of all conveyance systems.

List and describe BMPs:

- **Outlet Protection (BMP C209)**
  - All inlets and outlets from ponds/basins shall be protected with riprap.

Installation Schedules: Install outlet protection prior to allowing runoff to discharge from ponds.

Inspection and Maintenance plan: **Inspect Weekly. Daily during storm events**. Repair any damaged or failed BMPs immediately.

Responsible Staff: CESCL Lead

2.1.9 Element 9: Control Pollutants

The following pollutants are anticipated to be present on-site:

Table 2 – Pollutants

Pollutant (List pollutants and source, if applicable)
Sanitary Wastewater from construction workers
Solid wastes such as wood, metals, plastics from demolition/construction
Dust from excavating and grading activities.
Polluted waters and slurry from sawcutting
Agricultural chemicals such as fertilizers
Chemicals such as asphalt sealants

All pollutants, including waste materials and demolition debris, that are generated on site during construction activities shall be handled and disposed of in a manner that does not cause contamination of stormwater. Good housekeeping and preventative measures will be taken to ensure that the site will be kept clean, well-organized, and free of debris. If required, BMPs to be implemented to control specific sources of pollutants are discussed below.

Chemical storage:

- Any chemicals stored in the construction areas will conform to the appropriate source control BMPs listed in Volume II of the DOE Stormwater Management Manual. In Western WA, all chemicals shall have cover, containment, and protection provided on site, per BMP C153 for Material Delivery, Storage and Containment

- Application of agricultural chemicals, including fertilizers and pesticides, shall be conducted in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Manufacturers' recommendations for application procedures and rates shall be followed.

Excavation and tunneling spoils dewatering waste:

- Dewatering BMPs and BMPs specific to the excavation and tunneling (including handling of contaminated soils) are discussed under Element 10.

Demolition:

- Dust released from demolished sidewalks, buildings, or structures will be controlled using Dust Control measures (BMP C140).

- Storm drain inlets vulnerable to stormwater discharge carrying dust, soil, or debris will be protected using Storm Drain Inlet Protection (BMP C220 as described above for Element 7).

- Process water and slurry resulting from sawcutting and surfacing operations will be prevented from entering the waters of the State by implementing Sawcutting and Surfacing Pollution Prevention measures (BMP C152).

Concrete and grout:

- Process water and slurry resulting from concrete work will be prevented from entering the waters of the State by implementing Concrete Handling measures (BMP C151).

Sanitary wastewater:

- Portable sanitation facilities will be firmly secured, regularly maintained, and emptied when necessary.

Solid Waste:

- Solid waste will be stored in secure, clearly marked containers.

List and describe BMPs: BMPs are described above for various types of pollutants above.

Installation Schedules: Proper storage and cover measures shall be implemented throughout construction.

Inspection and Maintenance plan: **Inspect solid pollutants weekly, daily after storm events. Inspect watery pollutants such as from saw-cutting continually while the activity is taking place.**

Responsible Staff: CESCL Lead

Will maintenance, fueling, and/or repair of heavy equipment and vehicles occur on-site?
☐ Yes ☒ No

Will wheel wash or tire bath system BMPs be used during construction?
☐ Yes ☒ No

Will pH-modifying sources be present on-site?
☒ Yes ☐ No

Table 3 – pH-Modifying Sources

☐	None
☐	Bulk cement
☐	Cement kiln dust
☐	Fly ash
☒	Other cementitious materials
☒	New concrete washing or curing waters
☒	Waste streams generated from concrete grinding and sawing

☐	Exposed aggregate processes
☐	Dewatering concrete vaults
☒	Concrete pumping and mixer washout waters
☒	Recycled concrete
☒	Recycled concrete stockpiles
☐	Other (i.e., calcium lignosulfate) [please describe:]

Process water and slurry resulting from concrete work will be prevented from entering the waters of the State by implementing Concrete Handling measures. Adjust pH of stormwater if outside range of 6.5 to 8.5 su.

Obtain written approval from Ecology before using chemical treatment with the exception of CO_2 or dry ice to modify pH.

List and describe BMPs:

- **Sawcutting and Surfacing Pollution Prevention (BMP C152)**
  - Contingent based on demolition procedures used and CESCL lead.
- **Material Delivery, Storage and Containment (BMP C153)**
  - Contingent based on site activities and CESCL lead.

Installation Schedules: As needed.

Inspection and Maintenance plan: **Inspect continuously during construction activities that produce water and/or slurry**.

Responsible Staff: CESCL Lead

Concrete trucks must not be washed out onto the ground, or into storm drains, open ditches, streets, or streams. Excess concrete must not be dumped on-site, except in designated concrete washout areas with appropriate BMPs installed.

Will uncontaminated water from water-only based shaft drilling for construction of building, road, and bridge foundations be infiltrated provided the wastewater is managed in a way that prohibits discharge to surface waters?
☐ Yes ☒ No

2.1.10 Element 10: Control Dewatering

Dewatering may be required for construction. Per the geotechnical report there is shallow groundwater (about 1' below the surface at the peak). Dewatering efforts may be required for installation of deeper utilities.

If dewatering is required, water generated by dewatering will be filtered by sedimentation bags or transported offsite.

Table 4 – Dewatering BMPs

☐	Infiltration
☒	Transport off-site in a vehicle (vacuum truck for legal disposal)
☐	Ecology-approved on-site chemical treatment or other suitable treatment technologies
☐	Sanitary or combined sewer discharge with local sewer district approval (last resort)
☒	Use of sedimentation bag with discharge to ditch or swale (small volumes of localized dewatering)

List and describe BMPs:

- **Sedimentation Bag/Vacuum Truck**
  - Dewatering water should be stored in a vehicle for offsite disposal or sent through a sedimentation bag. Only clean, non-turbid water may be discharged from the site.

Installation Schedules: As needed.

Inspection and Maintenance plan: **Monitor dewatering water continuously during dewatering operations.**

Responsible Staff: CESCL Lead

2.1.11 Element 11: Maintain BMPs

All temporary and permanent Erosion and Sediment Control (ESC) BMPs shall be maintained and repaired as needed to ensure continued performance of their intended function.

Maintenance and repair shall be conducted in accordance with each particular BMP specification (see *Volume II of the SWMMWW or Chapter 7 of the SWMMEW*).

Visual monitoring of all BMPs installed at the site will be conducted at least once every calendar week and within 24 hours of any stormwater or non-stormwater discharge from the site. If the site becomes inactive and is temporarily stabilized, the inspection frequency may be reduced to once every calendar month.

All temporary ESC BMPs shall be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed.

Trapped sediment shall be stabilized on-site or removed. Disturbed soil resulting from removal of either BMPs or vegetation shall be permanently stabilized.

Additionally, protection must be provided for all BMPs installed for the permanent control of stormwater from sediment and compaction. BMPs that are to remain in place following completion of construction shall be examined and restored to full operating condition. If sediment enters these BMPs during construction, the sediment shall be removed and the facility shall be returned to conditions specified in the construction documents.

2.1.12 Element 12: Manage the Project

The project will be managed based on the following principles:

- Projects will be phased to the maximum extent practicable and seasonal work limitations will be taken into account.
- Inspection and monitoring:
    - Inspection, maintenance and repair of all BMPs will occur as needed to ensure performance of their intended function.
    - Site inspections and monitoring will be conducted in accordance with Special Condition S4 of the CSWGP. Sampling locations are indicated on the Site Map. Sampling station(s) are located in accordance with applicable requirements of the CSWGP.
- Maintain an updated SWPPP.
    - The SWPPP will be updated, maintained, and implemented in accordance with Special Conditions S3, S4, and S9 of the CSWGP.

As site work progresses the SWPPP will be modified routinely to reflect changing site conditions. The SWPPP will be reviewed monthly to ensure the content is current.

Table 5 – Management

☒	Design the project to fit the existing topography, soils, and drainage patterns
☒	Emphasize erosion control rather than sediment control
☒	Minimize the extent and duration of the area exposed
☒	Keep runoff velocities low
☒	Retain sediment on-site
☒	Thoroughly monitor site and maintain all ESC measures
☒	Schedule major earthwork during the dry season
☐	Other (please describe)

Optional: Fill out Table 6 by listing the BMP associated with specific construction activities. Identify the phase of the project (if applicable). To increase awareness of seasonal requirements, indicate if the activity falls within the wet or dry season.

Table 6 – BMP Implementation Schedule

Phase of Construction Project	Stormwater BMPs	Date	Wet/Dry Season
[Insert construction activity]	[Insert BMP]	[MM/DD/YYYY]	[Insert Season]

Phase of Construction Project	Stormwater BMPs	Date	Wet/Dry Season
[Insert construction activity]	[Insert BMP]	[MM/DD/YYYY]	[Insert Season]

2.1.13 Element 13: Protect Low Impact Development (LID) BMPs

No Low Impact Developments BMPs are proposed for this project.

3 Pollution Prevention Team

Table 7 – Team Information

Title	Name(s)	Phone Number
Certified Erosion and Sediment Control Lead (CESCL)		
Resident Engineer	Jason G. Hubbell, PE	425-251-6222
Emergency Ecology Contact		
Emergency Permittee/ Owner Contact		
Non-Emergency Owner Contact		
Monitoring Personnel		
Ecology Regional Office		

4 Monitoring and Sampling Requirements

Monitoring includes visual inspection, sampling for water quality parameters of concern, and documentation of the inspection and sampling findings in a site log book. A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements
- Site inspections
- Stormwater sampling data

A blank form can be found under Appendix D.

The site log book must be maintained on-site within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction.

Numeric effluent limits may be required for certain discharges to 303(d) listed waterbodies. See CSWGP Special Condition S8 and Section 5 of this template.

4.1 Site Inspection

Site inspections will be conducted at least once every calendar week and within 24 hours following any discharge from the site. For sites that are temporarily stabilized and inactive, the required frequency is reduced to once per calendar month.

The discharge point(s) are indicated on the Site Map (see Appendix A) and in accordance with the applicable requirements of the CSWGP.

4.2 Stormwater Quality Sampling

4.2.1 Turbidity Sampling

Requirements include calibrated turbidity meter or transparency tube to sample site discharges for compliance with the CSWGP. Sampling will be conducted at all discharge points at least once per calendar week.

Method for sampling turbidity:

Table 8 – Turbidity Sampling Method

☐	Turbidity Meter/Turbidimeter (required for disturbances 5 acres or greater in size)
☒	Transparency Tube (option for disturbances less than 1 acre and up to 5 acres in size)

The benchmark for turbidity value is 25 nephelometric turbidity units (NTU) and a transparency less than 33 centimeters.

If the discharge's turbidity is 26 to 249 NTU **or** the transparency is less than 33 cm but equal to or greater than 6 cm, the following steps will be conducted:

1. Review the SWPPP for compliance with Special Condition S9. Make appropriate revisions within 7 days of the date the discharge exceeded the benchmark.

2. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible. Address the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.
3. Document BMP implementation and maintenance in the site log book.

If the turbidity exceeds 250 NTU **or** the transparency is 6 cm or less at any time, the following steps will be conducted:

1. Telephone or submit an electronic report to the applicable Ecology Region's Environmental Report Tracking System (ERTS) within 24 hours.
    - **Central Region** (Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima): (509) 575-2490 or http://www.ecy.wa.gov/programs/spills/forms/nerts_online/CRO_nerts_online.html
    - **Eastern Region** (Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman): (509) 329-3400 or http://www.ecy.wa.gov/programs/spills/forms/nerts_online/ERO_nerts_online.html
    - **Northwest Region** (King, Kitsap, Island, San Juan, Skagit, Snohomish, Whatcom): (425) 649-7000 or http://www.ecy.wa.gov/programs/spills/forms/nerts_online/NWRO_nerts_online.html
    - **Southwest Region** (Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Lewis, Mason, Pacific, Pierce, Skamania, Thurston, Wahkiakum,): (360) 407-6300 or http://www.ecy.wa.gov/programs/spills/forms/nerts_online/SWRO_nerts_online.html
2. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible. Address the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period
3. Document BMP implementation and maintenance in the site log book.
4. Continue to sample discharges daily until one of the following is true:
    - Turbidity is 25 NTU (or lower).
    - Transparency is 33 cm (or greater).
    - Compliance with the water quality limit for turbidity is achieved.
        - 1 - 5 NTU over background turbidity, if background is less than 50 NTU
        - 1% - 10% over background turbidity, if background is 50 NTU or greater

The discharge stops or is eliminated.

4.2.2 pH Sampling

pH monitoring is required for “Significant concrete work” (i.e. greater than 1000 cubic yards poured concrete or recycled concrete over the life of the project).The use of engineered soils (soil amendments including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD] or fly ash) also requires pH monitoring.

For significant concrete work, pH sampling will start the first day concrete is poured and continue until it is cured, typically three (3) weeks after the last pour.

For engineered soils and recycled concrete, pH sampling begins when engineered soils or recycled concrete are first exposed to precipitation and continues until the area is fully stabilized.

If the measured pH is 8.5 or greater, the following measures will be taken:

1. Prevent high pH water from entering storm sewer systems or surface water.
2. Adjust or neutralize the high pH water to the range of 6.5 to 8.5 su using appropriate technology such as carbon dioxide (CO_2) sparging (liquid or dry ice).
3. Written approval will be obtained from Ecology prior to the use of chemical treatment other than CO_2 sparging or dry ice.

Method for sampling pH:

Table 9 – pH Sampling Method

X	pH meter
	pH test kit
	Wide range pH indicator paper

5 Discharges to 303(d) or Total Maximum Daily Load (TMDL) Waterbodies

5.1 303(d) Listed Waterbodies

Is the receiving water 303(d) (Category 5) listed for turbidity, fine sediment, phosphorus, or pH?

☐ Yes ☒ No

List the impairment(s):

The Puyallup River is listed for tempurature and Mercury

5.2 TMDL Waterbodies

Waste Load Allocation for CWSGP discharges:

N/A

List and describe BMPs:

N/A

Discharges to TMDL receiving waterbodies will meet in-stream water quality criteria at the point of discharge.

The Construction Stormwater General Permit Proposed New Discharge to an Impaired Water Body form is included in Appendix F.

6 Reporting and Record Keeping

6.1 Record Keeping

6.1.1 Site Log Book

A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements
- Site inspections
- Sample logs

6.1.2 Records Retention

Records will be retained during the life of the project and for a minimum of three (3) years following the termination of permit coverage in accordance with Special Condition S5.C of the CSWGP.

Permit documentation to be retained on-site:

- CSWGP
- Permit Coverage Letter
- SWPPP
- Site Log Book

Permit documentation will be provided within 14 days of receipt of a written request from Ecology. A copy of the SWPPP or access to the SWPPP will be provided to the public when requested in writing in accordance with Special Condition S5.G.2.b of the CSWGP.

6.1.3 Updating the SWPPP

The SWPPP will be modified if:

- Found ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site.
- There is a change in design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the State.

The SWPPP will be modified within seven (7) days if inspection(s) or investigation(s) determine additional or modified BMPs are necessary for compliance. An updated timeline for BMP implementation will be prepared.

6.2 Reporting

6.2.1 Discharge Monitoring Reports

Cumulative soil disturbance is one (1) acre or larger; therefore, Discharge Monitoring Reports (DMRs) will be submitted to Ecology monthly. If there was no discharge during a given monitoring period the DMR will be submitted as required, reporting "No Discharge". The DMR due date is fifteen (15) days following the end of each calendar month.

DMRs will be reported online through Ecology's WQWebDMR System.

To sign up for WQWebDMR go to:
http://www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html

6.2.2 Notification of Noncompliance

If any of the terms and conditions of the permit is not met, and the resulting noncompliance may cause a threat to human health or the environment, the following actions will be taken:

1. Ecology will be notified within 24-hours of the failure to comply by calling the applicable Regional office ERTS phone number (Regional office numbers listed below).
2. Immediate action will be taken to prevent the discharge/pollution or otherwise stop or correct the noncompliance. If applicable, sampling and analysis of any noncompliance will be repeated immediately and the results submitted to Ecology within five (5) days of becoming aware of the violation.
3. A detailed written report describing the noncompliance will be submitted to Ecology within five (5) days, unless requested earlier by Ecology.

Specific information to be included in the noncompliance report is found in Special Condition S5.F.3 of the CSWGP.

Anytime turbidity sampling indicates turbidity is 250 NTUs or greater, or water transparency is 6 cm or less, the Ecology Regional office will be notified by phone within 24 hours of analysis as required by Special Condition S5.A of the CSWGP.

- **Central Region** at (509) 575-2490 for Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, or Yakima County
- **Eastern Region** at (509) 329-3400 for Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, or Whitman County
- **Northwest Region** at (425) 649-7000 for Island, King, Kitsap, San Juan, Skagit, Snohomish, or Whatcom County
- **Southwest Region** at (360) 407-6300 for Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Lewis, Mason, Pacific, Pierce, Skamania, Thurston, or Wahkiakum

Include the following information:

1. Your name and / Phone number
2. Permit number
3. City / County of project
4. Sample results
5. Date / Time of call
6. Date / Time of sample
7. Project name

In accordance with Special Condition S4.D.5.b of the CSWGP, the Ecology Regional office will be notified if chemical treatment other than CO_2 sparging is planned for adjustment of high pH water.

Appendix/Glossary

A. Site Map

The site map must meet the requirements of Special Condition S9.E of the CSWGP

B. BMP Detail

Insert BMPs specification sheets here.
Download BMPs from the Ecology Construction Stormwater website at:
https://www.ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Stormwater-manuals

C. Correspondence

Ecology
EPA
Local Government

D. Site Inspection Form

Create your own or download Ecology's template:
https://www.ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits/Construction-stormwater-permit

E. Construction Stormwater General Permit (CSWGP)

Download CSWGP: https://www.ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits/Construction-stormwater-permit

F. 303(d) List Waterbodies / TMDL Waterbodies Information

Proposed New Discharge to an Impaired Water Body form
SWPPP Addendum addressing impairment

G. Contaminated Site Information

Administrative Order
Sanitary Discharge Permit
Soil Management Plan
Soil and Groundwater Reports
Maps and Figures Depicting Contamination

H. Engineering Calculations

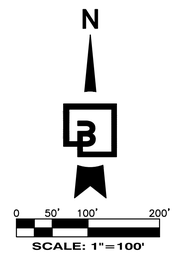
Appendix A
Site Plans

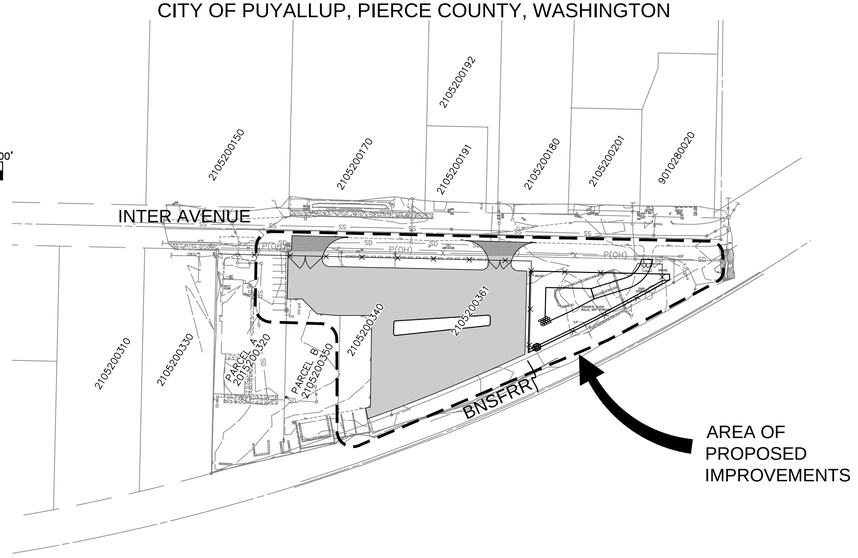
COVER SHEET

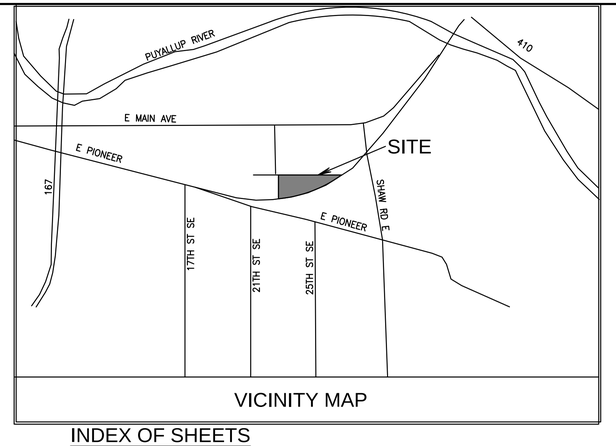
PORTIONS OF SE AND SW QUARTER OF SEC 26, TWP 20 N, RGE. 4 E, W.M.
CITY OF PUYALLUP, PIERCE COUNTY, WASHINGTON

GENERAL SITE NOTES:

1. THE CONTRACTOR SHALL OBTAIN AND HAVE AVAILABLE COPIES OF THE APPLICABLE GOVERNING AGENCY STANDARDS AT THE JOB SITE DURING THE RELATED CONSTRUCTION OPERATIONS.
2. CONTRACTOR SHALL ASSURE THAT ALL NECESSARY PERMITS HAVE BEEN OBTAINED PRIOR TO COMMENCING WORK.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION, DIMENSION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION WHETHER SHOWN ON THESE PLANS OR NOT. UTILITIES OTHER THAN THOSE SHOWN MAY EXIST ON THIS SITE. ONLY THOSE UTILITIES WITH EVIDENCE OF THEIR INSTALLATION VISIBLE AT GROUND SURFACE OR SHOWN ON RECORD DRAWING PROVIDED BY OTHERS ARE SHOWN HEREON. EXISTING UNDERGROUND UTILITY LOCATIONS SHOWN ARE APPROXIMATE ONLY AND ARE SUBJECT TO A DEGREE OF UNKNOWN VARIATION. SOME UNDERGROUND LOCATIONS SHOWN HEREON MAY HAVE BEEN TAKEN FROM PUBLIC RECORDS. BARGHAUSEN CONSULTING ENGINEERS, INC. ASSUMES NO LIABILITY FOR THE ACCURACY OF PUBLIC RECORDS OR RECORDS OF OTHERS. IF CONFLICTS SHOULD OCCUR, THE CONTRACTOR SHALL CONSULT BARGHAUSEN CONSULTING ENGINEERS, INC., TO RESOLVE ALL PROBLEMS PRIOR TO PROCEEDING WITH CONSTRUCTION.
4. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW ALL OF THE DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THE PROJECT WORK SCOPE PRIOR TO THE INITIATION OF CONSTRUCTION. SHOULD THE CONTRACTOR FIND A CONFLICT WITH THE DOCUMENTS RELATIVE TO THE SPECIFICATIONS OR THE RELATIVE CODES, IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE PROJECT ENGINEER OF RECORD IN WRITING PRIOR TO THE START OF CONSTRUCTION. FAILURE BY THE CONTRACTOR TO NOTIFY THE PROJECT ENGINEER SHALL CONSTITUTE ACCEPTANCE OF FULL RESPONSIBILITY BY THE CONTRACTOR TO COMPLETE THE SCOPE OF WORK AS DEFINED BY THE DRAWINGS AND IN FULL COMPLIANCE WITH LOCAL REGULATIONS AND CODES.
5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE APPROPRIATE UTILITIES INVOLVED PRIOR TO CONSTRUCTION.
6. INSPECTION OF SITE WORK WILL BE ACCOMPLISHED BY A REPRESENTATIVE OF THE COVERNING JURISDICTION. INSPECTION OF PRIVATE FACILITIES WILL BE ACCOMPLISHED BY A REPRESENTATIVE OF THE OWNER. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE INSPECTOR 24 HOURS IN ADVANCE OF BACKFILLING ALL CONSTRUCTION.
7. PRIOR TO ANY CONSTRUCTION OR DEVELOPMENT ACTIVITY THE CONTRACTOR SHALL CONTACT THE AGENCY AND/OR UTILITY INSPECTION PERSONNEL AND ARRANGE ANY REQUIRED PRE-CONSTRUCTION MEETING(S). CONTRACTOR SHALL PROVIDE ONE WEEK MIN. ADVANCE NOTIFICATION TO OWNER, FIELD ENGINEER AND ENGINEER OF PRE-CONSTRUCTION MEETINGS.
8. THE CONTRACTOR IS RESPONSIBLE FOR WORKER AND SITE SAFETY AND SHALL COMPLY WITH THE LATEST OSHA STANDARDS AND REGULATIONS, OR ANY OTHER AGENCY HAVING JURISDICTION FOR EXCAVATION AND TRENCHING PROCEDURES. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE "MEANS AND METHODS" REQUIRED TO MEET THE INTENT AND PERFORMANCE CRITERIA OF OSHA, AS WELL AS ANY OTHER ENTITY THAT HAS JURISDICTION FOR EXCAVATION AND/OR TRENCHING PROCEDURES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACTOR. ANY WORK WITHIN THE TRAVELED RIGHT-OF-WAY THAT MAY INTERRUPT NORMAL TRAFFIC FLOW SHALL REQUIRE AT LEAST ONE FLAGGER FOR EACH LANE OF TRAFFIC AFFECTED.
10. PROTECTIVE MEASURES SHALL BE TAKEN BY THE CONTRACTOR TO PROTECT ALL ADJACENT PUBLIC AND PRIVATE PROPERTIES AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF ALL EXISTING UTILITY SERVICES THAT ARE TO REMAIN OPERATIONAL WITHIN THE CONSTRUCTION AREA WHETHER SHOWN OR NOT SHOWN ON THE PLANS.
11. TWO (2) COPIES OF THESE APPROVED PLANS MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS. ONE (1) SET WITH RECORDS OF AS-BUILT INFORMATION SHALL BE SUBMITTED TO BARGHAUSEN CONSULTING ENGINEERS, INC. AT COMPLETION OF PROJECT.
12. CONTRACTOR SHALL OBTAIN SERVICES OF A LICENSED LAND SURVEYOR TO STAKE HORIZONTAL CONTROL FOR ALL NEW IMPROVEMENTS. STAKING CONTROL SHALL BE TAKEN FROM ELECTRONIC PLAN FILES PROVIDED BY BARGHAUSEN CONSULTING ENGINEERS, INC.
13. CONTRACTOR SHALL REQUEST FROM BARGHAUSEN CONSULTING ENGINEERS INC., PRIOR TO ANY CONSTRUCTION STAKING OR CONSTRUCTION WORK, A FORMAL CONSTRUCTION RELEASE PLAN SET OR SPECIFIC RELEASE IN WRITING. THE APPROVED AGENCY PERMIT DRAWINGS WILL NOT BE CONSIDERED CONSTRUCTION RELEASE PLANS BY BARGHAUSEN CONSULTING ENGINEERS, INC UNLESS BARGHAUSEN CONSULTING ENGINEERS, INC HAS GIVEN A FORMAL WRITTEN RELEASE OR ISSUED A CONSTRUCTION RELEASE PLAN SET.







INDEX OF SHEETS

UTILITIES/SERVICES

WATER:
CITY OF PUYALLUP WATER DIVISION
1100 39TH AVE. SE
PUYALLUP, WA 98374
(253) 841-5505

GAS:
PUGET SOUND ENERGY
8001 SOUTH 212TH STREET
KENT, WA 98032
(253) 395-7065

POWER:
PUGET SOUND ENERGY
8001 SOUTH 212TH STREET
KENT, WA 98032
(253) 395-7065

CONSTRUCTION SEQUENCE

1. HOLD A PRE-CONSTRUCTION MEETING WITH THE CITY AND OBTAIN REQUIRED PERMITS.
2. ESTABLISH CLEARING AND GRADING LIMITS.
3. CONSTRUCT TEMPORARY CONSTRUCTION ENTRANCE. CONTRACTOR SHALL COORDINATE ASPHALT REMOVAL AND UTILITY INSTALLATION, AS NECESSARY TO ACCOMMODATE REQUIRED TESC MEASURES.
4. INSTALL CATCH BASIN INLET PROTECTION ON ALL CATCH BASINS IN PROJECT VICINITY, AS SHOWN.
4. CONSTRUCT POND, SILT FENCES, V-DITCHES, AND ROCK CHECK DAMS AS SHOWN.
5. SCHEDULE AN EROSION CONTROL INSPECTION WITH THE CITY.
6. CONSTRUCT STORM DRAINAGE DETENTION POND (CONTROL AND STORAGE) FACILITIES WITH EMERGENCY OVERFLOW PER EROSION CONTROL PLAN/DETAILS).
7. ALL DITCHES AND SWALES AS SHOWN SHALL BE PROVIDED TO DIRECT ALL SURFACE WATER TO THE DETENTION AND SEDIMENTATION POND AS CLEARING AND GRADING PROGRESSES. NO UNCONTROLLED SURFACE WATER SHALL BE ALLOWED TO LEAVE THE SITE OR BE DISCHARGED TO A CRITICAL AREA AT ANY TIME DURING THE GRADING OPERATIONS.
8. BEGIN DEMOLITION AND GRADING ACTIVITIES ONLY AFTER ALL DRAINAGE AND EROSION CONTROL MEASURES ARE IN PLACE AND INSPECTED BY CITY.
9. WITH EACH LAYER OF FILL MATERIAL, INTERCEPTOR DITCHES AND T.E.S.C. FACILITIES MUST BE GRADED AND MAINTAINED TO PROVIDE POSITIVE SLOPE FOR DRAINAGE TO DISCHARGE POINT.
10. CONTINUOUS MAINTENANCE AND UPGRADE OF T.E.S.C. MEASURES, INCLUDING DUST CONTROL, SHALL BE PROVIDED THROUGHOUT ALL PHASES OF CONSTRUCTION.
11. MAINTAIN E.S.C. FACILITIES UNTIL ALL RISK OF EROSION/SEDIMENTATION DRAINAGE HAS PASSED. DO NOT CONVEY SEDIMENT-LADEN WATER INTO STORM DRAINAGE SYSTEM. TEMPORARY EROSION & SEDIMENTATION CONTROL FACILITIES CAN BE REMOVED ONLY UPON FINAL SITE STABILIZATION AND APPROVAL FROM CITY OFFICIAL. SEDIMENT THAT HAS ACCUMULATED WITHIN CATCH BASINS AND THE DETENTION POND SHALL BE REMOVED.
12. COMPLETE INSPECTION/ PUNCHLIST

LEGEND:

PROPOSED		EXISTING			
ASPHALT		CURB		LUMINAIRE (LUM.)	
SAWCUT		PAINT STRIPE		YARD LIGHT	
CONTOUR	--- 66 ---	CONCRETE		POWER METER	
STORM DRAIN PIPE		CONTOUR	432	POWER POLE	
TYPE 1 CATCH BASIN		WATER	-W- -W-	JUNCTION BOX (AS NOTED)	
TYPE 2 CATCH BASIN		STORM	SD	CATCH BASIN (CB)	
SPOT ELEVATION	65.00	TYPE 1 CATCH BASIN		STORM MANHOLE (SDMH)	
		SANITARY	SS	SANITARY SEWER MANHOLE (SSMH)	
		SS MANHOLE		CLEANOUT (AS NOTED)	
		GAS	G	GAS METER	
		POWER OVERHEAD	P (OH)	GAS VALVE	
		POWER UNDERGROUND	P (UG)	WATER VALVE (WV)	
		GRAVEL/SAND (AS NOTED)		FIRE HYDRANT(FH)	
		ASPHALT		CONNECTION(FDC)	
		BUILDING LINE		WATER METER	
		WATER LINE	W	SIGN	
		OH/UG TEL. LINE	T(XX)	DIRECTIONAL ARROW	
				BOLLARD	
				CONIFEROUS TREE	
				DECIDUOUS TREE	

ESTIMATED EARTHWORK QUANTITIES:

CUT: 1,500 CY
FILL: 1,500 CY
EXPORT: 0 CY

AREA TO BE DISTURBED = 68,550 SF (1.57 AC)

EARTHWORK QUANTITIES ARE APPROXIMATE AND HIGHLY DEPENDANT ON SOIL CONDITIONS ENCOUNTERED DURING CONSTRUCTION. CONTRACTOR SHOULD PERFORM INDEPENDENT ESTIMATE FOR BIDDING.

SITE ADDRESS

2412 INTER AVENUE
PUYALLUP, WA 98371-3306

TAX PARCEL NUMBERS

2015200320, 2105200350, 2105200340, 2105200361

ZONING

ML - LIMITED MANUFACTURING

CONTACTS

OWNER/APPLICANT

BEST PARKING LOT CLEANING, INC.
2412 INTER AVENUE
PUYALLUP, WA 98372
CONTACT: RICH HAMILTON
EMAIL: rich@bestparkinglot.com

CIVIL ENGINEERING CONSULTANT:

BARGHAUSEN CONSULTING ENGINEERS
18215 72ND AVENUE SOUTH
KENT, WA. 98032
(425) 251-6222
(425) 251-8782 (FAX)
JASON HUBBELL
EMAIL: jhubbell@barghausen.com

SITE SURVEY CONSULTANT:

C.E.S. NW INC.
310 29TH ST N.E., SUITE 101
PUYALLUP, WA 98372
CONTACT: SETH O'HARE
(253) 848-4282

SOILS REPORT NOTES

1. THE FOLLOWING SOILS REPORTS/ASSESSMENTS WERE PREPARED FOR THE SITE: GEOTECHNICAL EVALUATION, REPORT NO. ES-6481 DATED: FEB 12TH 2019, APRIL 27TH 2021, AND AUGUST 3, 2021:

   BEST PARKING LOT CLEANING, INC
   2412 INTER AVENUE
   PUYALLUP, WA 98372

   PREPARED BY:
   EARTH SOLUTIONS NW, LLC
   1805-136TH PL N.E., SUITE 201
   BELLEVUE, WA 98005
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL PROVISIONS OF THE SOILS REPORT FOR THE SITE BE OBSERVED AND COMPLIED WITH DURING ALL PHASES OF THE SITE PREPARATION, GRADING OPERATIONS, AND PAVING CONSTRUCTION.
3. ANY PROVISIONS OF THE SOILS REPORT WHICH CONFLICT WITH INFORMATION SHOWN ELSEWHERE ON THESE DRAWINGS, OR WHICH REQUIRE FURTHER CLARIFICATION, SHALL BE BROUGHT TO THE ATTENTION OF BARGHAUSEN ENGINEERS.
4. A REPRESENTATIVE FOR THE SOILS ENGINEER SHALL OBSERVE AND APPROVE THE EARTHWORK OPERATIONS AND TO VERIFY FIELD CONDITIONS AS WORK PROCEEDS. THE SOILS ENGINEER SHALL SUBMIT FIELD REPORTS CERTIFYING THAT THE METHODS AND MATERIALS OF THE EARTHWORK OPERATIONS WERE IN ACCORDANCE WITH THE RECOMMENDATION OF THE SOILS INVESTIGATION AND THAT THE WORK WAS PERFORMED TO THE SATISFACTION OF THE ENGINEER.
5. THE SOILS ENGINEER SHOULD BE NOTIFIED AT LEAST FIVE (5) WORKING DAYS PRIOR TO ANY SITE CLEARING OR GRADING.

BASIS OF PLAN

THIS SITE PLAN IS BASED ON LIMITED TOPOGRAPHIC AND BOUNDARY SURVEY, PREPARED BY C.E.S. NW INC. DATED 05/30/2019

THE EXISTING CULTURAL AND TOPOGRAPHIC DATA SHOWN ON THESE DRAWINGS HAS BEEN PREPARED, IN PART, BASED UPON INFORMATION FURNISHED BY OTHERS. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, BCE, INC. CANNOT ENSURE ACCURACY AND THUS IS NOT RESPONSIBLE FOR THE ACCURACY OF THAT INFORMATION OR FOR ANY ERRORS OR OMISSIONS WHICH MAY HAVE BEEN INCORPORATED INTO THESE DRAWINGS AS A RESULT.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE OWNER TO HAVE ALL IMPROVEMENTS FIELD VERIFIED PRIOR TO CONSTRUCTION. DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF BARGHAUSEN CONSULTING ENGINEERS, INC. PRIOR TO WORK.

SURVEY INFORMATION

LEGAL DESCRIPTION: (PER QUIT CLAIM DEED FILED UNDER RECORDING NUMBER 200105070774)

PARCEL A (2105200320)
EAST 100 FEET OF BLOCK 19, ACKERSON'S SECOND ADDITION TO PUYALLUP, ACCORDING TO PLAT RECORDED IN BOOK 8 OF PLATS, AT GAME 25, IN PIERCE COUNTY, WASHINGTON.

PARCEL B (2105200350)
WEST 75 FEET OF THAT PART OF BLOCK 20, ACKERSON'S SECOND ADDITION TO PUYALLUP, SITUATED IN THE CITY OF PUYALLUP, ACCORDING TO PLAT RECORDED IN BOOK 8 OF PLATS, AT PAGE 25, IN PIERCE COUNTY, WASHINGTON.
(PER ALTA COMMITMENT FOR TITLE INSURANCE ISSUED BY CHICAGO TITLE COMMITMENT NUMBER 0012400-TC DATED MARCH 25, 2014)

2105200361
BLOCK 20, ACKERSON'S SECOND ADDITION TO PUYALLUP. ACCORDING TO PLAT RECORDED IN VOLUME 8 OF PLATS, PAGE 25, RECORDS OF PIERCE COUNTY AUDITOR.
EXCEPT THE WEST 150 FEET THEREOF.
SITUATE IN THE CITY OF PUYALLUP, COUNTY OF PIERCE, STATE OF WASHINGTON.
(PER REAL ESTATE EXCISE TAX AFFIDAVIT FILED UNDER RECORDING NUMBER 4337181)

(2105200340)
THE EAST 75 FEET OF THE WEST 150 FEET OF BLOCK 20, ACKERSON'S SECOND ADDITION TO PUYALLUP, ACCORDING TO PLAT THEREOF RECORDED IN VOLUME 9 OF PLATS, AT PAGE 25, RECORDS OF PIERCE COUNTY AUDITOR.
SITUATE IN THE CITY OF PUYALLUP, COUNTY OF PIERCE, STATE OF WASHINGTON

BASIS OF BEARINGS:
NAD 83-2011 (EPOCH 2010.00), WASHINGTON STATE PLACE, SOUTH ZONE, (PER THE WASHINGTON STATE REFERENCE NETWORK).

VERTICAL DATUM:
NAD 88 (PER THE WASHINGTON STATE REFERENCE NETWORK)

UTILITY CONFLICT NOTE:

CAUTION:
THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION, DIMENSION, AND DEPTH OF ALL EXISTING UTILITIES WHETHER SHOWN ON THESE PLANS OR NOT BY POTHOLING THE UTILITIES AND SURVEYING THE HORIZONTAL AND VERTICAL LOCATION PRIOR TO CONSTRUCTION. THIS SHALL INCLUDE CALLING UTILITY LOCATE @ 811 AND THEN POTHOLING ALL OF THE EXISTING UTILITIES AT LOCATIONS OF NEW UTILITY CROSSINGS TO PHYSICALLY VERIFY WHETHER OR NOT CONFLICTS EXIST. LOCATIONS OF SAID UTILITIES AS SHOWN ON THESE PLANS ARE BASED UPON THE UNVERIFIED PUBLIC INFORMATION AND ARE SUBJECT TO VARIATION. IF CONFLICTS SHOULD OCCUR, THE CONTRACTOR SHALL CONSULT BARGHAUSEN CONSULTING ENGINEERS, INC. TO RESOLVE ALL PROBLEMS PRIOR TO PROCEEDING WITH CONSTRUCTION.

CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR OBTAINING PERMITS FROM THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES FOR REMOVING AND REPLACING ALL SURVEY MONUMENTATION THAT MAY BE AFFECTED BY CONSTRUCTION ACTIVITY, PURSUANT TO WAC 332-120. APPLICATIONS MUST BE COMPLETED BY A REGISTERED LAND SURVEYOR. APPLICATIONS FOR PERMITS TO REMOVE MONUMENTS MAY BE OBTAINED FROM THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES, OR BY CONTACTING THEIR OFFICE BY TELEPHONE AT (360) 902-1190.

WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES
PUBLIC LAND SURVEY OFFICE
801 88th AVE S.E.
OLYMPIA, WASHINGTON 98501-7019

UPON COMPLETION OF CONSTRUCTION, ALL MONUMENTS DISPLACED, REMOVED, OR DESTROYED SHALL BE REPLACED BY A REGISTERED LAND SURVEYOR, AT THE COST AND AT THE DIRECTION OF THE CONTRACTOR, PURSUANT TO THESE REGULATIONS. THE APPROPRIATE FORMS FOR REPLACEMENT OF SAID MONUMENTATION SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR.

811 Know what's **below.** **Call** before you dig.

APPROVED

BY: _____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE: _____

NOTE: THIS APPROVAL IS VOID AFTER 1 YEAR FROM APPROVAL DATE.
THE CITY WILL NOT BE RESPONSIBLE FOR ERRORS AND/OR OMISSIONS ON THESE PLANS. FIELD CHANGES MAY DICTATE CHANGES TO THESE PLANS AS DETERMINED BY THE ENGINEERING SERVICES MANAGER.

No.	Date	By	Ckd.	Appr.	Revision

Title: COVER SHEET
PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUBBELL — STATE OF WASHINGTON — 38950 — REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal 1"=100' Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Job Number 20630 Sheet C1 of 10

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CONSTRUCTION NOTES

STORMWATER NOTES:

1. ALL WORK IN CITY RIGHT-OF-WAY REQUIRES A PERMIT FROM THE CITY OF PUYALLUP. PRIOR TO ANY WORK COMMENCING, THE GENERAL CONTRACTOR SHALL ARRANGE FOR A PRECONSTRUCTION MEETING AT THE DEVELOPMENT SERVICES CENTER TO BE ATTENDED BY ALL CONTRACTORS THAT WILL PERFORM WORK SHOWN ON THE ENGINEERING PLANS, REPRESENTATIVES FROM ALL APPLICABLE UTILITY COMPANIES, THE PROJECT OWNER AND APPROPRIATE CITY STAFF. CONTACT ENGINEERING SERVICES TO SCHEDULE THE MEETING (253) 841-5568. THE CONTRACTOR IS RESPONSIBLE TO HAVE THEIR OWN APPROVED SET OF PLANS AT THE MEETING.
2. AFTER COMPLETION OF ALL ITEMS SHOWN ON THESE PLANS AND BEFORE ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL OBTAIN A 'PUNCH LIST' PREPARED BY THE CITY'S INSPECTOR DETAILING REMAINING ITEMS OF WORK TO BE COMPLETED. ALL ITEMS OF WORK SHOWN ON THESE PLANS SHALL BE COMPLETED TO THE SATISFACTION OF THE CITY PRIOR TO ACCEPTANCE OF THE WATER SYSTEM AND PROVISION OF SANITARY SEWER SERVICE.
3. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'STANDARD SPECIFICATIONS'), WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER, LATEST EDITION, UNLESS SUPERSEDED OR AMENDED BY THE CITY OF PUYALLUP CITY STANDARDS FOR PUBLIC WORKS ENGINEERING AND CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'CITY STANDARDS').
4. A COPY OF THESE APPROVED PLANS AND APPLICABLE CITY DEVELOPER SPECIFICATIONS AND DETAILS SHALL BE ON SITE DURING CONSTRUCTION.
5. ANY REVISIONS MADE TO THESE PLANS MUST BE REVIEWED AND APPROVED BY THE DEVELOPER'S ENGINEER AND THE ENGINEERING SERVICES STAFF PRIOR TO ANY IMPLEMENTATION IN THE FIELD. THE CITY SHALL NOT BE RESPONSIBLE FOR ANY ERRORS AND/OR OMISSIONS ON THESE PLANS.
6. THE CONTRACTOR SHALL HAVE ALL UTILITIES VERIFIED ON THE GROUND PRIOR TO ANY CONSTRUCTION. CALL (811) AT LEAST TWO WORKING DAYS IN ADVANCE. THE OWNER AND HIS/HER ENGINEER SHALL BE CONTACTED IMMEDIATELY IF A CONFLICT EXISTS.
7. ANY STRUCTURE AND/OR OBSTRUCTION WHICH REQUIRE REMOVAL OR RELOCATION RELATING TO THIS PROJECT, SHALL BE DONE SO AT THE DEVELOPER'S EXPENSE.
8. DURING CONSTRUCTION, ALL EXISTING AND NEWLY INSTALLED DRAINAGE STRUCTURES SHALL BE PROTECTED FROM SEDIMENTS.
9. ALL STORM MANHOLES SHALL CONFORM TO CITY STANDARD DETAIL NO. 02.01.01. FLOW CONTROL MANHOLE/OIL WATER SEPARATOR SHALL CONFORM TO CITY STANDARD DETAIL NO. 02.01.06 AND 02.01.07.
10. MANHOLE RING AND COVER SHALL CONFORM TO CITY STANDARD DETAIL 06.01.02.
11. CATCH BASINS TYPE I SHALL CONFORM TO CITY STANDARD DETAIL NO 02.01.02 AND 02.01.03 AND SHALL BE USED ONLY FOR DEPTHS LESS THAN 5 FEET FROM TOP OF THE GRATE TO THE INVERT OF THE STORM PIPE.
12. CATCH BASINS TYPE II SHALL CONFORM TO CITY STANDARD DETAIL NO. 02.01.04 AND SHALL BE USED FOR DEPTHS GREATER THAN 5 FEET FROM TOP OF THE GRATE TO THE INVERT OF THE STORM PIPE.
13. CAST IRON OR DUCTILE IRON FRAME AND GRATE SHALL CONFORM TO CITY STANDARD DETAIL NO. 02.01.05. GRATE SHALL BE MARKED WITH 'DRAINS TO STREAM'. SOLID CATCH BASIN LIDS (SQUARE UNLESS NOTED AS ROUND) SHALL CONFORM TO WSDOT STANDARD PLAN B-30.20-04 (OLYMPIC FOUNDRY NO. SM60 OR EQUAL). VANED GRATES SHALL CONFORM TO WSDOT STANDARD PLAN B-30.30-03 (OLYMPIC FOUNDRY NO. SM60V OR EQUAL).
14. STORMWATER PIPE SHALL BE ONLY PVC, CONCRETE, DUCTILE IRON, OR DUAL WALLED POLYPROPYLENE PIPE.
    A. THE USE OF ANY OTHER TYPE SHALL BE REVIEWED AND APPROVED BY THE ENGINEERING SERVICES STAFF PRIOR TO INSTALLATION.
    B. PVC PIPE SHALL BE PER ASTM D3034, SDR 35 FOR PIPE SIZE 15-INCH AND SMALLER AND F679 FOR PIPE SIZES 18 TO 27 INCH. MINIMUM COVER ON PVC PIPE SHALL BE 3.0 FEET.
    C. CONCRETE PIPE SHALL CONFORM TO THE WSDOT STANDARD SPECIFICATIONS FOR CONCRETE UNDERDRAIN PIPE. MINIMUM COVER ON CONCRETE PIPE SHALL NOT LESS THAN 3.0 FEET.
    D. DUCTILE IRON PIPE SHALL BE CLASS 50, CONFORMING TO AWWA C151. MINIMUM COVER ON DUCTILE IRON PIPE SHALL BE 1.0 FOOT.
    E. POLYPROPYLENE PIPE (PP) SHALL BE DUAL WALLED, HAVE A SMOOTH INTERIOR AND EXTERIOR CORRUGATIONS AND MEET WSDOT 9-05.24(1). 12-INCH THROUGH 30'-INCH PIPE SHALL MEET OR EXCEED ASTM F2736 AND AASHTO M330, TYPE S, OR TYPE D. 36-INCH THROUGH 60-INCH PIPE SHALL MEET OR EXCEED ASTM F2881 AND AASHTO M330, TYPE S, OR TYPE D. TESTING SHALL BE PER ASTM F1417. MINIMUM COVER OVER POLYPROPYLENE PIPE SHALL BE 3 FEET.
15. TRENCHING, BEDDING, AND BACKFILL FOR PIPE SHALL CONFORM TO CITY STANDARD DETAIL NO. 06.01.01.
16. STORM PIPE SHALL BE A MINIMUM OF 10 FEET AWAY FROM BUILDING FOUNDATIONS AND/OR ROOF LINES.
17. ALL STORM DRAIN MAINS SHALL TESTED AND INSPECTED FOR ACCEPTANCE AS OUTLINED IN SECTION 406 OF THE CITY OF PUYALLUP SANITARY SEWER SYSTEM STANDARDS.
18. ALL TEMPORARY SEDIMENTATION AND EROSION CONTROL MEASURES, AND PROTECTIVE MEASURES FOR CRITICAL AREAS AND SIGNIFICANT TREES SHALL BE INSTALLED PRIOR TO INITIATING ANY CONSTRUCTION ACTIVITIES.

GRADING, EROSION AND SEDIMENT CONTROL NOTES:

1. ALL WORK IN CITY RIGHT-OF-WAY REQUIRES A PERMIT FROM THE CITY OF PUYALLUP. PRIOR TO ANY WORK COMMENCING, THE GENERAL CONTRACTOR SHALL ARRANGE FOR A PRECONSTRUCTION MEETING AT THE DEVELOPMENT SERVICES CENTER TO BE ATTENDED BY ALL CONTRACTORS THAT WILL PERFORM WORK SHOWN ON THE ENGINEERING PLANS, REPRESENTATIVES FROM ALL APPLICABLE UTILITY COMPANIES, THE PROJECT OWNER AND APPROPRIATE CITY STAFF. CONTACT ENGINEERING SERVICES TO SCHEDULE THE MEETING (253) 841-5568. THE CONTRACTOR IS RESPONSIBLE TO HAVE THEIR OWN APPROVED SET OF PLANS AT THE MEETING.
2. AFTER COMPLETION OF ALL ITEMS SHOWN ON THESE PLANS AND BEFORE ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL OBTAIN A 'PUNCH LIST' PREPARED BY THE CITY'S INSPECTOR DETAILING REMAINING ITEMS OF WORK TO BE COMPLETED. ALL ITEMS OF WORK SHOWN ON THESE PLANS SHALL BE COMPLETED TO THE SATISFACTION OF THE CITY PRIOR TO ACCEPTANCE OF THE WATER SYSTEM AND PROVISION OF SANITARY SEWER SERVICE.
3. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'STANDARD SPECIFICATIONS'), WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER, LATEST EDITION, UNLESS SUPERSEDED OR AMENDED BY THE CITY OF PUYALLUP CITY STANDARDS FOR PUBLIC WORKS ENGINEERING AND CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'CITY STANDARDS').
4. A COPY OF THESE APPROVED PLANS AND APPLICABLE CITY DEVELOPER SPECIFICATIONS AND DETAILS SHALL BE ON SITE DURING CONSTRUCTION.
5. ANY REVISIONS MADE TO THESE PLANS MUST BE REVIEWED AND APPROVED BY THE DEVELOPER'S ENGINEER AND THE CITY ENGINEER PRIOR TO ANY IMPLEMENTATION IN THE FIELD. THE CITY SHALL NOT BE RESPONSIBLE FOR ANY ERRORS AND/OR OMISSIONS ON THESE PLANS.
6. THE CONTRACTOR SHALL HAVE ALL UTILITIES VERIFIED ON THE GROUND PRIOR TO ANY CONSTRUCTION. CALL (811) AT LEAST TWO WORKING DAYS HOURS IN ADVANCE. THE OWNER AND HIS/HER ENGINEER SHALL BE CONTACTED IMMEDIATELY IF A CONFLICT EXISTS.
7. ALL LIMITS OF CLEARING AND AREAS OF VEGETATION PRESERVATION AS PRESCRIBED ON THE PLANS SHALL BE CLEARLY FLAGGED IN THE FIELD AND OBSERVED DURING CONSTRUCTION.
8. ALL REQUIRED SEDIMENTATION AND EROSION CONTROL FACILITIES MUST BE CONSTRUCTED AND IN OPERATION PRIOR TO ANY LAND CLEARING AND/OR OTHER CONSTRUCTION TO ENSURE THAT SEDIMENT LADEN WATER DOES NOT ENTER THE NATURAL DRAINAGE SYSTEM. THE CONTRACTOR SHALL SCHEDULE AN INSPECTION OF THE EROSION CONTROL FACILITIES PRIOR TO ANY LAND CLEARING AND/OR OTHER CONSTRUCTION. ALL EROSION AND SEDIMENT FACILITIES SHALL BE MAINTAINED IN A SATISFACTORY CONDITION AS DETERMINED BY THE CITY, UNTIL SUCH TIME THAT CLEARING AND/OR CONSTRUCTION IS COMPLETED AND THE POTENTIAL FOR ONSITE EROSION HAS PASSED. THE IMPLEMENTATION, MAINTENANCE, REPLACEMENT, AND ADDITIONS TO THE EROSION AND SEDIMENTATION CONTROL SYSTEMS SHALL BE THE RESPONSIBILITY OF THE PERMITTEE.
9. THE EROSION AND SEDIMENTATION CONTROL SYSTEM FACILITIES DEPICTED ON THESE PLANS ARE INTENDED TO BE MINIMUM REQUIREMENTS TO MEET ANTICIPATED SITE CONDITIONS. AS CONSTRUCTION PROGRESSES AND UNEXPECTED OR SEASONAL CONDITIONS DICTATE, FACILITIES WILL BE NECESSARY TO ENSURE COMPLETE SILTATION CONTROL ON THE SITE. DURING THE COURSE OF CONSTRUCTION, IT SHALL BE THE OBLIGATION AND RESPONSIBILITY OF THE PERMITTEE TO ADDRESS ANY NEW CONDITIONS THAT MAY BE CREATED BY HIS ACTIVITIES AND TO PROVIDE ADDITIONAL FACILITIES, OVER AND ABOVE THE MINIMUM REQUIREMENTS, AS MAY BE NEEDED TO PROTECT ADJACENT PROPERTIES, SENSITIVE AREAS, NATURAL WATER COURSES, AND/OR STORM DRAINAGE SYSTEMS.
10. APPROVAL OF THESE PLANS IS FOR GRADING, TEMPORARY DRAINAGE, EROSION AND SEDIMENTATION CONTROL ONLY. IT DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT STORM DRAINAGE DESIGN, SIZE OR LOCATION OF PIPES, RESTRICTORS, CHANNELS, OR RETENTION FACILITIES.
11. ANY DISTURBED AREA WHICH HAS BEEN STRIPPED OF VEGETATION AND WHERE NO FURTHER WORK IS ANTICIPATED FOR A PERIOD OF 30 DAYS OR MORE, MUST BE IMMEDIATELY STABILIZED WITH MULCHING, GRASS PLANTING, OR OTHER APPROVED EROSION CONTROL TREATMENT APPLICABLE TO THE TIME OF YEAR IN QUESTION. GRASS SEEDING ALONE WILL BE ACCEPTABLE ONLY DURING THE MONTHS OF APRIL THROUGH SEPTEMBER INCLUSIVE. SEEDING MAY PROCEED OUTSIDE THE SPECIFIED TIME PERIOD WHENEVER IT IS IN THE INTEREST OF THE PERMITTEE BUT MUST BE AUGMENTED WITH MULCHING, NETTING, OR OTHER TREATMENT APPROVED BY THE CITY.
12. IN CASE EROSION OR SEDIMENTATION OCCURS TO ADJACENT PROPERTIES, ALL CONSTRUCTION WORK WITHIN THE DEVELOPMENT THAT WILL FURTHER AGGRAVATE THE SITUATION MUST CEASE, AND THE OWNER/CONTRACTOR WILL IMMEDIATELY COMMENCE RESTORATION METHODS. RESTORATION ACTIVITY WILL CONTINUE UNTIL SUCH TIME AS THE AFFECTED PROPERTY OWNER IS SATISFIED.
13. NO TEMPORARY OR PERMANENT STOCKPILING OF MATERIALS OR EQUIPMENT SHALL OCCUR WITHIN CRITICAL AREAS OR ASSOCIATED BUFFERS, OR THE CRITICAL ROOT ZONE FOR VEGETATION PROPOSED FOR RETENTION.

GENERAL NOTES:

1. ALL WORK IN CITY RIGHT-OF-WAY REQUIRES A PERMIT FROM THE CITY OF PUYALLUP. PRIOR TO ANY WORK COMMENCING, THE GENERAL CONTRACTOR SHALL ARRANGE FOR A PRECONSTRUCTION MEETING AT THE DEVELOPMENT SERVICES CENTER TO BE ATTENDED BY ALL CONTRACTORS THAT WILL PERFORM WORK SHOWN ON THE APPROVED ENGINEERING PLANS, REPRESENTATIVES FROM ALL APPLICABLE UTILITY COMPANIES, THE PROJECT OWNER AND APPROPRIATE CITY STAFF. CONTACT ENGINEERING SERVICES AT (253-841-5568) TO SCHEDULE THE MEETING. THE CONTRACTOR IS RESPONSIBLE TO HAVE THEIR OWN SET OF APPROVED PLANS AT THE MEETING.
2. AFTER COMPLETION OF ALL ITEMS SHOWN ON THESE PLANS AND BEFORE ACCEPTANCE OF THE PROJECT THE CONTRACTOR SHALL OBTAIN A 'PUNCH LIST' PREPARED BY THE CITY'S INSPECTOR DETAILING REMAINING ITEMS OF WORK TO BE COMPLETED. ALL ITEMS OF WORK SHOWN ON THESE PLANS SHALL BE COMPLETED TO THE SATISFACTION OF THE CITY PRIOR TO ACCEPTANCE OF THE WATER SYSTEM AND PROVISION OF SANITARY SEWER SERVICE.
3. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'STANDARD SPECIFICATIONS'), WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER, LATEST EDITION, UNLESS SUPERSEDED OR AMENDED BY THE CITY OF PUYALLUP CITY STANDARDS FOR PUBLIC WORKS ENGINEERING AND CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'CITY STANDARDS').
4. A COPY OF THESE APPROVED PLANS AND APPLICABLE CITY DEVELOPER SPECIFICATIONS AND DETAILS SHALL BE ON SITE DURING CONSTRUCTION.
5. ANY REVISIONS MADE TO THESE PLANS MUST BE REVIEWED AND APPROVED BY THE DEVELOPER'S ENGINEER AND THE CITY PRIOR TO ANY IMPLEMENTATION IN THE FIELD. THE CITY SHALL NOT BE RESPONSIBLE FOR ANY ERRORS AND/OR OMISSIONS ON THESE PLANS.
6. THE CONTRACTOR SHALL HAVE ALL UTILITIES VERIFIED ON THE GROUND PRIOR TO ANY CONSTRUCTION. CALL (811)AT LEAST TWO WORKING DAYS IN ADVANCE. THE OWNER AND HIS/HER ENGINEER SHALL BE CONTACTED IMMEDIATELY IF A CONFLICT EXISTS.
7. ANY STRUCTURE AND/OR OBSTRUCTION THAT REQUIRES REMOVAL OR RELOCATION RELATING TO THIS PROJECT SHALL BE DONE SO AT THE DEVELOPER'S EXPENSE.
8. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE TRUE ELEVATIONS AND LOCATIONS OF HIDDEN UTILITIES. ALL VISIBLE ITEMS SHALL BE THE ENGINEER'S RESPONSIBILITY.
9. THE CONTRACTOR SHALL INSTALL, REPLACE, OR RELOCATE ALL SIGNS, AS SHOWN ON THE PLANS OR AS AFFECTED BY CONSTRUCTION, PER CITY STANDARDS.
10. POWER, STREET LIGHT, CABLE, AND TELEPHONE LINES SHALL BE IN A TRENCH LOCATED WITHIN A 10-FOOT UTILITY EASEMENT ADJACENT TO PUBLIC RIGHT-OF-WAY. RIGHT-OF-WAY CROSSINGS SHALL HAVE A MINIMUM HORIZONTAL SEPARATION FROM OTHER UTILITIES (SEWER, WATER, AND STORM) OF 5 FEET.
11. ALL CONSTRUCTION SURVEYING FOR EXTENSIONS OF PUBLIC FACILITIES SHALL BE DONE UNDER THE DIRECTION OF A WASHINGTON STATE LICENSED LAND SURVEYOR OR A WASHINGTON STATE LICENSED PROFESSIONAL CIVIL ENGINEER.
12. DURING CONSTRUCTION, ALL PUBLIC STREETS ADJACENT TO THIS PROJECT SHALL BE KEPT CLEAN OF ALL MATERIAL DEPOSITS RESULTING FROM ON-SITE CONSTRUCTION, AND EXISTING STRUCTURES SHALL BE PROTECTED AS DIRECTED BY THE CITY.
13. CERTIFIED RECORD DRAWINGS ARE REQUIRED PRIOR TO PROJECT ACCEPTANCE.
14. A NPDES STORMWATER GENERAL PERMIT MAY BE REQUIRED BY THE DEPARTMENT OF ECOLOGY FOR THIS PROJECT. FOR INFORMATION CONTACT THE DEPARTMENT OF ECOLOGY, SOUTHWEST REGION OFFICE AT (360)407-6300.
15. ANY DISTURBANCE OR DAMAGE TO CRITICAL AREAS AND ASSOCIATED BUFFERS, OR SIGNIFICANT TREES DESIGNATED FOR PRESERVATION AND PROTECTION SHALL BE MITIGATED IN ACCORDANCE WITH A MITIGATION PLAN REVIEWED AND APPROVED BY THE CITY'S PLANNING DIVISION. PREPARATION AND IMPLEMENTATION OF THE MITIGATION PLAN SHALL BE AT THE DEVELOPER'S EXPENSE.

ROADWAY NOTES:

1. ALL WORK IN CITY RIGHT-OF-WAY REQUIRES A PERMIT FROM THE CITY OF PUYALLUP. PRIOR TO ANY WORK COMMENCING, THE GENERAL CONTRACTOR SHALL ARRANGE FOR A PRECONSTRUCTION MEETING AT THE DEVELOPMENT SERVICES CENTER TO BE ATTENDED BY ALL CONTRACTORS THAT WILL PERFORM WORK SHOWN ON THE ENGINEERING PLANS, REPRESENTATIVES FROM ALL APPLICABLE UTILITY COMPANIES, THE PROJECT OWNER AND APPROPRIATE CITY STAFF. CONTACT ENGINEERING SERVICES TO SCHEDULE THE MEETING (253) 841-5568. THE CONTRACTOR IS RESPONSIBLE TO HAVE THEIR OWN APPROVED SET OF PLANS AT THE MEETING.
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3. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'STANDARD SPECIFICATIONS'), WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER, LATEST EDITION, UNLESS SUPERSEDED OR AMENDED BY THE CITY OF PUYALLUP CITY STANDARDS FOR PUBLIC WORKS ENGINEERING AND CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'CITY STANDARDS').
4. A COPY OF THESE APPROVED PLANS AND APPLICABLE CITY DEVELOPER SPECIFICATIONS AND DETAILS SHALL BE ON SITE DURING CONSTRUCTION.
5. ANY REVISIONS MADE TO THESE PLANS MUST BE REVIEWED AND APPROVED BY THE DEVELOPER'S ENGINEER AND THE ENGINEERING SERVICES STAFF PRIOR TO ANY IMPLEMENTATION IN THE FIELD. THE CITY SHALL NOT BE RESPONSIBLE FOR ANY ERRORS AND/OR OMISSIONS ON THESE PLANS.
6. THE CONTRACTOR SHALL HAVE ALL UTILITIES VERIFIED ON THE GROUND PRIOR TO ANY CONSTRUCTION. CALL (811) AT LEAST TWO WORKING DAYS IN ADVANCE. THE OWNER AND HIS/HER ENGINEER SHALL BE CONTACTED IMMEDIATELY IF A CONFLICT EXISTS.
7. ANY STRUCTURE AND/OR OBSTRUCTION WHICH REQUIRES REMOVAL OR RELOCATION RELATING TO THIS PROJECT, SHALL BE DONE SO AT THE DEVELOPER'S EXPENSE.
8. MONUMENTS SHALL BE INSTALLED AT ALL STREET INTERSECTIONS, AT ANGLE POINTS, AND POINTS OF CURVATURE IN EACH STREET. ALL BOUNDARY MONUMENTS MUST BE INSTALLED ACCORDING TO THE WASHINGTON STATE SUBDIVISION LAWS.
9. CURB AND GUTTER INSTALLATION SHALL CONFORM TO CITY STANDARD DETAIL 01.02.09.
10. SIDEWALKS AND DRIVEWAYS SHALL BE INSTALLED AS LOTS ARE BUILT ON. SIDEWALKS AND DRIVEWAYS SHALL CONFORM TO CITY STANDARD DETAIL 01.02.01, 01.02.02 AND 01.02.12. IF ASPHALT IS DAMAGED DURING REPLACEMENT OF CURB AND GUTTER, THE REPAIR SHALL CONFORM TO CITY STANDARD DETAIL 01.02.10.
11. THE SURROUNDING GROUND (5 FEET BEYOND THE BASE) FOR ALL POWER TRANSFORMERS, TELEPHONE/TV PEDESTALS, AND STREET LIGHT MAIN DISCONNECTS SHALL BE GRADED TO A POSITIVE 2 PERCENT SLOPE FROM TOP OF CURB.
12. SIGNAGE AND TRAFFIC CONTROL DEVICES ARE SAFETY ITEMS AND SHALL BE INSTALLED PRIOR TO ISSUANCE OF ANY CERTIFICATE OF OCCUPANCY OR PLAT APPROVAL. HOWEVER, IN LARGER DEVELOPMENTS, EXACT LOCATIONS OF STOP AND YIELD SIGNS MAY NEED TO BE DETERMINED AFTER FULL BUILDOUT WHEN TRAFFIC PATTERNS HAVE BEEN ESTABLISHED. IN THIS CASE, CONTRACTOR SHALL PROVIDE INDICATED 'CITY-PLACED' SIGNS, SIGNPOSTS, AND BRACKETS TO THE CITY SIGN SPECIALIST (253) 841-5471 FOR LATER INSTALLATION BY THE CITY. ALL SIGNAGE SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
13. PRIOR TO ANY SIGN OR STRIPING INSTALLATION OR REMOVAL THE CONTRACTOR SHALL CONTACT THE CITY SIGN SPECIALIST (253) 841-5471 TO ARRANGE FOR AN ON-SITE MEETING TO DISCUSS PLACEMENT AND UNIFORMITY.
14. NEW OR REVISED STOP SIGNS OR YIELD SIGNS SHALL BE ADVANCE WARNED USING THE PROCEDURE OUTLINED IN THE MUTCD. ADVANCE WARNING SIGNS AND FLAGS SHALL BE MAINTAINED BY INSTALLER FOR 30 DAYS AND THEN REMOVED.

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

NOTE: THIS APPROVAL IS VOID AFTER 1 YEAR FROM APPROVAL DATE.
THE CITY WILL NOT BE RESPONSIBLE FOR ERRORS AND/OR OMISSIONS ON THESE PLANS. FIELD CHANGES MAY DICTATE CHANGES TO THESE PLANS AS DETERMINED BY THE ENGINEERING SERVICES MANAGER.

No.	Date	By	Ckd.	Appr.	Revision

Title: CONSTRUCTION NOTES

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

PUYALLUP, WASHINGTON

JASON GUY HUSBAND — STATE OF WASHINGTON — 38950 — REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal NA Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Job Number 20630

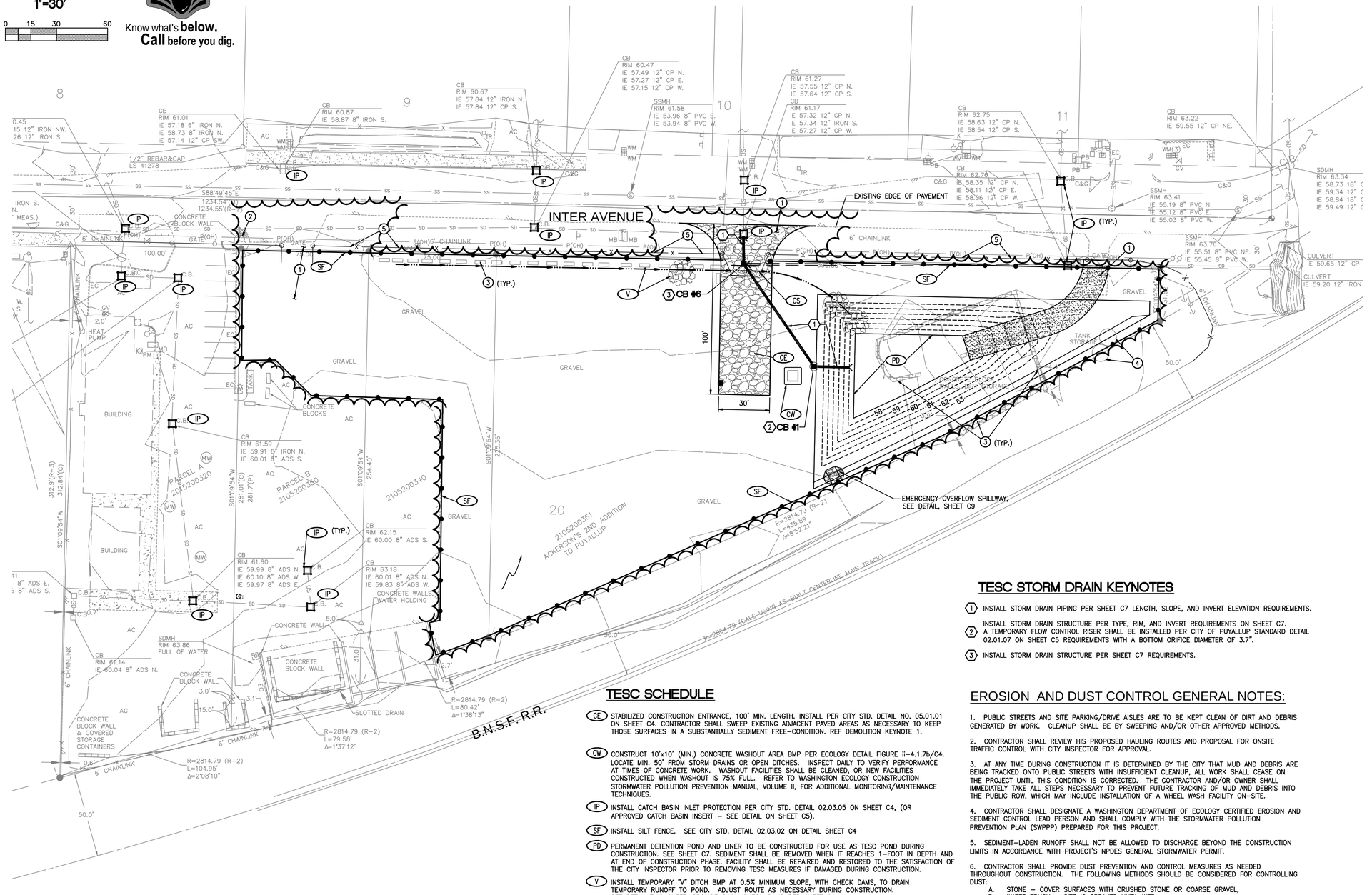
Sheet C2 of 10

EROSION CONTROL PLAN

1"=30'

0 15 30 60

811 Know what's **below.** **Call** before you dig.



LEGEND

- CLEARING LIMITS
- CATCH BASIN INLET PROTECTION
- TEMPORARY SWALE
- SILT FENCE
- OVERLAND FLOW DIRECTION
- TEMPORARY CONSTRUCTION ENTRANCE
- TEMPORARY SEDIMENT POND
- ROCK CHECK DAM
- EXISTING EASEMENT
- EXISTING CURB
- EXISTING SANITARY SEWER
- EXISTING STORM PIPE
- EXISTING WATER
- EXISTING FENCE
- EXISTING GROUND CONTOUR
- EXISTING CATCH BASIN (CB)
- EXISTING STORM MANHOLE (SDMH)
- EXISTING FIRE HYDRANT
- EXISTING SEWER MANHOLE (SSMH)
- DEMO EXISTING CURB
- DEMO EXISTING FENCE
- SAWCUT LINE
- EROSION CONTROL BMP CALLOUT (BMP INITIALS)

TESC SCHEDULE

- (CE) STABILIZED CONSTRUCTION ENTRANCE, 100' MIN. LENGTH. INSTALL PER CITY STD. DETAIL NO. 05.01.01 ON SHEET C4. CONTRACTOR SHALL SWEEP EXISTING ADJACENT PAVED AREAS AS NECESSARY TO KEEP THOSE SURFACES IN A SUBSTANTIALLY SEDIMENT FREE-CONDITION. REF DEMOLITION KEYNOTE 1.
- (CW) CONSTRUCT 10'x10' (MIN.) CONCRETE WASHOUT AREA BMP PER ECOLOGY DETAIL FIGURE ii-4.1.7b/C4. LOCATE MIN. 50' FROM STORM DRAINS OR OPEN DITCHES. INSPECT DAILY TO VERIFY PERFORMANCE AT TIMES OF CONCRETE WORK. WASHOUT FACILITIES SHALL BE CLEANED, OR NEW FACILITIES CONSTRUCTED WHEN WASHOUT IS 75% FULL. REFER TO WASHINGTON ECOLOGY CONSTRUCTION STORMWATER POLLUTION PREVENTION MANUAL, VOLUME II, FOR ADDITIONAL MONITORING/MAINTENANCE TECHNIQUES.
- (IP) INSTALL CATCH BASIN INLET PROTECTION PER CITY STD. DETAIL 02.03.05 ON SHEET C4, (OR APPROVED CATCH BASIN INSERT – SEE DETAIL ON SHEET C5).
- (SF) INSTALL SILT FENCE. SEE CITY STD. DETAIL 02.03.02 ON DETAIL SHEET C4
- (PD) PERMANENT DETENTION POND AND LINER TO BE CONSTRUCTED FOR USE AS TESC POND DURING CONSTRUCTION. SEE SHEET C7. SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1-FOOT IN DEPTH AND AT END OF CONSTRUCTION PHASE. FACILITY SHALL BE REPAIRED AND RESTORED TO THE SATISFACTION OF THE CITY INSPECTOR PRIOR TO REMOVING TESC MEASURES IF DAMAGED DURING CONSTRUCTION.
- (V) INSTALL TEMPORARY "V" DITCH BMP AT 0.5% MINIMUM SLOPE, WITH CHECK DAMS, TO DRAIN TEMPORARY RUNOFF TO POND. ADJUST ROUTE AS NECESSARY DURING CONSTRUCTION. SEE DETAIL THIS SHEET. PROVIDE ROCK CHECK DAMS PER SHEET C4.
- (CS) TEMP ROAD CROSSING SWALE (PER DETAIL SHT C4)

DEMOLITION KEYNOTES

1. REMOVE EXISTING ASPHALT PAVEMENT. WHERE ASPHALT IS SAWCUT, IT SHALL BE TO A CLEAN, VERTICAL, UNYIELDING EDGE. REMOVE PAVEMENT DURING INITIAL CONSTRUCTION, AS NECESSARY TO INSTALL CONSTRUCTION ENTRANCE AND PROPOSED IMPROVEMENTS, REFERENCE SHEET C6 AND C7.
2. REMOVE EXISTING HYDRANT METER AT EXISTING FIRE HYDRANT. COORDINATE WITH INSPECTOR AND CITY OF PUYALLUP WATER UTILITY DEPARTMENT.
3. CONCRETE BLOCKS TO BE REMOVED AND SALVAGED TO OWNER OR DISPOSED OF AT AN APPROVED OFFSITE LOCATION.
4. TANK STORAGE TO BE REMOVED AND SALVAGED TO OWNER OR DISPOSED OF AT AN APPROVED OFFSITE LOCATION.
5. REMOVE EXISTING FENCE WITHIN PUBLIC RIGHT-OF-WAY. SEE SHEET C6 FOR ONSITE FENCING REQUIREMENTS.

TESC STORM DRAIN KEYNOTES

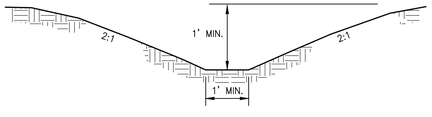
1. INSTALL STORM DRAIN PIPING PER SHEET C7 LENGTH, SLOPE, AND INVERT ELEVATION REQUIREMENTS.
2. INSTALL STORM DRAIN STRUCTURE PER TYPE, RIM, AND INVERT REQUIREMENTS ON SHEET C7. A TEMPORARY FLOW CONTROL RISER SHALL BE INSTALLED PER CITY OF PUYALLUP STANDARD DETAIL 02.01.07 ON SHEET C5 REQUIREMENTS WITH A BOTTOM ORIFICE DIAMETER OF 3.7".
3. INSTALL STORM DRAIN STRUCTURE PER SHEET C7 REQUIREMENTS.

EROSION AND DUST CONTROL GENERAL NOTES:

1. PUBLIC STREETS AND SITE PARKING/DRIVE AISLES ARE TO BE KEPT CLEAN OF DIRT AND DEBRIS GENERATED BY WORK. CLEANUP SHALL BE BY SWEEPING AND/OR OTHER APPROVED METHODS.
2. CONTRACTOR SHALL REVIEW HIS PROPOSED HAULING ROUTES AND PROPOSAL FOR ONSITE TRAFFIC CONTROL WITH CITY INSPECTOR FOR APPROVAL.
3. AT ANY TIME DURING CONSTRUCTION IT IS DETERMINED BY THE CITY THAT MUD AND DEBRIS ARE BEING TRACKED ONTO PUBLIC STREETS WITH INSUFFICIENT CLEANUP, ALL WORK SHALL CEASE ON THE PROJECT UNTIL THIS CONDITION IS CORRECTED. THE CONTRACTOR AND/OR OWNER SHALL IMMEDIATELY TAKE ALL STEPS NECESSARY TO PREVENT FUTURE TRACKING OF MUD AND DEBRIS INTO THE PUBLIC ROW, WHICH MAY INCLUDE INSTALLATION OF A WHEEL WASH FACILITY ON-SITE.
4. CONTRACTOR SHALL DESIGNATE A WASHINGTON DEPARTMENT OF ECOLOGY CERTIFIED EROSION AND SEDIMENT CONTROL LEAD PERSON AND SHALL COMPLY WITH THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARED FOR THIS PROJECT.
5. SEDIMENT-LADEN RUNOFF SHALL NOT BE ALLOWED TO DISCHARGE BEYOND THE CONSTRUCTION LIMITS IN ACCORDANCE WITH PROJECT'S NPDES GENERAL STORMWATER PERMIT.
6. CONTRACTOR SHALL PROVIDE DUST PREVENTION AND CONTROL MEASURES AS NEEDED THROUGHOUT CONSTRUCTION. THE FOLLOWING METHODS SHOULD BE CONSIDERED FOR CONTROLLING DUST:
   - A. STONE – COVER SURFACES WITH CRUSHED STONE OR COARSE GRAVEL,
   - B. WATER TRUCK – SITE IS SPRAYED UNTIL WET,
   - C. SPRINKLERS – SITE IS SPRINKLED UNTIL WET.
   - D. BARRIERS – SOLID BOARD FENCES, HAY BALES BURLAP FENCES, AND SIMILAR MATERIALS CAN BE USED TO CONTROL AIR CURRENTS AND SOIL BLOWING.

DEMOLITION AND EXCAVATION NOTES:

1. CONTRACTOR SHALL ASSURE THAT ALL NECESSARY PERMITS HAVE BEEN OBTAINED AND NECESSARY PRECONSTRUCTION MEETINGS HELD, PRIOR TO COMMENCING WORK.
2. CONTRACTOR SHALL FIELD VERIFY LOCATION, SIZE, AND TYPE OF EXISTING UTILITIES IN WORK AREA PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO ENGINEER IMMEDIATELY.
3. CONTRACTOR SHALL PROTECT AND PRESERVE ALL IMPROVEMENTS ALONG THE PERIMETER OF THE WORK AREA. ANY DAMAGED IMPROVEMENTS SHALL BE REPAIRED/REPLACED AT CONTRACTOR'S EXPENSE.
4. ALL SILT PROTECTION AND EROSION CONTROL MEASURES MUST BE IN PLACE BEFORE SAWCUTTING, CURB AND PAVEMENT REMOVAL, OR STRIPPING OF SITE VEGETATION.
5. ANY/ALL EXISTING WELLS AND/OR SEPTIC SYSTEMS DISCOVERED ON-SITE SHALL BE REMOVED AND/OR ABANDONED PER PIERCE COUNTY HEALTH DEPARTMENT STANDARDS.
6. THE PROJECT SITE IS SUBJECT TO HIGH GROUNDWATER LEVELS. IMPLEMENT DEWATERING PROCEDURES AS NECESSARY.



TEMPORARY "V" DITCH

NOT TO SCALE

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

NOTE: THIS APPROVAL IS VOID AFTER 1 YEAR FROM APPROVAL DATE.
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No.	Date	By	Ckd.	Appr.	Revision

Title: EROSION CONTROL PLAN

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUBER — STATE OF WASHINGTON — 38950 — REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal 1"=30' Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 barghausen.com

Job Number 20630

Sheet C3 of 10

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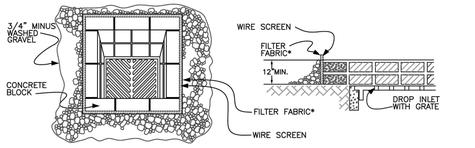
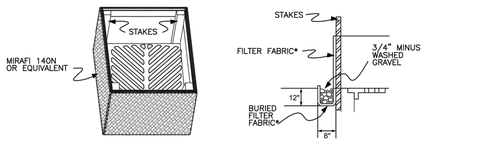
EROSION CONTROL NOTES AND DETAILS

BLOCK AND GRAVEL FILTER



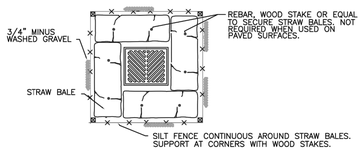
* MIRAFI 140-N OR EQUIVALENT

FILTER FABRIC FENCE



* MIRAFI 140-N OR EQUIVALENT

STRAW BALE BARRIER



CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

STORM DRAIN BARRIERS

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
LINDA LANSING	LINDA LIAN	COLLEEN HARRIS	XXXX	
FILE NAME: F:\DWG\COMMON\STDS\CITY\2009\02_SD\02.03.05		DATE APPROVED: 09/01/1992	DATE REVISED: 06/01/2003	SCALE: NTS

02.03.05

CONDITIONS WHERE PRACTICE APPLIES

1. BLOCK AND GRAVEL FILTER – APPLICABLE FOR AREAS GREATER THAN 5% SLOPE.
2. FILTER FABRIC FENCE – APPLICABLE WHERE THE INLET DRAINS A RELATIVELY SMALL (ONE ACRE OR LESS) AND FLAT AREA (LESS THAN 5% SLOPE).
3. STRAW BALE BARRIER – APPLICABLE WHERE INLET DRAINS A RELATIVELY FLAT DISTURBED AREA (LESS THAN 5% SLOPE) IN WHICH SHEET FLOW (NOT EXCEEDING 0.5 FT/SEC.) OCCURES. BARRIERS OF THIS TYPE SHOULD NOT BE PLACED AROUND INLETS RECEIVING CONCENTRATED FLOWS SUCH AS THOSE ALONG MAJOR STREETS AND HIGHWAYS.

1. BLOCK AND GRAVEL FILTER – INSTALLATION PROCEDURE

A: PLACE WIRE MESH OVER THE DROP INLET SO THAT THE WIRE EXTENDS A MINIMUM OF ONE FOOT BEYOND EACH SIDE OF THE INLET STRUCTURE. USE WIRE SCREEN WITH 1/2-INCH OPENINGS. IF MORE THAN ONE STRIP OF MESH IS NECESSARY, OVERLAP THE STRIPS. PLACE FILTER FABRIC* OVER WIRE MESH.

B: PLACE CONCRETE BLOCKS LENGTHWISE ON THEIR SIDES IN A SINGLE ROW AROUND THE PERIMETER OF THE INLET, SO THAT THE OPEN ENDS FACE OUTWARD, NOT UPWARD. THE ENDS OF ADJACENT BLOCKS SHOULD ABUT. THE HIEGHT OF THE BARRIER CAN BE VARIED, DEPENDING ON DESIGN NEEDS, BY STACKING COMBINATIONS OF BLOCKS THAT ARE 4-INCH, 8-INCH AND 12-INCH WIDE. THE ROW OF BLOCKS SHOULD BE AT LEAST 12-INCHES BUT NO GREATER THAN 24-INCHES HIGH.

C: PLACE WIRE SCREEN OVER THE OVERSIDE VERTICAL FACE (OPEN END) OF THE CONCRETE BLOCKS TO PREVENT STONES FROM BEING WASHED THROUGH THE BLOCKS. USE WIRE SCREEN WITH 1/2-INCH OPENINGS.

D: PILE STONES AGAINST THE WIRE MESH TO THE TOP OF THE BLOCKS. USE 3/4" MINUS WASHED GRAVEL.

2. FILTER FABRIC FENCE – INSTALLATION PROCEDURE

A: PLACE 2-INCH BY 2-INCH WOODEN STAKES AROUND THE PERIMETER OF THE INLET A MAXIMUM OF 3 FEET APART AND DRIVE THEM AT LEAST 8-INCHES INTO THE GROUND. THE STAKES MUST BE AT LEAST 3 FEET LONG.

B: EXCAVATE A TRENCH APPROXIMATELY 8-INCHES WIDE AND 12-INCHES DEEP AROUND THE OUTSIDE PERIMETER OF THE STAKES.

C: STAPLE THE FILTER FABRIC* TO THE WOODEN STAKES SO THAT 32-INCHES OF THE FABRIC EXTENDS AND CAN BE FORMED INTO THE TRENCH, AND USE HEAVY-DUTY WIRE STAPLES AT LEAST 1/2-INCHES LONG.

D: BACKFILL THE TRENCH WITH 3/4-INCH MINUS WASHED GRAVEL ALL THE WAY AROUND.

3. STRAW BALE BARRIER – INSTALLATION PROCEDURE

A: EXCAVATE A 4-INCH DEEP TRENCH AROUND THE INLET. MAKE THE TRENCH AS WIDE AS A STRAW BALE.

B: ORIENT STRAW BALES WITH THE BINDINGS AROUND THE SIDES OF THE BALES RATHER THAN OVER AND UNDER THE BALES.

C: PLACE BALES LENGTHWISE AROUND THE INLET AND PRESS THE ENDS OF ADJACENT BALES SECURELY IN PLACE.

D: DRIVE TWO 2-INCH BY 2-INCH STAKES THROUGH EACH BALE TO ANCHOR THE BALE SECURELY IN PLACE.

E: BACKFILL THE EXCAVATED SOIL AND COMPACT IT AGAINST THE BALE.

F: WEDGE LOOSE STRAW BETWEEN BALES TO PREVENT WATER FROM FLOWING BETWEEN BALES.

* MIRAFI 140-N OR EQUIVALENT

CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

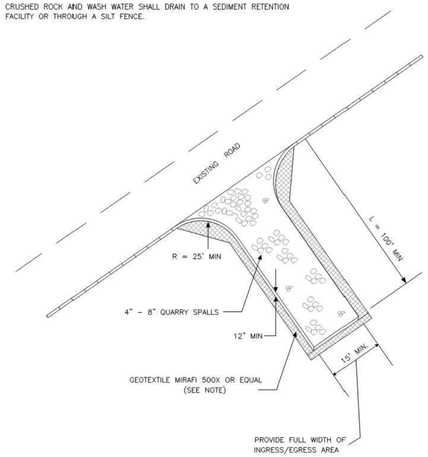
STORM DRAIN BARRIERS NOTES

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
LINDA LANSING	LINDA LIAN	COLLEEN HARRIS	XXXX	
FILE NAME: F:\DWG\COMMON\STDS\CITY\2009\02_SD\02.03.06		DATE APPROVED: 09/01/1992	DATE REVISED: 06/01/2003	SCALE: NTS

02.03.06

NOTE:

1. GEOTEXTILE MIRAFI 500 X OR APPROVED EQUAL SHALL BE PLACED UNDER THE ENTIRETY OF THE TEMPORARY ENTRANCE.
2. ADDITIONAL ROCK SHALL BE ADDED PERIODICALLY TO MAINTAIN PROPER FUNCTION OF THE PAD.
3. IF THE PAD DOES NOT ADEQUATELY REMOVE THE MUD FROM THE VEHICLE'S WHEELS, THE WHEELS SHALL BE HOSED OFF BEFORE THE VEHICLE ENTERS A PAVED STREET. THE WASHING SHALL BE DONE ON AN AREA COVERED WITH CRUSHED ROCK AND WASH WATER SHALL DRAIN TO A SEDIMENT RETENTION FACILITY OR THROUGH A SILT FENCE.

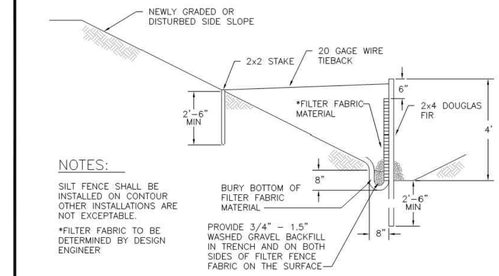


CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

TEMPORARY CONSTRUCTION ENTRANCE

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
JIM EBEN-ES-VOBODA	LINDA LIAN	COLLEEN HARRIS	XXXX	
FILE NAME: F:\DWG\COMMON\STDS\CITY\2009\02_SD\05.01.01		DATE APPROVED: 07/01/2009	DATE REVISED: XX/XX/XX	SCALE: NTS

05.01.01

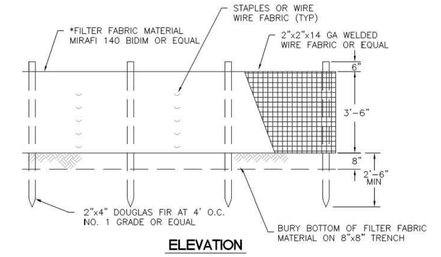


NOTES:

SILT FENCE SHALL BE INSTALLED ON CONTOUR OTHER INSTALLATIONS ARE NOT EXCEPTABLE.

*FILTER FABRIC TO BE DETERMINED BY DESIGN ENGINEER

TYPICAL CROSS SECTION



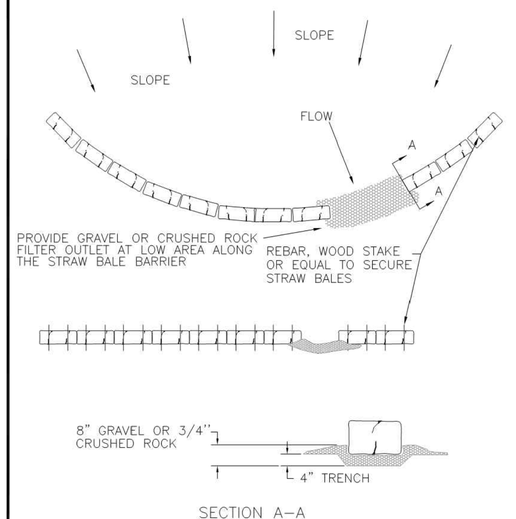
ELEVATION

CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

SILTATION FENCE

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
LINDA LANSING	LINDA LIAN	COLLEEN HARRIS	XXXX	
FILE NAME: F:\DWG\COMMON\STDS\CITY\2009\02_SD\02.03.02		DATE APPROVED: 09/01/1992	DATE REVISED: 06/01/2003	SCALE: NTS

02.03.02



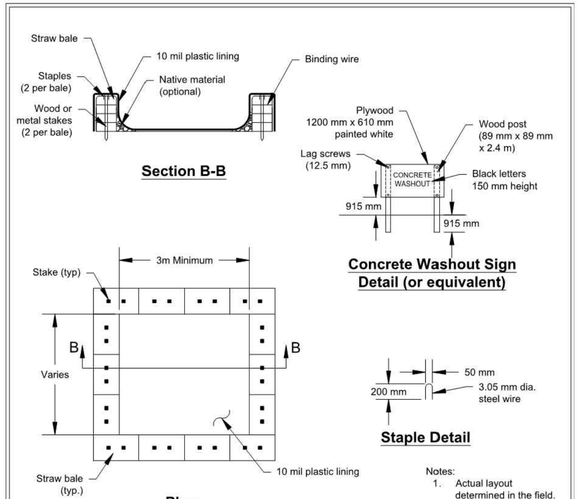
SECTION A-A

CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

BARRIER WITH GRAVEL OUTLET

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
LINDA LANSING	LINDA LIAN	COLLEEN HARRIS	XXXX	
FILE NAME: F:\DWG\COMMON\STDS\CITY\2009\02_SD\02.03.04		DATE APPROVED: 09/01/1992	DATE REVISED: 06/01/2003	SCALE: NTS

02.03.04



Notes:
1. Actual layout determined in the field.
2. The concrete washout sign shall be installed within 10 m of the temporary concrete washout facility.

Type "Above Grade" with Straw Bales

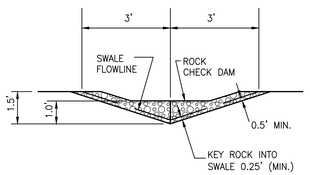
NOT TO SCALE

DEPARTMENT OF ECOLOGY
State of Washington

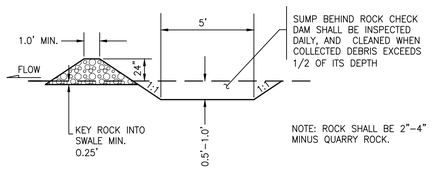
Figure II-4.1.7b
Concrete Washout Area
Revised June 2015

SWALE SLOPE	CHECK DAM SPACING
0% - 5%	150'
5% - 10%	100'
> 10%	50'

← THIS PROJECT



SWALE X-SECTION AT ROCK CHECK DAM



ROCK DAM X-SECTION

ROCK CHECK DAM DETAILS

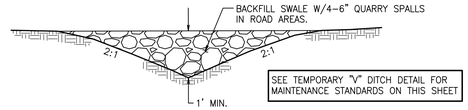
NOT TO SCALE

ALL RIP RAP PADS SHALL BE THE WIDTH OF THE PIPE PLUS 6' WIDE X 8' LONG X 1' DEEP, USING THE GRADATION SPECIFIED BELOW: (UNLESS OTHERWISE SPECIFIED). EXTEND ROCK TO 1' ABOVE CROWN OF OUTLET PIPE.

RIP RAP TO BE QUARRY SPALLS WITH ROCK GRADATION AS FOLLOWS:
- PASSING 8-INCH SQUARE SIEVE: 100%
- PASSING 3-INCH SQUARE SIEVE: 40%-60%
- PASSING 3/4-INCH SQUARE SIEVE: 0-10%

RIP RAP PROTECTION SPECIFICATIONS

NOT TO SCALE



TEMPORARY ROAD X-ING SWALE

NOT TO SCALE

ALL AREAS SUBJECT TO CLEARING AND GRADING THAT HAVE NOT BEEN COVERED BY IMPERVIOUS SURFACE, INCORPORATED INTO A DRAINAGE FACILITY OR ENGINEERED AS STRUCTURAL FILL OR SLOPE SHALL, AT PROJECT COMPLETION, DEMONSTRATE THE FOLLOWING:

1. A TOPSOIL LAYER WITH A MINIMUM ORGANIC MATTER CONTENT OF 10% DRY WEIGHT IN PLANTING BEDS, AND 5% ORGANIC MATTER CONTENT IN TURF AREAS, AND A PH FROM 6.0 TO 8.0 OR MATCHING THE PH OF THE UNDISTURBED SOIL. THE TOPSOIL LAYER SHALL HAVE A MINIMUM DEPTH OF EIGHT INCHES EXCEPT WHERE TREE ROOTS LIMIT THE DEPTH OF INCORPORATION OF AMENDMENTS NEEDED TO MEET THE CRITERIA. SUBSOILS BELOW THE TOPSOIL LAYER SHOULD BE SCARIFIED AT LEAST 4 INCHES WITH SOME INCORPORATION OF THE UPPER MATERIAL TO AVOID STRATIFIED LAYERS, WHERE FEASIBLE.

2. MULCH PLANTING BEDS WITH 2 INCHES OF ORGANIC MATERIAL.
3. USE COMPOST AND OTHER MATERIALS THAT MEET THE FOLLOWING ORGANIC CONTENT REQUIREMENTS:

3.1. THE ORGANIC CONTENT FOR PRE-APPROVED AMENDMENT RATES CAN BE MET ONLY USING COMPOST MEETING THE COMPOST SPECIFICATION FOR BMP T7.30: BIORETENTION, WITH THE EXCEPTION THAT THE COMPOST MAY HAVE UP TO 35% BIOSOLIDS OR MANURE.

THE COMPOST MUST ALSO HAVE AN ORGANIC MATTER CONTENT OF 40% TO 65%, AND A CARBON TO NITROGEN RATIO BELOW 25:1.

THE CARBON TO NITROGEN RATIO MAY BE AS HIGH AS 35:1 FOR PLANTINGS COMPOSED ENTIRELY OF PLANTS NATIVE TO THE PUGET SOUND LOWLANDS REGION.

3.2. THE CALCULATED AMENDMENT RATES MAY BE MET THROUGH USE OF COMPOSTED MATERIAL MEETING (A.) ABOVE; OR OTHER ORGANIC MATERIALS AMENDED TO MEET THE CARBON TO NITROGEN RATIO REQUIREMENTS, AND NOT EXCEEDING THE CONTAMINANT LIMITS IDENTIFIED IN TABLE 220-B, TESTING PARAMETERS, IN WAC 173-350-220.

THE RESULTING SOIL SHOULD BE CONDUCIVE TO THE TYPE OF VEGETATION TO BE ESTABLISHED.

IMPLEMENTATION OPTIONS
THE SOIL QUALITY DESIGN GUIDELINES LISTED ABOVE CAN BE MET BY USING ONE OF THE METHODS LISTED BELOW:
LEAVE UNDISTURBED NATIVE VEGETATION AND SOIL, AND PROTECT FROM COMPACTION DURING CONSTRUCTION.

AMEND EXISTING SITE TOPSOIL OR SUBSOIL EITHER AT DEFAULT "PRE-APPROVED" RATES, OR AT CUSTOM CALCULATED RATES BASED ON TESTS OF THE SOIL AND AMENDMENT.

STOCKPILE EXISTING TOPSOIL DURING GRADING, AND REPLACE IT PRIOR TO PLANTING. STOCKPILED TOPSOIL MUST ALSO BE AMENDED IF NEEDED TO MEET THE ORGANIC MATTER OR DEPTH REQUIREMENTS, EITHER AT A DEFAULT "PRE-APPROVED" RATE OR AT A CUSTOM CALCULATED RATE.

IMPORT TOPSOIL MIX OF SUFFICIENT ORGANIC CONTENT AND DEPTH TO MEET THE REQUIREMENTS.

MORE THAN ONE METHOD MAY BE USED ON DIFFERENT PORTIONS OF THE SAME SITE. SOIL THAT ALREADY MEETS THE DEPTH AND ORGANIC MATTER QUALITY STANDARDS, AND IS NOT COMPACTED, DOES NOT NEED TO BE AMENDED.

BMP T5.13
POST-CONSTRUCTION SOIL QUALITY AND DEPTH

NOT TO SCALE

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

NOTE: THIS APPROVAL IS VOID AFTER 1 YEAR FROM APPROVAL DATE.
THE CITY WILL NOT BE RESPONSIBLE FOR ERRORS AND/OR OMISSIONS ON THESE PLANS. FIELD CHANGES MAY DICTATE CHANGES TO THESE PLANS AS DETERMINED BY THE ENGINEERING SERVICES MANAGER.

No.	Date	By	Ckd.	Appr.	Revision

Title: EROSION CONTROL NOTES AND DETAILS

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUBER — STATE OF WASHINGTON — 38950 — REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal NA Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Job Number 20630

Sheet C4 of 10

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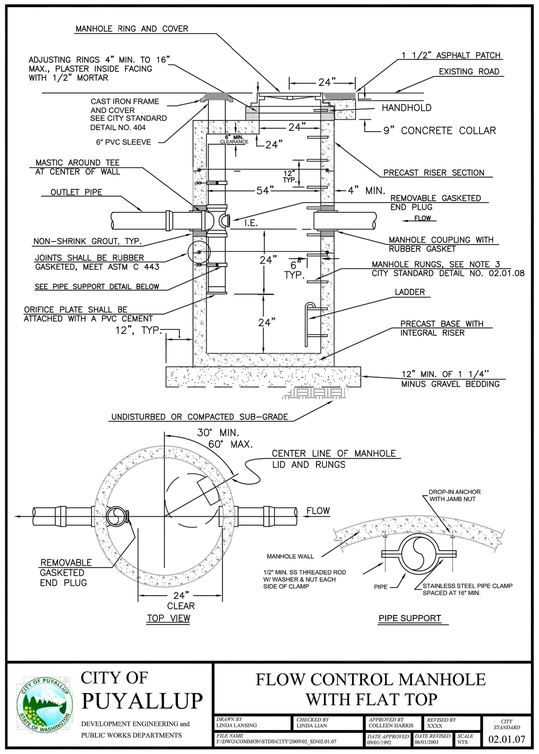
EROSION CONTROL NOTES AND DETAILS



CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

FLOW CONTROL MANHOLE WITH FLAT TOP

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
LINDA LANSING	LINDA LIAN	COLLEEN HARRIS	XXXX	
FILE NAME		DATE APPROVED	DATE REVISED	SCALE
F:\DWG\COMMON\STDS\CITY\200902_SD\02.01.07		09/01/1992	05/01/2003	NTS

02.01.07

MATERIALS OF CONSTRUCTION

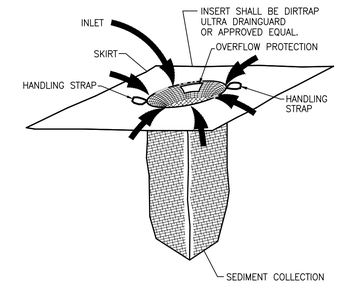
FABRIC:	NEEDLE PUNCHED NON-WOVEN GEOTEXTILE MATERIAL. FABRIC IS IS RESISTANT TO ULTRAVIOLET AND BIOLOGICAL DEGRADATION AND A BROAD RANGE OF CHEMICALS.
APPARENT OPENING SIZE (AOS):	80 US STANDARD SIEVE (0.180 MM)
GRAB TENSILE STRENGTH:	200 LBS
PUNCTURE STRENGTH:	130 LBS
MULLEN BURST:	400 PSI
TRAPEZOIDAL TEAR:	85 LBS
WATER FLOW RATE:	110 GPM/FT2
PERMEABILITY:	0.38 CM/SECOND

DIMENSIONS:

SKIRT:	24"x36"
SOCK FILTER/SEPARATOR:	10" D x 24" L

DISPOSAL REQUIREMENTS:

CONSULT FEDERAL, STATE, AND LOCAL REGULATIONS FOR DISPOSAL OF INSERTS



CATCH BASIN INSERT

NOT TO SCALE

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

NOTE: THIS APPROVAL IS VOID AFTER 1 YEAR FROM APPROVAL DATE.
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No.	Date	By	Ckd.	Appr.	Revision

Title: EROSION CONTROL NOTES AND DETAILS

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUSBAND — STATE OF WASHINGTON — 38950 — REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal NA Vertical N/A

Designed DL
Drawn RDC
Checked DL
Approved JGH
Date 02/09/2022

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barghausen.com

Job Number 20630

Sheet C5 of 10

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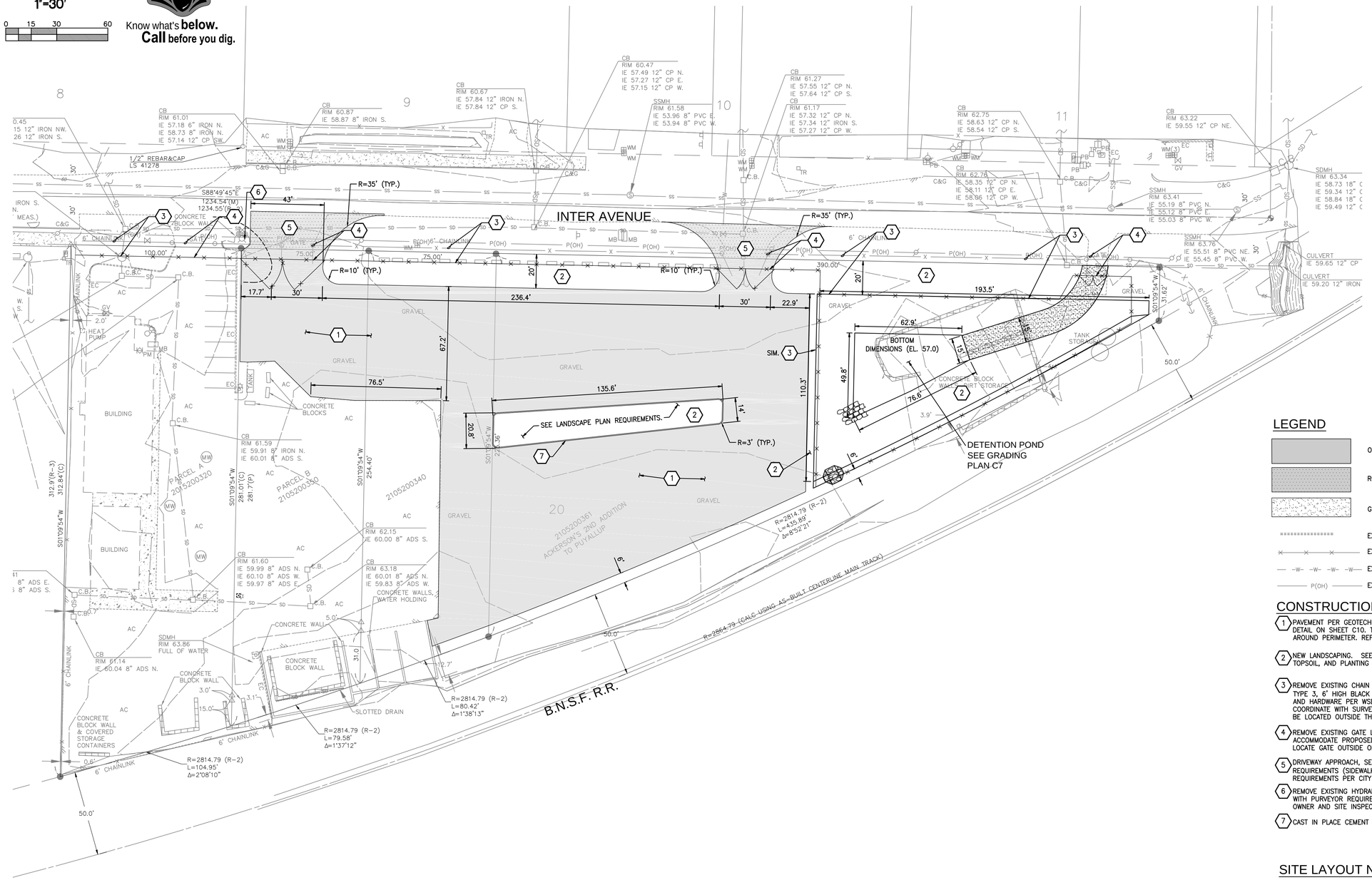
CIVIL SITE PLAN

1"=30'

0 15 30 60

811 Know what's **below.** **Call** before you dig.



LEGEND

- ONSITE ASPHALT PAVEMENT
- ROW ASPHALT PAVEMENT
- GRAVEL
- EXISTING CURB
- EX. CHAIN LINK FENCE
- EX. WATERLINE
- EX. OVERHEAD POWER

CONSTRUCTION CALL OUTS

1. PAVEMENT PER GEOTECHNICAL ENGINEER–RECOMMENDED ASPHALT PAVEMENT SECTION, SEE DETAIL ON SHEET C10. TACK COAT EXISTING PAVEMENT AND MATCH EXISTING ELEVATIONS AROUND PERIMETER. REFER TO GRADING PLAN C7 FOR ADDITIONAL DETAILS.
2. NEW LANDSCAPING. SEE LANDSCAPE PLANS L–1 AND L–2 FOR SOIL PREPARATION, TOPSOIL, AND PLANTING REQUIREMENTS AND DETAILS.
3. REMOVE EXISTING CHAIN LINK FENCE LOCATED WITHIN EXISTING R.O.W. INSTALL TYPE 3, 6' HIGH BLACK VINYL CHAIN LINK FENCE ONSITE WITH BLACK POSTS AND HARDWARE PER WSDOT STD. PLANS L–20.10–03 AND L–30.10–02. COORDINATE WITH SURVEYOR AND OWNER FOR EXACT LIMITS. ALL FENCING MUST BE LOCATED OUTSIDE THE PUBLIC R.O.W.
4. REMOVE EXISTING GATE LOCATED WITHIN EXISTING R.O.W. INSTALL GATE TO ACCOMMODATE PROPOSED DRIVEWAY ENTRY, IN–KIND WITH EXISTING. LOCATE GATE OUTSIDE OF PUBLIC R.O.W.
5. DRIVEWAY APPROACH, SEE CITY STANDARD 01.02.16 ON SHEET C10 FOR DIMENSION REQUIREMENTS (SIDEWALK, CURB AND GUTTER NOT REQUIRED). ROW ASPHALT PAVING REQUIREMENTS PER CITY STANDARD 01.01.04 ON SHEET C10.
6. REMOVE EXISTING HYDRANT METER AND RETURN TO PURVEYOR IN ACCORDANCE WITH PURVEYOR REQUIREMENTS. CONTRACTOR SHALL COORDINATE REMOVAL WITH OWNER AND SITE INSPECTOR.
7. CAST IN PLACE CEMENT CONCRETE TRAFFIC CURB PER WSDOT STANDARD F–10.12–04.

SITE LAYOUT NOTES

1. CONTRACTOR SHALL OBTAIN SERVICES OF A LICENSED LAND SURVEYOR TO PROVIDE HORIZONTAL AND VERTICAL CONTROL FOR ALL NEW WORK. SURVEYOR TO CONTACT BCE, INC. TO OBTAIN ELECTRONIC DRAWING FILES FOR STAKING CONTROL PURPOSES.
2. ALL DIMENSIONS ARE TO FACE OF CURB, UNLESS OTHERWISE NOTED ON PLAN.

SITE AREAS:

TOTAL PROJECT AREA	= 68,550 SF
PERVIOUS AREA, PROVIDED	= 23,585 SF (34.4%)
IMPERVIOUS AREA, PROVIDED	= 44,965 SF (65.6%)

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

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No.	Date	By	Ckd.	Appr.	Revision

Title: CIVIL SITE PLAN

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUSBAND STATE OF WASHINGTON 38950 REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal 1"=30' Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

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Sheet C6 of 10

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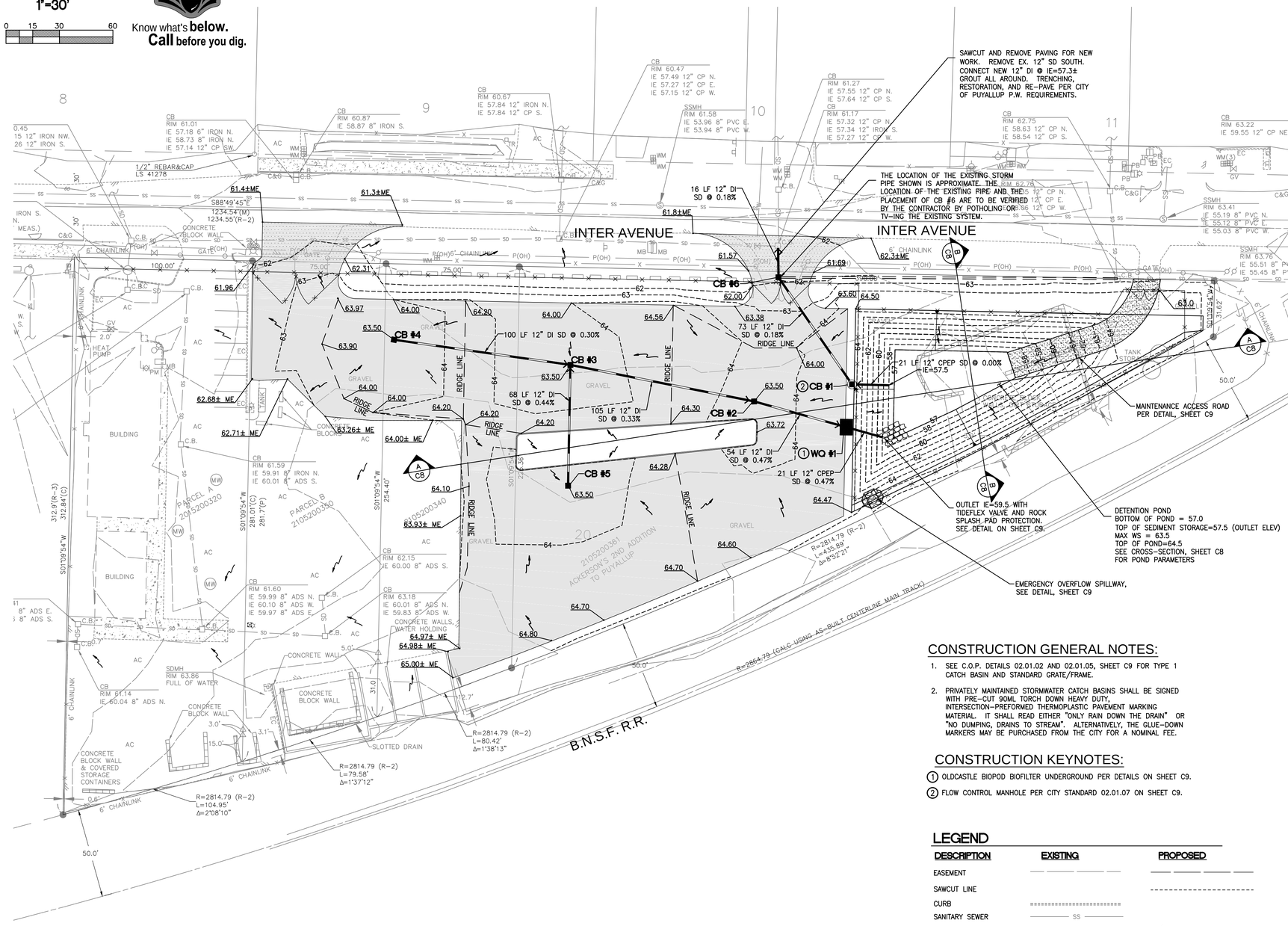
GRADING AND STORM DRAINAGE PLAN

1"=30'

0 15 30 60

811 Know what's **below.** **Call** before you dig.



CONSTRUCTION GENERAL NOTES:

1. SEE C.O.P. DETAILS 02.01.02 AND 02.01.05, SHEET C9 FOR TYPE 1 CATCH BASIN AND STANDARD GRATE/FRAME.
2. PRIVATELY MAINTAINED STORMWATER CATCH BASINS SHALL BE SIGNED WITH PRE-CUT 90ML TORCH DOWN HEAVY DUTY, INTERSECTION-PREFORMED THERMOPLASTIC PAVEMENT MARKING MATERIAL. IT SHALL READ EITHER "ONLY RAIN DOWN THE DRAIN" OR "NO DUMPING, DRAINS TO STREAM". ALTERNATIVELY, THE GLUE-DOWN MARKERS MAY BE PURCHASED FROM THE CITY FOR A NOMINAL FEE.

CONSTRUCTION KEYNOTES:

1. OLDCASTLE BIOPOD BIOFILTER UNDERGROUND PER DETAILS ON SHEET C9.
2. FLOW CONTROL MANHOLE PER CITY STANDARD 02.01.07 ON SHEET C9.

LEGEND

DESCRIPTION	EXISTING	PROPOSED
EASEMENT		
SAWCUT LINE		
CURB		
SANITARY SEWER	SS	
STORM	SD	
WATER	W	
FENCE		
GROUND CONTOUR	55.0	60.0
SPOT ELEVATION		65.0
CATCH BASIN (CB)		
STORM MANHOLE (SDMH)		
FIRE HYDRANT		
ASPHALT PAVEMENT		
OVERLAND FLOW DIRECTION		
MATCH EXISTING ELEVATION		ME

CATCH BASIN TABLE

CB #1, TYPE 2 - 54" RIM = 66.30 IE=57.50 (12" E) IE=57.50 (12" NW)
CB #2, TYPE 1, W/STANDARD GRATE RIM = 63.50 IE=59.85 (12" W) IE=59.85 (12" E)
CB #3, TYPE 1, W/STANDARD GRATE RIM = 63.50 IE=60.20 (12" W) IE=60.20 (12" S) IE=60.20 (12" E)
CB #4, TYPE 1, W/STANDARD GRATE RIM = 63.50 IE=60.50 (12" E)
CB #5, TYPE 1, W/STANDARD GRATE RIM = 63.50 IE=60.50 (12" N)
CB #6, TYPE 1, W/SOLID LOCKING LID RIM = 61.79 IE=57.37 (12" SE) IE=57.30 (12" E) IE=57.37 (12" N)
WQ #1, 6'x8' WATER QUALITY VAULT RIM = 64.44 IE=59.60 (12" W) IE=59.60 (12" E)

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

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No.	Date	By	Ckd.	Appr.	Revision

Title: GRADING AND STORM DRAINAGE PLAN

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUSBAND
STATE OF WASHINGTON
38950
REGISTERED
PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal 1"=30' Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

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Job Number 20630

Sheet C7 of 10

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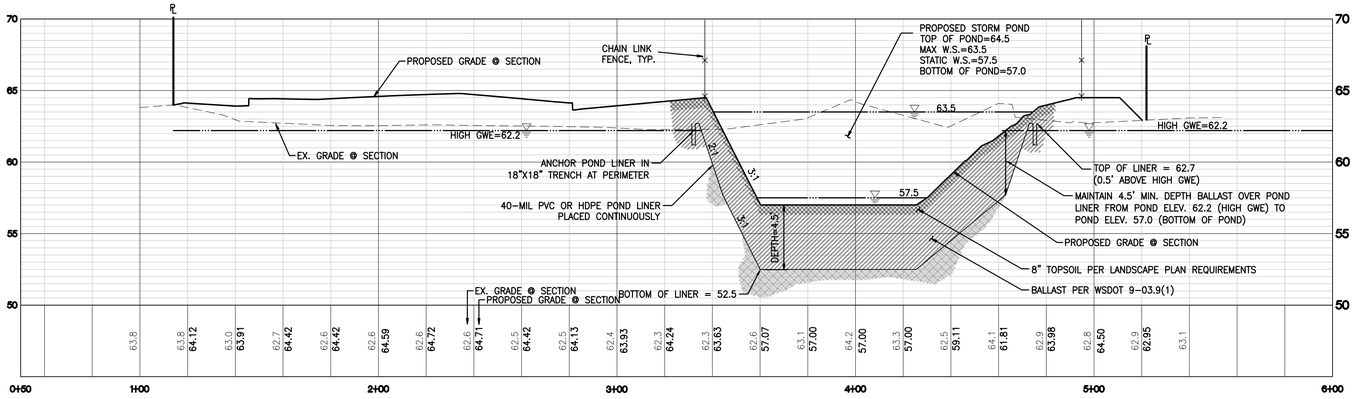
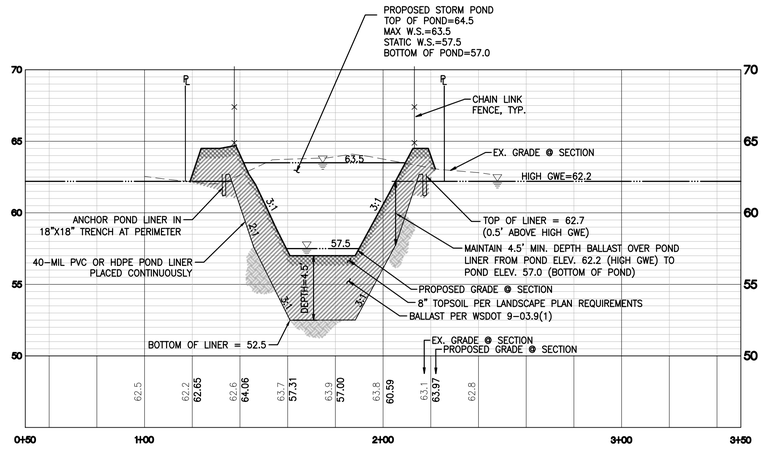
SITE CROSS SECTIONS



SITE SECTIONS A-A

1"=30' HORIZ, 1"=5' VERT



SITE SECTIONS B-B

1"=30' HORIZ, 1"=5' VERT

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

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No.	Date	By	Ckd.	Appr.	Revision

Title: SITE CROSS SECTIONS

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUBER
STATE OF WASHINGTON
38950
REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal NA Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

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Job Number 20630

Sheet C8 of 10

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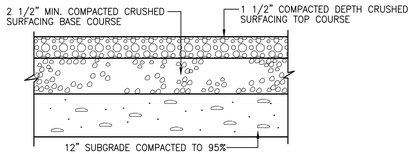
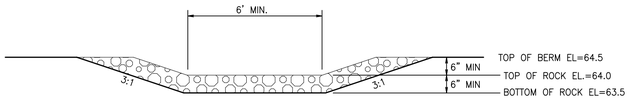
CONSTRUCTION NOTES AND DETAILS



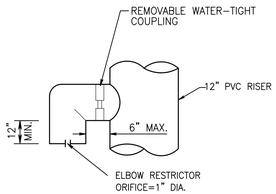
MAINTENANCE ACCESS TYPICAL GRAVEL ROAD SECTION

NOT TO SCALE



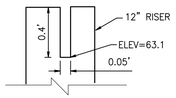
DETENTION POND EMERGENCY OVERFLOW SPILLWAY

NOT TO SCALE



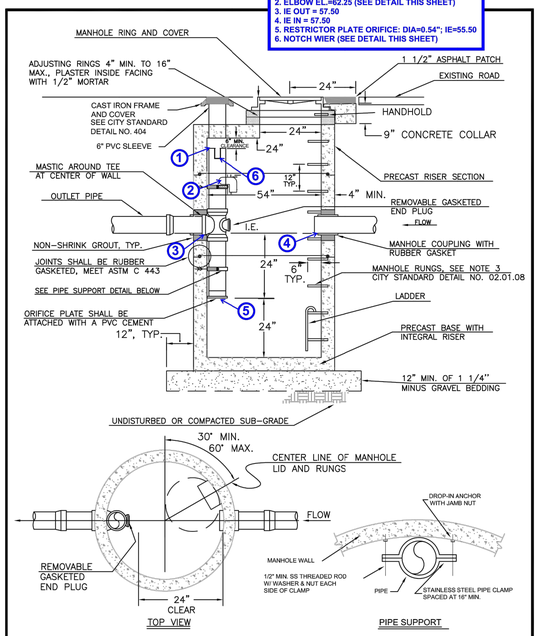
ELBOW DETAIL

N.T.S.

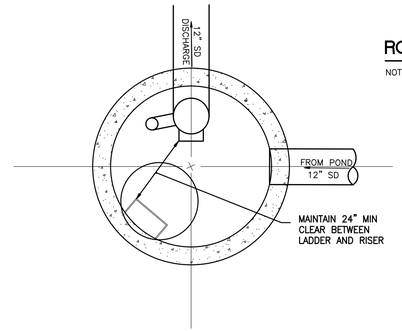


NOTCH DETAIL

N.T.S.

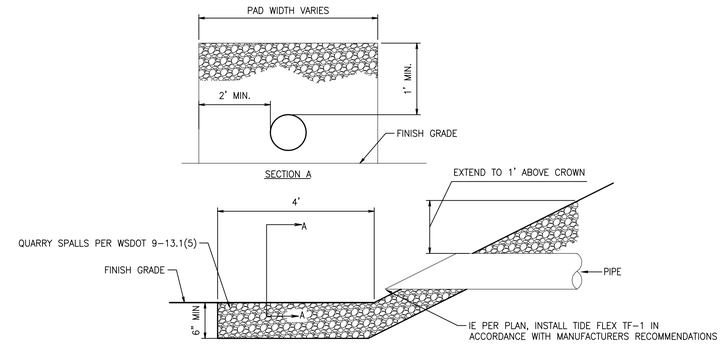


CITY OF PUYALLUP DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS	FLOW CONTROL MANHOLE WITH FLAT TOP				
DRAWN BY: LINDA LANSING	CHECKED BY: LINDA LIAN	APPROVED BY: COLLEEN HARRIS	REVISED BY: XXXX	CITY STANDARD: 02.01.07
FILE NAME: F:\PWGCOMMON\STDS\CITY\20090[2_SD02.01.07	DATE APPROVED: 09/01/1992	DATE REVISED: 06/01/2005	SCALE: NTS	



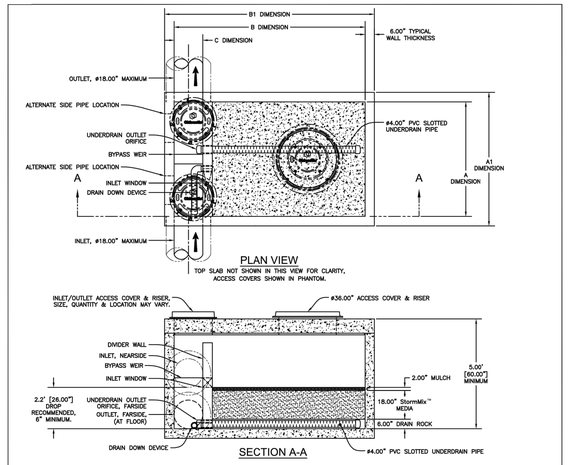
PLAN VIEW

SCALE: 1"=2'



ROCK SPLASH PAD AT PIPE OUTLET

NOT TO SCALE



MODEL	VAULT SIZE[1] (ID)			VAULT FOOTPRINT[1] (OD)		TREATMENT FLOW CAPACITY (GPM/CFS)	
	A DIM	B DIM	C DIM	A1 DIM	B1 DIM	1.6 GPM/SF (WA GULD[2])	1.8 GPM/SF (NJCAT[3])
BPU-46IB	4'	6'	1.5'	5'	7'	25.6 / 0.057	28.8 / 0.064
BPU-48IB	4'	8'	1.5'	5'	9'	38.4 / 0.086	43.2 / 0.096
BPU-412IB	4'	12'	1.5'	5'	13'	64.0 / 0.143	72.0 / 0.160
BPU-66IB	6'	6'	1.5'	7'	7'	38.4 / 0.086	43.2 / 0.096
BPU-68IB	6'	8'	1.5'	7'	9'	57.6 / 0.128	64.8 / 0.144
BPU-612IB	6'	12'	2'	7'	13'	91.2 / 0.203	102.6 / 0.229
BPU-816IB	8'	16'	2'	9'	17'	172.8 / 0.385	194.4 / 0.433

[1] All Dimensions are nominal, ID=Inside Dimension, OD=Outside Dimension.
[2] Treatment flow capacity at 1.6 gpm/sf media surface area based on an WA Ecology GULD Approval for Basic, Enhanced & Phosphorus.
[3] Treatment flow capacity at 1.8 gpm/sf media surface area based on an NJCAT Verification & NJ DEP Certification.

SITE SPECIFIC DATA				
Structure ID				WQ #1
Model Size				6'x8'
Orientation (Left or Right)				
Treatment Flow Rate (cfs)				0.1084 CFS
Peak Flow Rate (cfs)				1.0986 CFS
Rim Elevation				
Pipe Data	Pipe Location (Front or Side)	Pipe Size	Pipe Type	Invert Elevation
Inlet		12"	CPEP	59.60
Outlet		12"	CPEP	59.60
Notes:				

US Patents Pending

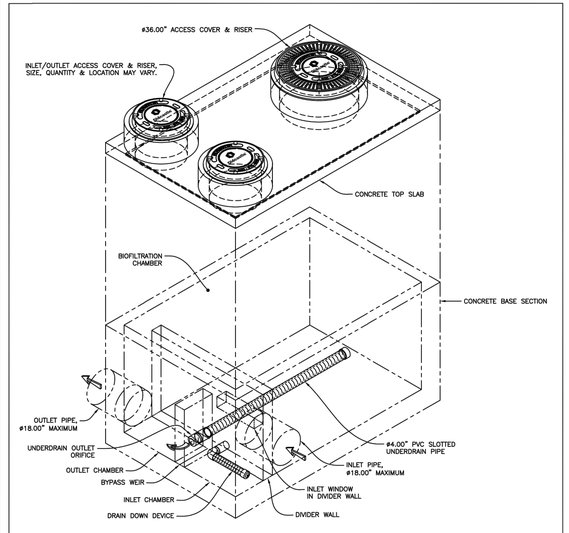
Bioretention/ Biofiltration

BioPod™ Biofilter Underground

Vault with Internal Bypass

Oldcastle Infrastructure™ A CRH COMPANY

DRAWING NO.	REV	ECO	DATE	SHEET
BPU-IB	B	ECO--0161 ARG 5/1/19	MJW 5/6/19	SHEET 2 OF 2



ISOMETRIC VIEW

FILTER MEDIA & DRAIN ROCK NOT SHOWN FOR CLARITY. SCALE: 1X

NOTES:
1. LEFT CONFIGURATION SHOWN, MIRROR RIGHT CONFIGURATION OF INLET AND OUTLET CHAMBER AVAILABLE.
2. CONTACT OLDCASTLE INFRASTRUCTURE FOR ENGINEERING ASSISTANCE AND DETAIL DRAWINGS.
3. CONCRETE COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C890 & C913.

US Patents Pending

Bioretention/ Biofiltration

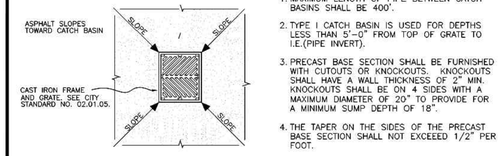
BioPod™ Biofilter Underground

Vault with Internal Bypass

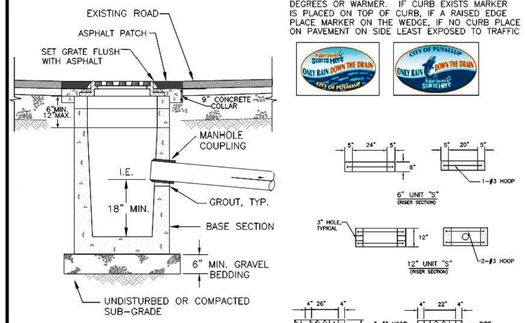
Oldcastle Infrastructure™ A CRH COMPANY

DRAWING NO.	REV	ECO	DATE	SHEET
BPU-IB	B	ECO--0161 ARG 5/1/19	MJW 5/6/19	SHEET 1 OF 2

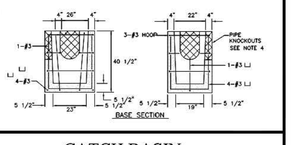
NOTES:
1. MAXIMUM LENGTH OF PIPE BETWEEN CATCH BASINS SHALL BE 400'.
2. TYPE I CATCH BASIN IS USED FOR DEPTHS LESS THAN 5'-0" FROM TOP OF GRATE TO I.E.(PIPE INVERT).
3. PRECAST BASE SECTION SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. KNOCKOUTS SHALL BE ON 4 SIDES WITH A MAXIMUM DIAMETER OF 20" TO PROVIDE FOR A MINIMUM SUMP DEPTH OF 18".
4. THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION SHALL NOT EXCEEDED 1/2" PER FOOT.
5. CATCH BASIN SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C 478 (AASHTO M 199) AND ASTM C 890 UNLESS OTHERWISE NOTED.
6. CATCH BASIN MARKER WILL BE AFFIXED WITH MANUFACTURER'S EPOXY IN DRY WEATHER, 40 DEGREES OR WARMER. IF CURB EXISTS MARKER IS PLACED ON TOP OF CURB, IF A RAISED EDGE PLACE MARKER ON THE WEDGE. IF NO CURB PLACE ON PAVEMENT ON SIDE LEAST EXPOSED TO TRAFFIC



PLAN VIEW

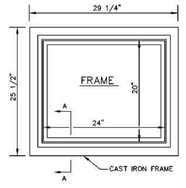


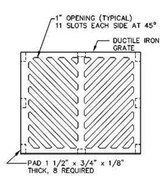
SECTION VIEW

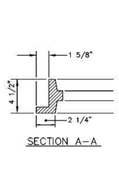


CITY OF PUYALLUP DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS	CATCH BASIN TYPE 1 (AREA DRAIN)				
DRAWN BY: LINDA LANSING	CHECKED BY: LINDA LIAN	APPROVED BY: COLLEEN HARRIS	REVISED BY: XXXX	CITY STANDARD: 02.01.02
FILE NAME: F:\PWGCOMMON\STDS\CITY\20090[2_SD02.01.02	DATE APPROVED: 09/01/1992	DATE REVISED: 06/01/2005	SCALE: NTS	

GRATE



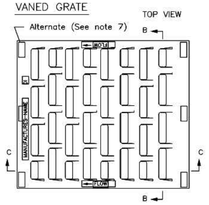


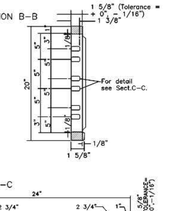


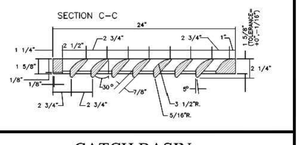
SECTION A-A

NOTES:
1. MATERIAL SHALL CONFORM TO SECTION 9-05.15 "METAL CASTINGS" OF THE "STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION" PUBLISHED BY THE STATE DEPARTMENT OF TRANSPORTATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER.
2. THE NAME OF THE MANUFACTURE AND DIRECTION OF FLOW SHALL BE EMBOSSED ON THE TOP SURFACE OF EACH GRATE. LETTERING TO BE RECESSED 1/16".
3. THE MATERIAL USED FOR THE GRATE SHALL BE DESIGNATED BY EMBASSING EITHER DI (FOR DUCTILE IRON) OR CS (FOR CAST STEEL) NEAR THE NAME OF THE MANUFACTURER.
4. DIMENSIONS SHALL HAVE A +/- 1/16" TOLERANCE, EXCEPT AS NOTED.
5. EDGES SHALL HAVE 1/8" RADIUS.
6. WELDING IS NOT PERMITTED.
7. AS AN ALTERNATE, 8 PADS 1 1/2" X 3/4" X 1/8", INTEGRALLY CAST WITH THE GRATE, MAY BE USED.

VANED GRATE







CITY OF PUYALLUP DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS	CATCH BASIN FRAME AND GRATE/VANED GRATE				
DRAWN BY: LINDA LANSING	CHECKED BY: LINDA LIAN	APPROVED BY: COLLEEN HARRIS	REVISED BY: LINDA LIAN	CITY STANDARD: 02.01.05
FILE NAME: F:\PWGCOMMON\STDS\CITY\20090[2_SD02.01.05	DATE APPROVED: 07/01/2009	DATE REVISED: 09/21/11	SCALE: NTS	

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

NOTE: THIS APPROVAL IS VOID AFTER 1 YEAR FROM APPROVAL DATE.
THE CITY WILL NOT BE RESPONSIBLE FOR ERRORS AND/OR OMISSIONS ON THESE PLANS. FIELD CHANGES MAY DICTATE CHANGES TO THESE PLANS AS DETERMINED BY THE ENGINEERING SERVICES MANAGER.

No.	Date	By	Ckd.	Appr.	Revision

Title: CONSTRUCTION NOTES AND DETAILS

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUSBAND — STATE OF WASHINGTON — 38950 — REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal NA Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/09/20

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Job Number 20630

Sheet C9 of 10

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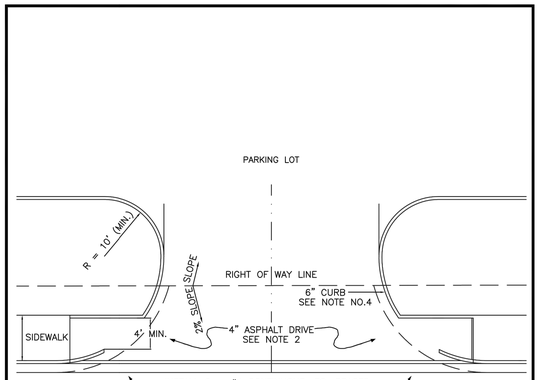
CONSTRUCTION NOTES AND DETAILS



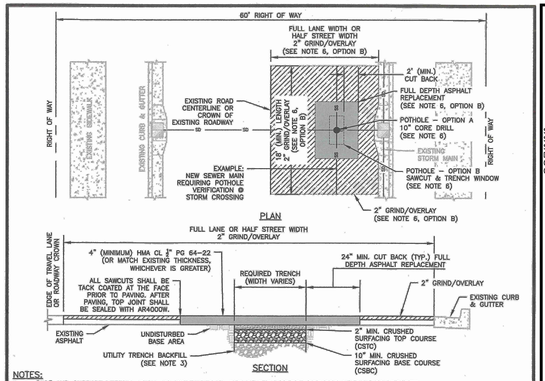
NOTES:

1. TYPICAL COMMERCIAL APPROACHES SHALL BE 30' WIDE AND INCLUDE 35' CURB RADII. IF TRUCKS ARE EXPECTED TO USE THE APPROACH, DRIVEWAY WIDTH, CHANNELIZATION, AND CURB RADII SHALL BE BASED ON AN APPROVED TURNING MOVEMENT ANALYSIS
2. ALL ASPHALT PAVEMENT MUST CONFORM TO CITY STANDARD NO. 01.01.01.
3. APPROACH SHALL BE ASPHALT WITH STANDARD CURB AND GUTTER PLACED ON EACH SIDE OF THE APPROACH.
4. WHEEL CHAIR RAMPS SHALL BE INSTALLED IN ACCORDANCE TO ALL APPLICABLE STANDARDS. DETECTABLE WARNING PATTERNS SHALLBE CONSTRUCTED AT A DRIVEWAY ONLY WHEN IT WILL BE SIGNALIZED. CURB RAMP SLOPE SHALL NOT EXCEED 8.3%, AS MEASURE BY A SMART LEVEL, UNLESS RAMP LENGTH IS EXTENDED TO 15'. SEE DETAIL 01.02.19 FOR ADDITIONAL ADA RAMP INFORMATION.
5. SPACING OF COMMERCIAL APPROACHES ON PRINCIPAL AND MINOR ARTERIALS SHALL BE MINIMUM 300' AND SPACING ON COLLECTORS SHALL BE MINIMUM 150', MEASURED BETWEEN THE CLOSEST EDGES OF EACH DRIVEWAY. THIS REQUIREMENT IS ALSO APPLICABLE TO THE DRIVEWAYS THAT ARE ACROSS THE STREET.
6. SPACING OF COMMERCIAL APPROACHES FROM PRINCIPAL AND MINOR ARTERIALS SHALL BE MINIMUM 300' AND SPACING FROM A COLLECTOR SHALL BE MINIMUM 150', MEASURED FROM NEAREST ROW LINE TO APPROACH PAVEMENT EDGE. THE CITY MAY BE MORE RESTRICTIVE THAN SPECIFIED HEREIN IF DEEMED NECESSARY BASED ON TRAFFIC VOLUMES, CHANNELIZATION AND SIGNALIZATION.
7. THIS COMMERCIAL APPROACH STANDARD SHALL BE USED ON ARTERIALS AND COLLECTORS WITH SPEED LIMITS OF 35 MPH OR GREATER, AND/OR WHEN TRUCK TRAFFIC WILL BE USING THE APPROACH.

CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

STANDARD COMMERCIAL APPROACH

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
JIM ERWIN-SVOBODA	LINDA LIAN	COLLEEN HARRIS	LINDA LIAN	01.02.16
FILE NAME: P:\DWG\COMMON\STDS\CITY\2009\01_ST\R01.02\01.02.16	DATE APPROVED: 07/01/2009	DATE REVISED: 02/19/14	SCALE: 1"=30'	



NOTES:

1. BASE AND SUBBASE MATERIAL SHALL BE COMPACTED TO 95% OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY.
2. ALL DEPTHS INDICATED ARE A MINIMUM COMPACTED DEPTH.
3. INITIAL BACKFILLING SHALL BE PERFORMED ONLY AFTER INSPECTION AND APPROVAL OF THE INSTALLED PIPE OR STRUCTURE. THE TRENCH BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH CITY STANDARD DETAIL NO. 06.01.01.
4. ALL BACKFILL FOR PIPE TRENCHES SHALL BE MECHANICALLY COMPACTED BY A POWER-OPERATED MECHANICAL TAMPER(S) AS SPECIFIED IN WSDOT STANDARD SPEC. 2-03.3 (14)C, COMPACTING EARTH EMBANKMENTS, METHOD C OF THE WSDOT STANDARD SPECIFICATIONS.
5. IF PAVING SURFACES ADJACENT TO THE TRENCH OPENING MAY BE DAMAGED WHERE TRENCHES ARE MADE PARALLEL TO THE STREET, OR WHERE A NUMBER OF CROSS TRENCHES ARE LAID IN CLOSE PROXIMITY TO ONE ANOTHER OR WHERE THE EQUIPMENT USED MAY CAUSE SUCH DAMAGE, THE CITY ENGINEER MAY REQUIRE A RESOTHED CONTRIBUTION FROM THE PERMITTEE FOR RESURFACING IN LIEU OF PATCHING.

   IF THE TOTAL AREA OF THE PROPOSED PATCH OR PROBABLE DAMAGED AREA EXCEEDS 25 PERCENT OF THE TOTAL PAVEMENT SURFACING BETWEEN CURB FACES OR BETWEEN CONCRETE GUTTER EDGES IN ANY BLOCK, SUCH NEGOTIATIONS SHALL BE CARRIED ON AND CONTRIBUTIONS AGREED UPON PRIOR TO ISSUANCE OF A PERMIT. SUCH CONTRIBUTIONS SHALL BE IN ADDITION TO THE STANDARD PERMIT FEE.
6. POTHOLING FOR UTILITIES:

   OPTION A – UP TO A 10" DIAMETER CORE DRILL IS ALLOWED. CORE HOLES MADE DURING UTILITY POTHOLES SHALL BE BACKFILLED WITH CDF TO WITHIN 6" OF FINISHED GRADE. 4" OF HMA SHALL THEN BE PLACED AND COMPACTED, FLUSH WITH EXISTING GRADE.

   OPTION B – FOR POTHOLE WINDOWS LARGER THAN 10" IN DIAMETER OR TRENCHING COMPLETED IN EXISTING ROADWAY, THE CONTRACTOR SHALL MEET CITY STANDARD D5.01.01 FOR PIPE BEDDING AND BACKFILL REQUIREMENTS. PAVEMENT RESTORATION SHALL BE ACCOMPLISHED BY INSTALLING THE TRENCH PATCH, AS SHOWN HEREIN, AND THEN GRINDING/OVERLAYING TO A MINIMUM DEPTH OF 2". THE LIMITS OF THE REQUIRED GRIND/OVERLAY SHALL BE TO THE NEAREST LANE LINE, OR HALF STREET, AND SHALL BE A MINIMUM OF 18 FEET LONG (LONGITUDINALLY ALONG ROADWAY) CENTERED AT LOCATION OF PATCH. NOTE: IF EXISTING ASPHALT THICKNESS IS LESS THAN 3", FULL DEPTH PAVEMENT REPLACEMENT, IN LIEU OF GRIND/OVERLAY, TO MEET A MINIMUM ASPHALT THICKNESS OF 4" WILL BE REQUIRED.

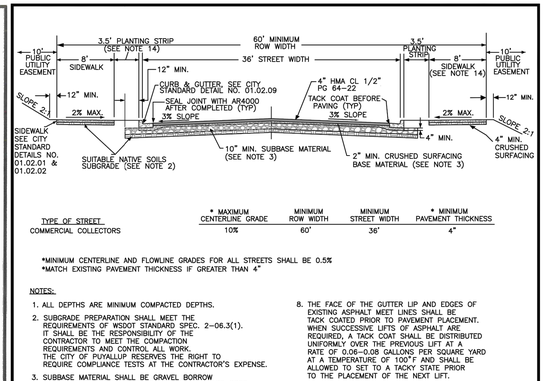
   WHERE LOCATION OF TRENCH OR POTHOLE WINDOW INTERSECTS ROAD CENTERLINE, A MINIMUM GRIND AND OVERLAY OF ONE FULL LANE WIDTH (12') IS REQUIRED CENTERED ON ROADWAY. NO LONGITUDINAL JOINTS WILL BE ALLOWED IN THE WHEEL PATH.
7. ALL MANHOLE FRAMES, VALVE FRAMES AND MONUMENT COVERS SHALL BE INSTALLED AFTER PLACEMENT OF ASPHALT. IF MORE THAN ONE LIFT IS NECESSARY, FRAMES AND LIDS WILL BE ADJUSTED TO FINISH GRADE AT FIRST LIFT AS DIRECTED BY THE CITY.

CITY OF PUYALLUP
OFFICE of THE CITY ENGINEER

APPROVED FOR PUBLICATION
DATE/TIME: 3/15/18

STREET PATCH

CITY STANDARD 01.01.20
(NOT TO SCALE)
FILE NAME: P:\DWG\COMMON\STDS\CITY\2009\01_ST\R01.01\01.01.20.dwg



TYPE OF STREET	* MAXIMUM CENTERLINE GRADE	MINIMUM ROW WIDTH	MINIMUM STREET WIDTH	* MINIMUM PAVEMENT THICKNESS
COMMERCIAL COLLECTORS	10%	60'	36'	4"

*MINIMUM CENTERLINE AND FLOWLINE GRADES FOR ALL STREETS SHALL BE 0.5%
*MATCH EXISTING PAVEMENT THICKNESS IF GREATER THAN 4"

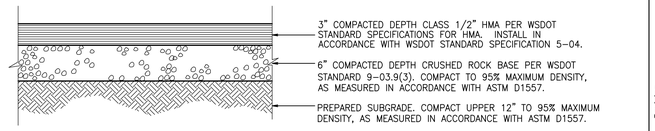
NOTES:

1. ALL DEPTHS ARE MINIMUM COMPACTED DEPTHS.
2. SUBGRADE PREPARATION SHALL MEET THE REQUIREMENTS OF WSDOT STANDARD SPEC. 2-06.3(1). IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MEET THE COMPACTION REQUIREMENTS AND CONTROL ALL WORK. THE CITY OF PUYALLUP RESERVES THE RIGHT TO REQUIRE COMPLIANCE TESTS AT THE CONTRACTOR'S EXPENSE.
3. SUBBASE MATERIAL SHALL BE GRAVEL BORROW MEETING THE REQUIREMENTS OF WSDOT STANDARD SPEC. 9-03.14(1) OR CRUSHED BALLAST MEETING THE REQUIREMENTS OF WSDOT STANDARD SPEC. 9-03.9(1). CRUSHED SURFACING SHALL MEET THE GRADATION REQUIREMENTS OF WSDOT STANDARD SPEC. 9-03.9(3). THE SUBBASE AND BASE MATERIAL SHALL BE INSTALLED IN ACCORDANCE WITH WSDOT STANDARD SPEC. 4-04.
4. SOIL STABILIZATION FABRIC MAY BE REQUIRED BY THE DEVELOPMENT REVIEW ENGINEER TO BE INSTALLED PRIOR TO THE INSTALLATION OF THE BASE MATERIAL. WHEN REQUIRED, THE CONTRACTOR SHALL PLACE A GEOTEXTILE FABRIC OVER THE PREPARED SUBGRADE WITH A 2 FOOT MINIMUM OVERLAP. THE FABRIC SHALL BE INSTALLED PER MANUFACTURER SPECIFICATIONS.
5. ASPHALT CONCRETE PAVEMENT SHALL BE INSTALLED IN ACCORDANCE WITH WSDOT STANDARD SPEC. 5-04. DESIGN ENGINEER SHALL SUBMIT A STATE APPROVED HMA MIX FOR APPROVAL.
6. TEMPERATURE SHALL NOT EXCEED 325°F AT DISCHARGE OF THE PLANT NOR BE LESS THAN 185°F LEAVING THE SPREADER BOX.
7. THE MAXIMUM COMPACTED THICKNESS OF ANY SINGLE LIFT SHALL MEET WSDOT STANDARD SPEC. 5-04.3(9) TO A MINIMUM AVERAGE COMPACTED DRY DENSITY OF 91 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY WSDOT TEST METHOD SPECIFIED IN STANDARD SPEC. 5-04.3(10)B. PERIODIC COMPLIANCE TESTS SHALL BE MADE BY A CERTIFIED TESTING AGENCY AT THE EXPENSE OF THE CONTRACTOR.
8. THE FACE OF THE GUTTER LIP AND EDGES OF EXISTING ASPHALT MEET LINES SHALL BE TACK COATED PRIOR TO PAVEMENT PLACEMENT. WHEN SUCCESSIVE LIFTS OF ASPHALT ARE REQUIRED, A TACK COAT SHALL BE DISTRIBUTED UNIFORMLY OVER THE PREVIOUS LIFT AT A RATE OF 0.06-0.08 GALLONS PER SQUARE YARD AT A TEMPERATURE OF 100°F AND SHALL BE ALLOWED TO SET TO A TACKY STATE PRIOR TO THE PLACEMENT OF THE NEXT LIFT.
9. ALL MEET LINES BETWEEN LIFTS OF ASPHALT SHALL BE UNIFORM AND VERTICAL. THE MEET LINES SHALL BE CLEANED AND TACK COATED.
10. ANY CHANGES TO THE STANDARD PAVEMENT SECTION SHALL REQUIRE APPROVAL BY THE DEVELOPMENT REVIEW ENGINEER. A STRUCTURAL PAVEMENT CROSS SECTION DESIGN WITH CALCULATIONS SHALL BE REQUIRED.
11. ALL MANHOLE FRAMES, VALVE FRAMES AND MONUMENT COVERS SHALL BE INSTALLED AFTER PLACEMENT OF ASPHALT. IF MORE THAN ONE LIFT IS NECESSARY, FRAMES AND LIDS WILL BE ADJUSTED TO FINISH GRADE AT FIRST LIFT AS DIRECTED BY THE CITY.
12. ADDITIONAL BIKE LANES AND/OR ON-STREET PARKING MAY BE REQUIRED PER TRAFFIC ENGINEER.
13. A UTILITY EASEMENT OF 10' SHALL BE PROVIDED ON BOTH SIDES OF THE ROADWAY.
14. WHEN PLANTING STRIP IS 5' IN WIDTH OR LESS, STREET TREE PLANTER BOXES SHALL BE INSERTED AT LOCATIONS AS REQUIRED BY THE CITY (REFER TO CITY STANDARD DETAIL NO. 01.02.04).
15. PLANTING STRIP SHALL BE PLANTED AS DIRECTED BY CITY PLANNING DEPARTMENT.

CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

36' PUBLIC ROADWAY COMMERCIAL COLLECTOR CROSS SECTION

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
JIM ERWIN-SVOBODA	LINDA LIAN	COLLEEN HARRIS	XXXX	01.01.04
FILE NAME: P:\DWG\COMMON\STDS\CITY\2009\01_ST\R01.01\01.01.04	DATE APPROVED: 07/01/2009	DATE REVISED: XX/XX/XX	SCALE: 1:10	

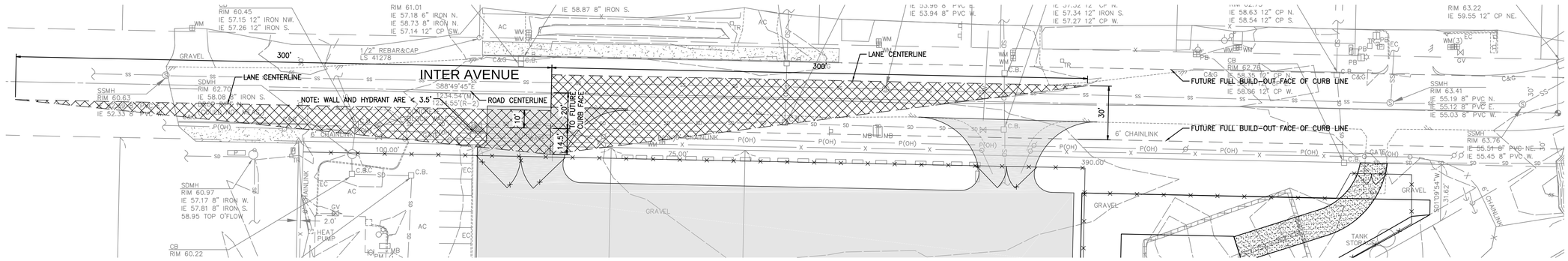


PAVEMENT DESIGN AND INSPECTION NOTE:
ONSITE PAVEMENT DESIGN SECTION IS PER GEOTECHNICAL REPORT PREPARED BY EARTH SOLUTIONS NORTHWEST, LLC UNDER PROJECT NO. ES-6481.01. GEOTECHNICAL ENGINEER SHALL INSPECT AND APPROVE SUBGRADE PRIOR TO PLACEMENT OF CRUSHED ROCK BASE AND PRIOR TO PLACEMENT OF HMA.

ASPHALT PAVEMENT SECTION

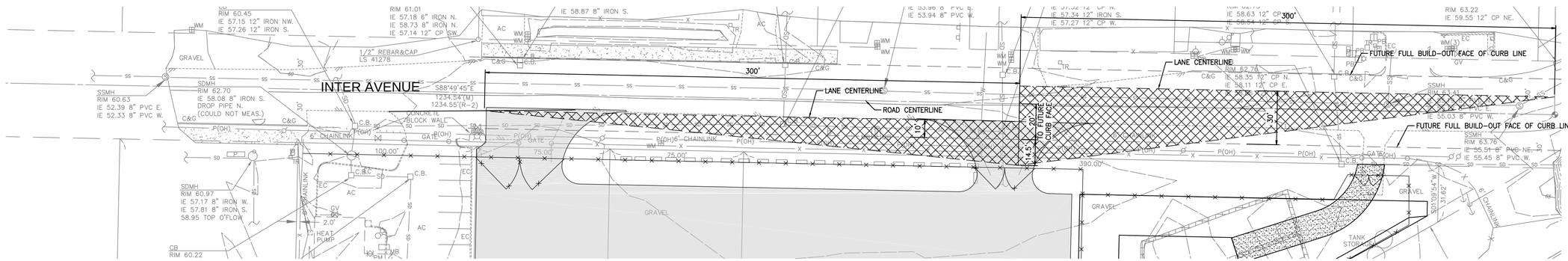
NOT TO SCALE

811 Know what's **below.** **Call** before you dig.



WEST DRIVEWAY SIGHT DISTANCE

1"=30'



EAST DRIVEWAY SIGHT DISTANCE

1"=30'

DRIVEWAY SIGHT DISTANCE
SPEED LIMIT = 25 MPH
ENTERING SITE DISTANCE = 300'
(PER CITY OF PUYALLUP ROADS STANDARDS, TABLE 100-2)

N

0 15' 30' 60'
SCALE: 1"=30'

APPROVED

BY: _____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE: _____

NOTE: THIS APPROVAL IS VOID AFTER 1 YEAR FROM APPROVAL DATE.
THE CITY WILL NOT BE RESPONSIBLE FOR ERRORS AND/OR OMISSIONS ON THESE PLANS. FIELD CHANGES MAY DICTATE CHANGES TO THESE PLANS AS DETERMINED BY THE ENGINEERING SERVICES MANAGER.

No.	Date	By	Ckd.	Appr.	Revision

Title: CONSTRUCTION NOTES AND DETAILS

PUYALLUP, WASHINGTON

BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

For:

JASON GUY HUSER — STATE OF WASHINGTON — 38950 — REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal NA Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Job Number 20630 Sheet C10 of 10

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Appendix B
BMP Details

BMP C101: Preserving Natural Vegetation

Purpose

The purpose of preserving natural vegetation is to reduce erosion wherever practicable. Limiting site disturbance is the single most effective method for reducing erosion. For example, conifers can hold up to about 50 percent of all rain that falls during a storm. Up to 20-30 percent of this rain may never reach the ground but is taken up by the tree or evaporates. Another benefit is that the rain held in the tree can be released slowly to the ground after the storm.

Conditions of Use

Natural vegetation should be preserved on steep slopes, near perennial and intermittent watercourses or swales, and on building sites in wooded areas.

- As required by local governments.
- Phase construction to preserve natural vegetation on the project site for as long as possible during the construction period.

Design and Installation Specifications

Natural vegetation can be preserved in natural clumps or as individual trees, shrubs and vines.

The preservation of individual plants is more difficult because heavy equipment is generally used to remove unwanted vegetation. The points to remember when attempting to save individual plants are:

- Is the plant worth saving? Consider the location, species, size, age, vigor, and the work involved. Local governments may also have ordinances to save natural vegetation and trees.
- Fence or clearly mark areas around trees that are to be saved. It is preferable to keep ground disturbance away from the trees at least as far out as the dripline.

  Plants need protection from three kinds of injuries:

- *Construction Equipment* - This injury can be above or below the ground level. Damage results from scarring, cutting of roots, and compaction of the soil. Placing a fenced buffer zone around plants to be saved prior to construction can prevent construction equipment injuries.
- *Grade Changes* - Changing the natural ground level will alter grades, which affects the plant's ability to obtain the necessary air, water, and minerals. Minor fills usually do not cause problems although sensitivity between species does vary and should be checked. Trees can typically tolerate fill of 6 inches or less. For shrubs and other plants, the fill should be less.

  When there are major changes in grade, it may become necessary to supply air to the roots of plants. This can be done by placing a layer of gravel and a tile system over the roots before the fill is made. A tile system protects a tree from a raised grade. The tile system should be

laid out on the original grade leading from a dry well around the tree trunk. The system should then be covered with small stones to allow air to circulate over the root area.

Lowering the natural ground level can seriously damage trees and shrubs. The highest percentage of the plant roots are in the upper 12 inches of the soil and cuts of only 2-3 inches can cause serious injury. To protect the roots it may be necessary to terrace the immediate area around the plants to be saved. If roots are exposed, construction of retaining walls may be needed to keep the soil in place. Plants can also be preserved by leaving them on an undisturbed, gently sloping mound. To increase the chances for survival, it is best to limit grade changes and other soil disturbances to areas outside the dripline of the plant.

- *Excavations* - Protect trees and other plants when excavating for drainfields, power, water, and sewer lines. Where possible, the trenches should be routed around trees and large shrubs. When this is not possible, it is best to tunnel under them. This can be done with hand tools or with power augers. If it is not possible to route the trench around plants to be saved, then the following should be observed:

  Cut as few roots as possible. When you have to cut, cut clean. Paint cut root ends with a wood dressing like asphalt base paint if roots will be exposed for more than 24-hours.

  Backfill the trench as soon as possible.

  Tunnel beneath root systems as close to the center of the main trunk to preserve most of the important feeder roots.

Some problems that can be encountered with a few specific trees are:

- Maple, Dogwood, Red alder, Western hemlock, Western red cedar, and Douglas fir do not readily adjust to changes in environment and special care should be taken to protect these trees.
- The windthrow hazard of Pacific silver fir and madrona is high, while that of Western hemlock is moderate. The danger of windthrow increases where dense stands have been thinned. Other species (unless they are on shallow, wet soils less than 20 inches deep) have a low windthrow hazard.
- Cottonwoods, maples, and willows have water-seeking roots. These can cause trouble in sewer lines and infiltration fields. On the other hand, they thrive in high moisture conditions that other trees would not.
- Thinning operations in pure or mixed stands of Grand fir, Pacific silver fir, Noble fir, Sitka spruce, Western red cedar, Western hemlock, Pacific dogwood, and Red alder can cause serious disease problems. Disease can become established through damaged limbs, trunks, roots,

and freshly cut stumps. Diseased and weakened trees are also susceptible to insect attack.

Maintenance Standards

Inspect flagged and/or fenced areas regularly to make sure flagging or fencing has not been removed or damaged. If the flagging or fencing has been damaged or visibility reduced, it shall be repaired or replaced immediately and visibility restored.

- If tree roots have been exposed or injured, "prune" cleanly with an appropriate pruning saw or lopers directly above the damaged roots and recover with native soils. Treatment of sap flowing trees (fir, hemlock, pine, soft maples) is not advised as sap forms a natural healing barrier.

BMP C102: Buffer Zones

Purpose

Creation of an undisturbed area or strip of natural vegetation or an established suitable planting that will provide a living filter to reduce soil erosion and runoff velocities.

Conditions of Use

Natural buffer zones are used along streams, wetlands and other bodies of water that need protection from erosion and sedimentation. Vegetative buffer zones can be used to protect natural swales and can be incorporated into the natural landscaping of an area.

Critical-areas buffer zones should not be used as sediment treatment areas. These areas shall remain completely undisturbed. The local permitting authority may expand the buffer widths temporarily to allow the use of the expanded area for removal of sediment.

Design and Installation Specifications

- Preserving natural vegetation or plantings in clumps, blocks, or strips is generally the easiest and most successful method.
- Leave all unstable steep slopes in natural vegetation.
- Mark clearing limits and keep all equipment and construction debris out of the natural areas and buffer zones. Steel construction fencing is the most effective method in protecting sensitive areas and buffers. Alternatively, wire-backed silt fence on steel posts is marginally effective. Flagging alone is typically not effective.
- Keep all excavations outside the dripline of trees and shrubs.
- Do not push debris or extra soil into the buffer zone area because it will cause damage from burying and smothering.
- Vegetative buffer zones for streams, lakes or other waterways shall be established by the local permitting authority or other state or federal permits or approvals.

Maintenance Standards

Inspect the area frequently to make sure flagging remains in place and the area remains undisturbed. Replace all damaged flagging immediately.

BMP C103: High Visibility Fence

Purpose

Fencing is intended to:

1. Restrict clearing to approved limits.
2. Prevent disturbance of sensitive areas, their buffers, and other areas required to be left undisturbed.
3. Limit construction traffic to designated construction entrances, exits, or internal roads.
4. Protect areas where marking with survey tape may not provide adequate protection.

Conditions of Use

To establish clearing limits plastic, fabric, or metal fence may be used:

- At the boundary of sensitive areas, their buffers, and other areas required to be left uncleared.
- As necessary to control vehicle access to and on the site.

Design and Installation Specifications

High visibility plastic fence shall be composed of a high-density polyethylene material and shall be at least four feet in height. Posts for the fencing shall be steel or wood and placed every 6 feet on center (maximum) or as needed to ensure rigidity. The fencing shall be fastened to the post every six inches with a polyethylene tie. On long continuous lengths of fencing, a tension wire or rope shall be used as a top stringer to prevent sagging between posts. The fence color shall be high visibility orange. The fence tensile strength shall be 360 lbs./ft. using the ASTM D4595 testing method.

If appropriate install fabric silt fence in accordance with BMP C233 to act as high visibility fence. Silt fence shall be at least 3 feet high and must be highly visible to meet the requirements of this BMP.

Metal fences shall be designed and installed according to the manufacturer's specifications.

Metal fences shall be at least 3 feet high and must be highly visible.

Fences shall not be wired or stapled to trees.

Maintenance Standards

If the fence has been damaged or visibility reduced, it shall be repaired or replaced immediately and visibility restored.

BMP C105: Stabilized Construction Entrance / Exit

Purpose

Stabilized Construction entrances are established to reduce the amount of sediment transported onto paved roads by vehicles or equipment. This is done by constructing a stabilized pad of quarry spalls at entrances and exits for construction sites.

Conditions of Use

Construction entrances shall be stabilized wherever traffic will be entering or leaving a construction site if paved roads or other paved areas are within 1,000 feet of the site.

For residential construction provide stabilized construction entrances for each residence, rather than only at the main subdivision entrance. Stabilized surfaces shall be of sufficient length/width to provide vehicle access/parking, based on lot size/configuration.

On large commercial, highway, and road projects, the designer should include enough extra materials in the contract to allow for additional stabilized entrances not shown in the initial Construction SWPPP. It is difficult to determine exactly where access to these projects will take place; additional materials will enable the contractor to install them where needed.

Design and Installation Specifications

See Figure 4.1.1 for details. Note: the 100' minimum length of the entrance shall be reduced to the maximum practicable size when the size or configuration of the site does not allow the full length (100').

Construct stabilized construction entrances with a 12-inch thick pad of 4-inch to 8-inch quarry spalls, a 4-inch course of asphalt treated base (ATB), or use existing pavement. Do not use crushed concrete, cement, or calcium chloride for construction entrance stabilization because these products raise pH levels in stormwater and concrete discharge to surface waters of the State is prohibited.

A separation geotextile shall be placed under the spalls to prevent fine sediment from pumping up into the rock pad. The geotextile shall meet the following standards:

Grab Tensile Strength (ASTM D4751)	200 psi min.
Grab Tensile Elongation (ASTM D4632)	30% max.
Mullen Burst Strength (ASTM D3786-80a)	400 psi min.
AOS (ASTM D4751)	20-45 (U.S. standard sieve size)

- Consider early installation of the first lift of asphalt in areas that will paved; this can be used as a stabilized entrance. Also consider the installation of excess concrete as a stabilized entrance. During large concrete pours, excess concrete is often available for this purpose.

- Fencing (see BMP C103) shall be installed as necessary to restrict traffic to the construction entrance.
- Whenever possible, the entrance shall be constructed on a firm, compacted subgrade. This can substantially increase the effectiveness of the pad and reduce the need for maintenance.
- Construction entrances should avoid crossing existing sidewalks and back of walk drains if at all possible. If a construction entrance must cross a sidewalk or back of walk drain, the full length of the sidewalk and back of walk drain must be covered and protected from sediment leaving the site.

Maintenance Standards

Quarry spalls shall be added if the pad is no longer in accordance with the specifications.

- If the entrance is not preventing sediment from being tracked onto pavement, then alternative measures to keep the streets free of sediment shall be used. This may include replacement/cleaning of the existing quarry spalls, street sweeping, an increase in the dimensions of the entrance, or the installation of a wheel wash.
- Any sediment that is tracked onto pavement shall be removed by shoveling or street sweeping. The sediment collected by sweeping shall be removed or stabilized on site. The pavement shall not be cleaned by washing down the street, except when high efficiency sweeping is ineffective and there is a threat to public safety. If it is necessary to wash the streets, the construction of a small sump to contain the wash water shall be considered. The sediment would then be washed into the sump where it can be controlled.
- Perform street sweeping by hand or with a high efficiency sweeper. Do not use a non-high efficiency mechanical sweeper because this creates dust and throws soils into storm systems or conveyance ditches.
- Any quarry spalls that are loosened from the pad, which end up on the roadway shall be removed immediately.
- If vehicles are entering or exiting the site at points other than the construction entrance(s), fencing (see BMP C103) shall be installed to control traffic.
- Upon project completion and site stabilization, all construction accesses intended as permanent access for maintenance shall be permanently stabilized.

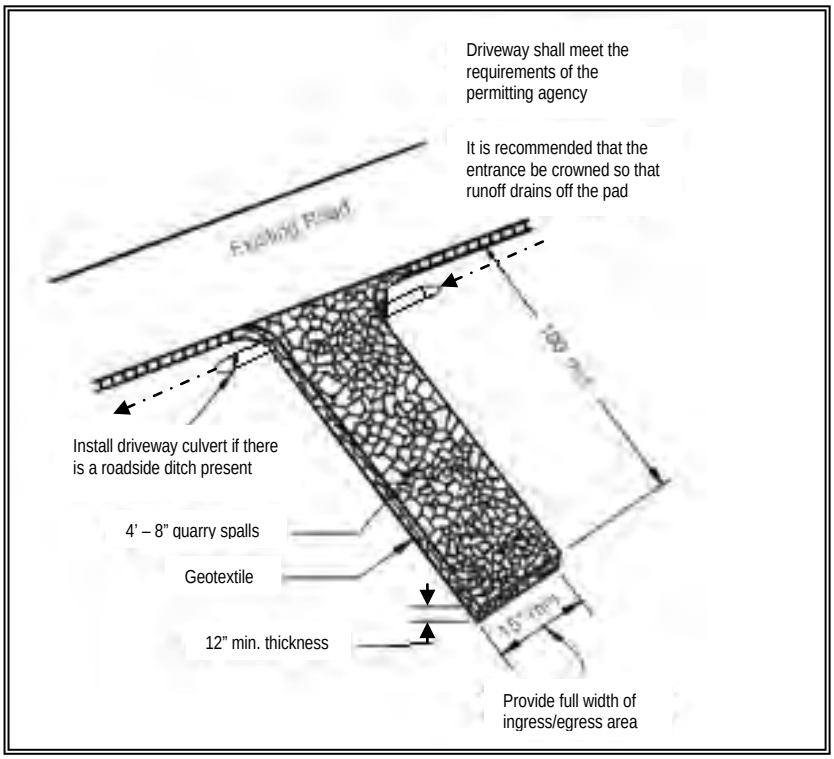


Figure 4.1.1 – Stabilized Construction Entrance

Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C105. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html

BMP C106: Wheel Wash

Purpose

Wheel washes reduce the amount of sediment transported onto paved roads by motor vehicles.

Conditions of Use

When a stabilized construction entrance (see BMP C105) is not preventing sediment from being tracked onto pavement.

- Wheel washing is generally an effective BMP when installed with careful attention to topography. For example, a wheel wash can be detrimental if installed at the top of a slope abutting a right-of-way where the water from the dripping truck can run unimpeded into the street.

stable driving surface and to stabilize any areas that have eroded.

Following construction, these areas shall be restored to pre-construction condition or better to prevent future erosion.

Perform street cleaning at the end of each day or more often if necessary.

BMP C120: Temporary and Permanent Seeding

Purpose

Seeding reduces erosion by stabilizing exposed soils. A well-established vegetative cover is one of the most effective methods of reducing erosion.

Conditions of Use

Use seeding throughout the project on disturbed areas that have reached final grade or that will remain unworked for more than 30 days.

The optimum seeding windows for western Washington are April 1 through June 30 and September 1 through October 1.

Between July 1 and August 30 seeding requires irrigation until 75 percent grass cover is established.

Between October 1 and March 30 seeding requires a cover of mulch with straw or an erosion control blanket until 75 percent grass cover is established.

Review all disturbed areas in late August to early September and complete all seeding by the end of September. Otherwise, vegetation will not establish itself enough to provide more than average protection.

- Mulch is required at all times for seeding because it protects seeds from heat, moisture loss, and transport due to runoff. Mulch can be applied on top of the seed or simultaneously by hydroseeding. See BMP C121: Mulching for specifications.
- Seed and mulch, all disturbed areas not otherwise vegetated at final site stabilization. Final stabilization means the completion of all soil disturbing activities at the site and the establishment of a permanent vegetative cover, or equivalent permanent stabilization measures (such as pavement, riprap, gabions or geotextiles) which will prevent erosion.

Design and Installation Specifications

Seed retention/detention ponds as required.

Install channels intended for vegetation before starting major earthwork and hydroseed with a Bonded Fiber Matrix. For vegetated channels that will have high flows, install erosion control blankets over hydroseed. Before allowing water to flow in vegetated channels, establish 75 percent vegetation cover. If vegetated channels cannot be established by seed before water flow; install sod in the channel bottom—over hydromulch and erosion control blankets.

- Confirm the installation of all required surface water control measures to prevent seed from washing away.
- Hydroseed applications shall include a minimum of 1,500 pounds per acre of mulch with 3 percent tackifier. See BMP C121: Mulching for specifications.
- Areas that will have seeding only and not landscaping may need compost or meal-based mulch included in the hydroseed in order to establish vegetation. Re-install native topsoil on the disturbed soil surface before application.
- When installing seed via hydroseeding operations, only about 1/3 of the seed actually ends up in contact with the soil surface. This reduces the ability to establish a good stand of grass quickly. To overcome this, consider increasing seed quantities by up to 50 percent.
- Enhance vegetation establishment by dividing the hydromulch operation into two phases:

  1. Phase 1- Install all seed and fertilizer with 25-30 percent mulch and tackifier onto soil in the first lift.
  2. Phase 2- Install the rest of the mulch and tackifier over the first lift.

  Or, enhance vegetation by:

  1. Installing the mulch, seed, fertilizer, and tackifier in one lift.
  2. Spread or blow straw over the top of the hydromulch at a rate of 800-1000 pounds per acre.
  3. Hold straw in place with a standard tackifier.

  Both of these approaches will increase cost moderately but will greatly improve and enhance vegetative establishment. The increased cost may be offset by the reduced need for:

  - Irrigation.
  - Reapplication of mulch.
  - Repair of failed slope surfaces.

  This technique works with standard hydromulch (1,500 pounds per acre minimum) and BFM/MBFMs (3,000 pounds per acre minimum).
- Seed may be installed by hand if:
  - Temporary and covered by straw, mulch, or topsoil.
  - Permanent in small areas (usually less than 1 acre) and covered with mulch, topsoil, or erosion blankets.
- The seed mixes listed in the tables below include recommended mixes for both temporary and permanent seeding.

- Apply these mixes, with the exception of the wetland mix, at a rate of 120 pounds per acre. This rate can be reduced if soil amendments or slow-release fertilizers are used.
- Consult the local suppliers or the local conservation district for their recommendations because the appropriate mix depends on a variety of factors, including location, exposure, soil type, slope, and expected foot traffic. Alternative seed mixes approved by the local authority may be used.
- Other mixes may be appropriate, depending on the soil type and hydrology of the area.

- Table 4.1.2 lists the standard mix for areas requiring a temporary vegetative cover.

Table 4.1.2
Temporary Erosion Control Seed Mix

	% Weight	% Purity	% Germination
Chewings or annual blue grass *Festuca rubra var. commutata* or *Poa anna*	40	98	90
Perennial rye - *Lolium perenne*	50	98	90
Redtop or colonial bentgrass *Agrostis alba* or *Agrostis tenuis*	5	92	85
White dutch clover *Trifolium repens*	5	98	90

- Table 4.1.3 lists a recommended mix for landscaping seed.

Table 4.1.3
Landscaping Seed Mix

	% Weight	% Purity	% Germination
Perennial rye blend *Lolium perenne*	70	98	90
Chewings and red fescue blend *Festuca rubra var. commutata* or *Festuca rubra*	30	98	90

- Table 4.1.4 lists a turf seed mix for dry situations where there is no need for watering. This mix requires very little maintenance.

Table 4.1.4
Low-Growing Turf Seed Mix

	% Weight	% Purity	% Germination
Dwarf tall fescue (several varieties) *Festuca arundinacea var.*	45	98	90
Dwarf perennial rye (Barclay) *Lolium perenne var. barclay*	30	98	90
Red fescue *Festuca rubra*	20	98	90
Colonial bentgrass *Agrostis tenuis*	5	98	90

- Table 4.1.5 lists a mix for bioswales and other intermittently wet areas.

Table 4.1.5
Bioswale Seed Mix*

	% Weight	% Purity	% Germination
Tall or meadow fescue *Festuca arundinacea* or *Festuca elatior*	75-80	98	90
Seaside/Creeping bentgrass *Agrostis palustris*	10-15	92	85
Redtop bentgrass *Agrostis alba* or *Agrostis gigantea*	5-10	90	80

* *Modified Briargreen, Inc. Hydroseeding Guide Wetlands Seed Mix*

- Table 4.1.6 lists a low-growing, relatively non-invasive seed mix appropriate for very wet areas that are not regulated wetlands. Apply this mixture at a rate of 60 pounds per acre. Consult Hydraulic Permit Authority (HPA) for seed mixes if applicable.

Table 4.1.6
Wet Area Seed Mix*

	% Weight	% Purity	% Germination
Tall or meadow fescue *Festuca arundinacea* or *Festuca elatior*	60-70	98	90
Seaside/Creeping bentgrass *Agrostis palustris*	10-15	98	85
Meadow foxtail *Alepocurus pratensis*	10-15	90	80
Alsike clover *Trifolium hybridum*	1-6	98	90
Redtop bentgrass *Agrostis alba*	1-6	92	85

** Modified Briargreen, Inc. Hydroseeding Guide Wetlands Seed Mix*

- Table 4.1.7 lists a recommended meadow seed mix for infrequently maintained areas or non-maintained areas where colonization by native plants is desirable. Likely applications include rural road and utility right-of-way. Seeding should take place in September or very early October in order to obtain adequate establishment prior to the winter months. Consider the appropriateness of clover, a fairly invasive species, in the mix. Amending the soil can reduce the need for clover.

Table 4.1.7
Meadow Seed Mix

	% Weight	% Purity	% Germination
Redtop or Oregon bentgrass *Agrostis alba* or *Agrostis oregonensis*	20	92	85
Red fescue *Festuca rubra*	70	98	90
White dutch clover *Trifolium repens*	10	98	90

- **Roughening and Rototilling:**
  - The seedbed should be firm and rough. Roughen all soil no matter what the slope. Track walk slopes before seeding if engineering purposes require compaction. Backblading or smoothing of slopes greater than 4H:1V is not allowed if they are to be seeded.
  - Restoration-based landscape practices require deeper incorporation than that provided by a simple single-pass rototilling treatment. Wherever practical, initially rip the subgrade to improve long-term permeability, infiltration, and water inflow qualities. At a minimum, permanent areas shall use soil amendments to achieve organic matter and permeability performance defined in engineered soil/landscape systems. For systems that are deeper than 8 inches complete the rototilling process in multiple lifts, or prepare the engineered soil system per specifications and place to achieve the specified depth.
- **Fertilizers:**
  - Conducting soil tests to determine the exact type and quantity of fertilizer is recommended. This will prevent the over-application of fertilizer.
  - Organic matter is the most appropriate form of fertilizer because it provides nutrients (including nitrogen, phosphorus, and potassium) in the least water-soluble form.
  - In general, use 10-4-6 N-P-K (nitrogen-phosphorus-potassium) fertilizer at a rate of 90 pounds per acre. Always use slow-release fertilizers because they are more efficient and have fewer environmental impacts. Do not add fertilizer to the hydromulch machine, or agitate, more than 20 minutes before use. Too much agitation destroys the slow-release coating.
  - There are numerous products available that take the place of chemical fertilizers. These include several with seaweed extracts that are beneficial to soil microbes and organisms. If 100 percent cottonseed meal is used as the mulch in hydroseed, chemical fertilizer may not be necessary. Cottonseed meal provides a good source of long-term, slow-release, available nitrogen.
- **Bonded Fiber Matrix and Mechanically Bonded Fiber Matrix:**
  - On steep slopes use Bonded Fiber Matrix (BFM) or Mechanically Bonded Fiber Matrix (MBFM) products. Apply BFM/MBFM products at a minimum rate of 3,000 pounds per acre of mulch with approximately 10 percent tackifier. Achieve a minimum of 95 percent soil coverage during application. Numerous products are available commercially. Installed products per manufacturer's instructions. Most products require 24-36 hours to cure before rainfall and cannot be installed on wet or saturated soils.

Generally, products come in 40-50 pound bags and include all necessary ingredients except for seed and fertilizer.

- BFMs and MBFMs provide good alternatives to blankets in most areas requiring vegetation establishment. Advantages over blankets include:
  - BFM and MBFMs do not require surface preparation.
  - Helicopters can assist in installing BFM and MBFMs in remote areas.
  - On slopes steeper than 2.5H:1V, blanket installers may require ropes and harnesses for safety.
  - Installing BFM and MBFMs can save at least $1,000 per acre compared to blankets.

Maintenance Standards

Reseed any seeded areas that fail to establish at least 80 percent cover (100 percent cover for areas that receive sheet or concentrated flows). If reseeding is ineffective, use an alternate method such as sodding, mulching, or nets/blankets. If winter weather prevents adequate grass growth, this time limit may be relaxed at the discretion of the local authority when sensitive areas would otherwise be protected.

- Reseed and protect by mulch any areas that experience erosion after achieving adequate cover. Reseed and protect by mulch any eroded area.
- Supply seeded areas with adequate moisture, but do not water to the extent that it causes runoff.

Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C120. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html

BMP C121: Mulching

Purpose

Mulching soils provides immediate temporary protection from erosion. Mulch also enhances plant establishment by conserving moisture, holding fertilizer, seed, and topsoil in place, and moderating soil temperatures. There is an enormous variety of mulches that can be used. This section discusses only the most common types of mulch.

Conditions of Use

As a temporary cover measure, mulch should be used:

- For less than 30 days on disturbed areas that require cover.
- At all times for seeded areas, especially during the wet season and

BMP C140: Dust Control

Purpose

Dust control prevents wind transport of dust from disturbed soil surfaces onto roadways, drainage ways, and surface waters.

Conditions of Use

- In areas (including roadways) subject to surface and air movement of dust where on-site and off-site impacts to roadways, drainage ways, or surface waters are likely.

Design and Installation Specifications

- Vegetate or mulch areas that will not receive vehicle traffic. In areas where planting, mulching, or paving is impractical, apply gravel or landscaping rock.
- Limit dust generation by clearing only those areas where immediate activity will take place, leaving the remaining area(s) in the original condition. Maintain the original ground cover as long as practical.
- Construct natural or artificial windbreaks or windscreens. These may be designed as enclosures for small dust sources.
- Sprinkle the site with water until surface is wet. Repeat as needed. To prevent carryout of mud onto street, refer to Stabilized Construction Entrance (BMP C105).
- Irrigation water can be used for dust control. Irrigation systems should be installed as a first step on sites where dust control is a concern.
- Spray exposed soil areas with a dust palliative, following the manufacturer's instructions and cautions regarding handling and application. Used oil is prohibited from use as a dust suppressant. Local governments may approve other dust palliatives such as calcium chloride or PAM.
- PAM (BMP C126) added to water at a rate of 0.5 lbs. per 1,000 gallons of water per acre and applied from a water truck is more effective than water alone. This is due to increased infiltration of water into the soil and reduced evaporation. In addition, small soil particles are bonded together and are not as easily transported by wind. Adding PAM may actually reduce the quantity of water needed for dust control. Use of PAM could be a cost-effective dust control method.

Techniques that can be used for unpaved roads and lots include:

- Lower speed limits. High vehicle speed increases the amount of dust stirred up from unpaved roads and lots.
- Upgrade the road surface strength by improving particle size, shape, and mineral types that make up the surface and base materials.
- Add surface gravel to reduce the source of dust emission. Limit the amount of fine particles (those smaller than .075 mm) to 10 to 20 percent.

- Use geotextile fabrics to increase the strength of new roads or roads undergoing reconstruction.
- Encourage the use of alternate, paved routes, if available.
- Restrict use of paved roadways by tracked vehicles and heavy trucks to prevent damage to road surface and base.
- Apply chemical dust suppressants using the admix method, blending the product with the top few inches of surface material. Suppressants may also be applied as surface treatments.
- Pave unpaved permanent roads and other trafficked areas.
- Use vacuum street sweepers.
- Remove mud and other dirt promptly so it does not dry and then turn into dust.
- Limit dust-causing work on windy days.
- Contact your local Air Pollution Control Authority for guidance and training on other dust control measures. Compliance with the local Air Pollution Control Authority constitutes compliance with this BMP.

Maintenance Standards Respray area as necessary to keep dust to a minimum.

BMP C150: Materials on Hand

Purpose Keep quantities of erosion prevention and sediment control materials on the project site at all times to be used for regular maintenance and emergency situations such as unexpected heavy summer rains. Having these materials on-site reduces the time needed to implement BMPs when inspections indicate that existing BMPs are not meeting the Construction SWPPP requirements. In addition, contractors can save money by buying some materials in bulk and storing them at their office or yard.

Conditions of Use

- Construction projects of any size or type can benefit from having materials on hand. A small commercial development project could have a roll of plastic and some gravel available for immediate protection of bare soil and temporary berm construction. A large earthwork project, such as highway construction, might have several tons of straw, several rolls of plastic, flexible pipe, sandbags, geotextile fabric and steel "T" posts.
- Materials are stockpiled and readily available before any site clearing, grubbing, or earthwork begins. A large contractor or developer could keep a stockpile of materials that are available for use on several projects.
- If storage space at the project site is at a premium, the contractor could maintain the materials at their office or yard. The office or yard must be less than an hour from the project site.

Design and Installation Specifications

Depending on project type, size, complexity, and length, materials and quantities will vary. A good minimum list of items that will cover numerous situations includes:

Material
Clear Plastic, 6 mil
Drainpipe, 6 or 8 inch diameter
Sandbags, filled
Straw Bales for mulching,
Quarry Spalls
Washed Gravel
Geotextile Fabric
Catch Basin Inserts
Steel "T" Posts
Silt fence material
Straw Wattles

Maintenance Standards

- All materials with the exception of the quarry spalls, steel "T" posts, and gravel should be kept covered and out of both sun and rain.
- Re-stock materials used as needed.

BMP C151: Concrete Handling

Purpose

Concrete work can generate process water and slurry that contain fine particles and high pH, both of which can violate water quality standards in the receiving water. Concrete spillage or concrete discharge to surface waters of the State is prohibited. Use this BMP to minimize and eliminate concrete, concrete process water, and concrete slurry from entering waters of the state.

Conditions of Use

Any time concrete is used, utilize these management practices. Concrete construction projects include, but are not limited to, the following:

- Curbs
- Sidewalks
- Roads
- Bridges
- Foundations
- Floors
- Runways

Design and Installation

- Wash out concrete truck chutes, pumps, and internals into formed areas only. Assure that washout of concrete trucks is performed off-

Specifications

site or in designated concrete washout areas. Do not wash out concrete trucks onto the ground, or into storm drains, open ditches, streets, or streams. Refer to BMP C154 for information on concrete washout areas.

- Return unused concrete remaining in the truck and pump to the originating batch plant for recycling. Do not dump excess concrete on site, except in designated concrete washout areas.
- Wash off hand tools including, but not limited to, screeds, shovels, rakes, floats, and trowels into formed areas only.
- Wash equipment difficult to move, such as concrete pavers in areas that do not directly drain to natural or constructed stormwater conveyances.
- Do not allow washdown from areas, such as concrete aggregate driveways, to drain directly to natural or constructed stormwater conveyances.
- Contain washwater and leftover product in a lined container when no formed areas are available,. Dispose of contained concrete in a manner that does not violate ground water or surface water quality standards.
- Always use forms or solid barriers for concrete pours, such as pilings, within 15-feet of surface waters.
- Refer to BMPs C252 and C253 for pH adjustment requirements.
- Refer to the Construction Stormwater General Permit for pH monitoring requirements if the project involves one of the following activities:
  - Significant concrete work (greater than 1,000 cubic yards poured concrete or recycled concrete used over the life of a project).
  - The use of engineered soils amended with (but not limited to) Portland cement-treated base, cement kiln dust or fly ash.
  - Discharging stormwater to segments of water bodies on the 303(d) list (Category 5) for high pH.

Maintenance Standards

Check containers for holes in the liner daily during concrete pours and repair the same day.

BMP C152: Sawcutting and Surfacing Pollution Prevention

Purpose

Sawcutting and surfacing operations generate slurry and process water that contains fine particles and high pH (concrete cutting), both of which can violate the water quality standards in the receiving water. Concrete spillage or concrete discharge to surface waters of the State is prohibited. Use this BMP to minimize and eliminate process water and slurry created through sawcutting or surfacing from entering waters of the State.

Conditions of Use

Utilize these management practices anytime sawcutting or surfacing operations take place. Sawcutting and surfacing operations include, but are not limited to, the following:

- Sawing
- Coring
- Grinding
- Roughening
- Hydro-demolition
- Bridge and road surfacing

Design and Installation Specifications

- Vacuum slurry and cuttings during cutting and surfacing operations.
- Slurry and cuttings shall not remain on permanent concrete or asphalt pavement overnight.
- Slurry and cuttings shall not drain to any natural or constructed drainage conveyance including stormwater systems. This may require temporarily blocking catch basins.
- Dispose of collected slurry and cuttings in a manner that does not violate ground water or surface water quality standards.
- Do not allow process water generated during hydro-demolition, surface roughening or similar operations to drain to any natural or constructed drainage conveyance including stormwater systems. Dispose process water in a manner that does not violate ground water or surface water quality standards.
- Handle and dispose cleaning waste material and demolition debris in a manner that does not cause contamination of water. Dispose of sweeping material from a pick-up sweeper at an appropriate disposal site.

Maintenance Standards

Continually monitor operations to determine whether slurry, cuttings, or process water could enter waters of the state. If inspections show that a violation of water quality standards could occur, stop operations and immediately implement preventive measures such as berms, barriers, secondary containment, and vacuum trucks.

BMP C153: Material Delivery, Storage and Containment

Purpose

Prevent, reduce, or eliminate the discharge of pollutants to the stormwater system or watercourses from material delivery and storage. Minimize the storage of hazardous materials on-site, store materials in a designated area, and install secondary containment.

Conditions of Use

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

- Petroleum products such as fuel, oil and grease
- Soil stabilizers and binders (e.g. Polyacrylamide)
- Fertilizers, pesticides and herbicides
- Detergents
- Asphalt and concrete compounds
- Hazardous chemicals such as acids, lime, adhesives, paints, solvents and curing compounds
- Any other material that may be detrimental if released to the environment

Design and Installation Specifications

The following steps should be taken to minimize risk:

- Temporary storage area should be located away from vehicular traffic, near the construction entrance(s), and away from waterways or storm drains.
- Material Safety Data Sheets (MSDS) should be supplied for all materials stored. Chemicals should be kept in their original labeled containers.
- Hazardous material storage on-site should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- During the wet weather season (Oct 1 – April 30), consider storing materials in a covered area.
- Materials should be stored in secondary containments, such as earthen dike, horse trough, or even a children's wading pool for non-reactive materials such as detergents, oil, grease, and paints. Small amounts of material may be secondarily contained in "bus boy" trays or concrete mixing trays.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and, when possible, and within secondary containment.
- If drums must be kept uncovered, store them at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion. Domed plastic covers are inexpensive and snap to the top of drums, preventing water from collecting.

Material Storage Areas and Secondary Containment Practices:

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 shall be stored in approved containers and drums and shall not be overfilled. Containers and drums shall be stored in temporary secondary containment facilities.
- Temporary secondary containment facilities shall provide for a spill containment volume able to contain 10% of the total enclosed container volume of all containers, or 110% of the capacity of the largest container within its boundary, whichever is greater.
- Secondary containment facilities shall be impervious to the materials stored therein for a minimum contact time of 72 hours.
- Secondary containment facilities shall be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills shall be collected and placed into drums. These liquids shall be handled as hazardous waste unless testing determines them to be non-hazardous.
- Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- During the wet weather season (Oct 1 – April 30), each secondary containment facility shall be covered during non-working days, prior to and during rain events.
- Keep material storage areas clean, organized and equipped with an ample supply of appropriate spill clean-up material (spill kit).
- The spill kit should include, at a minimum:
    - 1-Water Resistant Nylon Bag
    - 3-Oil Absorbent Socks 3”x 4’
    - 2-Oil Absorbent Socks 3”x 10’
    - 12-Oil Absorbent Pads 17”x19”
    - 1-Pair Splash Resistant Goggles
    - 3-Pair Nitrile Gloves
    - 10-Disposable Bags with Ties
    - Instructions

BMP C160: Certified Erosion and Sediment Control Lead

Purpose

The project proponent designates at least one person as the responsible representative in charge of erosion and sediment control (ESC), and water quality protection. The designated person shall be the Certified Erosion and Sediment Control Lead (CESCL) who is responsible for ensuring compliance with all local, state, and federal erosion and sediment control and water quality requirements.

Conditions of Use

A CESCL shall be made available on projects one acre or larger that discharge stormwater to surface waters of the state. Sites less than one acre may have a person without CESCL certification conduct inspections; sampling is not required on sites that disturb less than an acre.

- The CESCL shall:
  - Have a current certificate proving attendance in an erosion and sediment control training course that meets the minimum ESC training and certification requirements established by Ecology (see details below).

    Ecology will maintain a list of ESC training and certification providers at:
    http://www.ecy.wa.gov/programs/wq/stormwater/cescl.html

    OR

  - Be a Certified Professional in Erosion and Sediment Control (CPESC); for additional information go to: www.cpesc.net

Specifications

- Certification shall remain valid for three years.
- The CESCL shall have authority to act on behalf of the contractor or developer and shall be available, or on-call, 24 hours per day throughout the period of construction.
- The Construction SWPPP shall include the name, telephone number, fax number, and address of the designated CESCL.
- A CESCL may provide inspection and compliance services for multiple construction projects in the same geographic region.

Duties and responsibilities of the CESCL shall include, but are not limited to the following:

- Maintaining permit file on site at all times which includes the Construction SWPPP and any associated permits and plans.
- Directing BMP installation, inspection, maintenance, modification, and removal.

- Updating all project drawings and the Construction SWPPP with changes made.
- Completing any sampling requirements including reporting results using WebDMR.
- Keeping daily logs, and inspection reports. Inspection reports should include:
    - Inspection date/time.
    - Weather information; general conditions during inspection and approximate amount of precipitation since the last inspection.
    - A summary or list of all BMPs implemented, including observations of all erosion/sediment control structures or practices. The following shall be noted:
        1. Locations of BMPs inspected.
        2. Locations of BMPs that need maintenance.
        3. Locations of BMPs that failed to operate as designed or intended.
        4. Locations of where additional or different BMPs are required.
    - Visual monitoring results, including a description of discharged stormwater. The presence of suspended sediment, turbid water, discoloration, and oil sheen shall be noted, as applicable.
    - Any water quality monitoring performed during inspection.
    - General comments and notes, including a brief description of any BMP repairs, maintenance or installations made as a result of the inspection.
- Facilitate, participate in, and take corrective actions resulting from inspections performed by outside agencies or the owner.

BMP C162: Scheduling

Purpose Sequencing a construction project reduces the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking.

Conditions of Use The construction sequence schedule is an orderly listing of all major land-disturbing activities together with the necessary erosion and sedimentation control measures planned for the project. This type of schedule guides the contractor on work to be done before other work is started so that serious erosion and sedimentation problems can be avoided.

Following a specified work schedule that coordinates the timing of land-disturbing activities and the installation of control measures is perhaps the most cost-effective way of controlling erosion during construction. The removal of surface ground cover leaves a site vulnerable to accelerated

BMP C200: Interceptor Dike and Swale

Purpose

Provide a ridge of compacted soil, or a ridge with an upslope swale, at the top or base of a disturbed slope or along the perimeter of a disturbed construction area to convey stormwater. Use the dike and/or swale to intercept the runoff from unprotected areas and direct it to areas where erosion can be controlled. This can prevent storm runoff from entering the work area or sediment-laden runoff from leaving the construction site.

Conditions of Use

Where the runoff from an exposed site or disturbed slope must be conveyed to an erosion control facility which can safely convey the stormwater.

- Locate upslope of a construction site to prevent runoff from entering disturbed area.
- When placed horizontally across a disturbed slope, it reduces the amount and velocity of runoff flowing down the slope.
- Locate downslope to collect runoff from a disturbed area and direct water to a sediment basin.

Design and Installation Specifications

- Dike and/or swale and channel must be stabilized with temporary or permanent vegetation or other channel protection during construction.
- Channel requires a positive grade for drainage; steeper grades require channel protection and check dams.
- Review construction for areas where overtopping may occur.
- Can be used at top of new fill before vegetation is established.
- May be used as a permanent diversion channel to carry the runoff.
- Sub-basin tributary area should be one acre or less.
- Design capacity for the peak flow from a 10-year, 24-hour storm, assuming a Type 1A rainfall distribution, for temporary facilities. Alternatively, use 1.6 times the 10-year, 1-hour flow indicated by an approved continuous runoff model. For facilities that will also serve on a permanent basis, consult the local government's drainage requirements.

Interceptor dikes shall meet the following criteria:

Top Width	2 feet minimum.
Height	1.5 feet minimum on berm.
Side Slope	2H:1V or flatter.
Grade	Depends on topography, however, dike system minimum is 0.5%, and maximum is 1%.
Compaction	Minimum of 90 percent ASTM D698 standard proctor.

Horizontal Spacing of Interceptor Dikes:

Average Slope	Slope Percent	Flowpath Length
20H:1V or less	3-5%	300 feet
(10 to 20)H:1V	5-10%	200 feet
(4 to 10)H:1V	10-25%	100 feet
(2 to 4)H:1V	25-50%	50 feet

Stabilization depends on velocity and reach

Slopes <5% Seed and mulch applied within 5 days of dike construction (see BMP C121, Mulching).

Slopes 5 - 40% Dependent on runoff velocities and dike materials. Stabilization should be done immediately using either sod or riprap or other measures to avoid erosion.

- The upslope side of the dike shall provide positive drainage to the dike outlet. No erosion shall occur at the outlet. Provide energy dissipation measures as necessary. Sediment-laden runoff must be released through a sediment trapping facility.
- Minimize construction traffic over temporary dikes. Use temporary cross culverts for channel crossing.

Interceptor swales shall meet the following criteria:

Bottom Width	2 feet minimum; the cross-section bottom shall be level.
Depth	1-foot minimum.
Side Slope	2H:1V or flatter.
Grade	Maximum 5 percent, with positive drainage to a suitable outlet (such as a sediment pond).
Stabilization	Seed as per BMP C120, *Temporary and Permanent Seeding*, or *BMP C202*, *Channel Lining*, 12 inches thick riprap pressed into the bank and extending at least 8 inches vertical from the bottom.

- Inspect diversion dikes and interceptor swales once a week and after every rainfall. Immediately remove sediment from the flow area.
- Damage caused by construction traffic or other activity must be repaired before the end of each working day.

Check outlets and make timely repairs as needed to avoid gully formation. When the area below the temporary diversion dike is permanently stabilized, remove the dike and fill and stabilize the channel to blend with the natural surface.

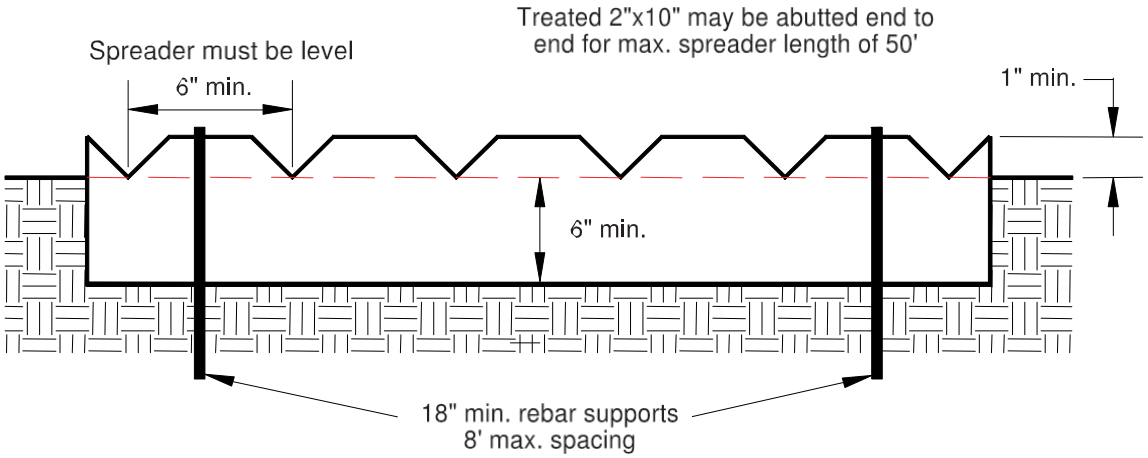


Figure 4.2.6 – Detail of Level Spreader

BMP C207: Check Dams

Purpose Construction of small dams across a swale or ditch reduces the velocity of concentrated flow and dissipates energy at the check dam.

Conditions of Use Where temporary channels or permanent channels are not yet vegetated, channel lining is infeasible, and/or velocity checks are required.

- Check dams may not be placed in streams unless approved by the State Department of Fish and Wildlife. Check dams may not be placed in wetlands without approval from a permitting agency.
- Do not place check dams below the expected backwater from any salmonid bearing water between October 1 and May 31 to ensure that there is no loss of high flow refuge habitat for overwintering juvenile salmonids and emergent salmonid fry.
- Construct rock check dams from appropriately sized rock. The rock used must be large enough to stay in place given the expected design flow through the channel. The rock must be placed by hand or by mechanical means (no dumping of rock to form dam) to achieve complete coverage of the ditch or swale and to ensure that the center of the dam is lower than the edges.
- Check dams may also be constructed of either rock or pea-gravel filled bags. Numerous new products are also available for this purpose. They tend to be re-usable, quick and easy to install, effective, and cost efficient.
- Place check dams perpendicular to the flow of water.
- The dam should form a triangle when viewed from the side. This prevents undercutting as water flows over the face of the dam rather than falling directly onto the ditch bottom.

- Before installing check dams impound and bypass upstream water flow away from the work area. Options for bypassing include pumps, siphons, or temporary channels.
- Check dams in association with sumps work more effectively at slowing flow and retaining sediment than just a check dam alone. A deep sump should be provided immediately upstream of the check dam.
- In some cases, if carefully located and designed, check dams can remain as permanent installations with very minor regrading. They may be left as either spillways, in which case accumulated sediment would be graded and seeded, or as check dams to prevent further sediment from leaving the site.
- The maximum spacing between the dams shall be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.
- Keep the maximum height at 2 feet at the center of the dam.
- Keep the center of the check dam at least 12 inches lower than the outer edges at natural ground elevation.
- Keep the side slopes of the check dam at 2H:1V or flatter.
- Key the stone into the ditch banks and extend it beyond the abutments a minimum of 18 inches to avoid washouts from overflow around the dam.
- Use filter fabric foundation under a rock or sand bag check dam. If a blanket ditch liner is used, filter fabric is not necessary. A piece of organic or synthetic blanket cut to fit will also work for this purpose.
- In the case of grass-lined ditches and swales, all check dams and accumulated sediment shall be removed when the grass has matured sufficiently to protect the ditch or swale - unless the slope of the swale is greater than 4 percent. The area beneath the check dams shall be seeded and mulched immediately after dam removal.
- Ensure that channel appurtenances, such as culvert entrances below check dams, are not subject to damage or blockage from displaced stones. Figure 4.2.7 depicts a typical rock check dam.

Maintenance Standards

Check dams shall be monitored for performance and sediment accumulation during and after each runoff producing rainfall. Sediment shall be removed when it reaches one half the sump depth.

- Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam.
- If significant erosion occurs between dams, install a protective riprap liner in that portion of the channel.

Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C207. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html

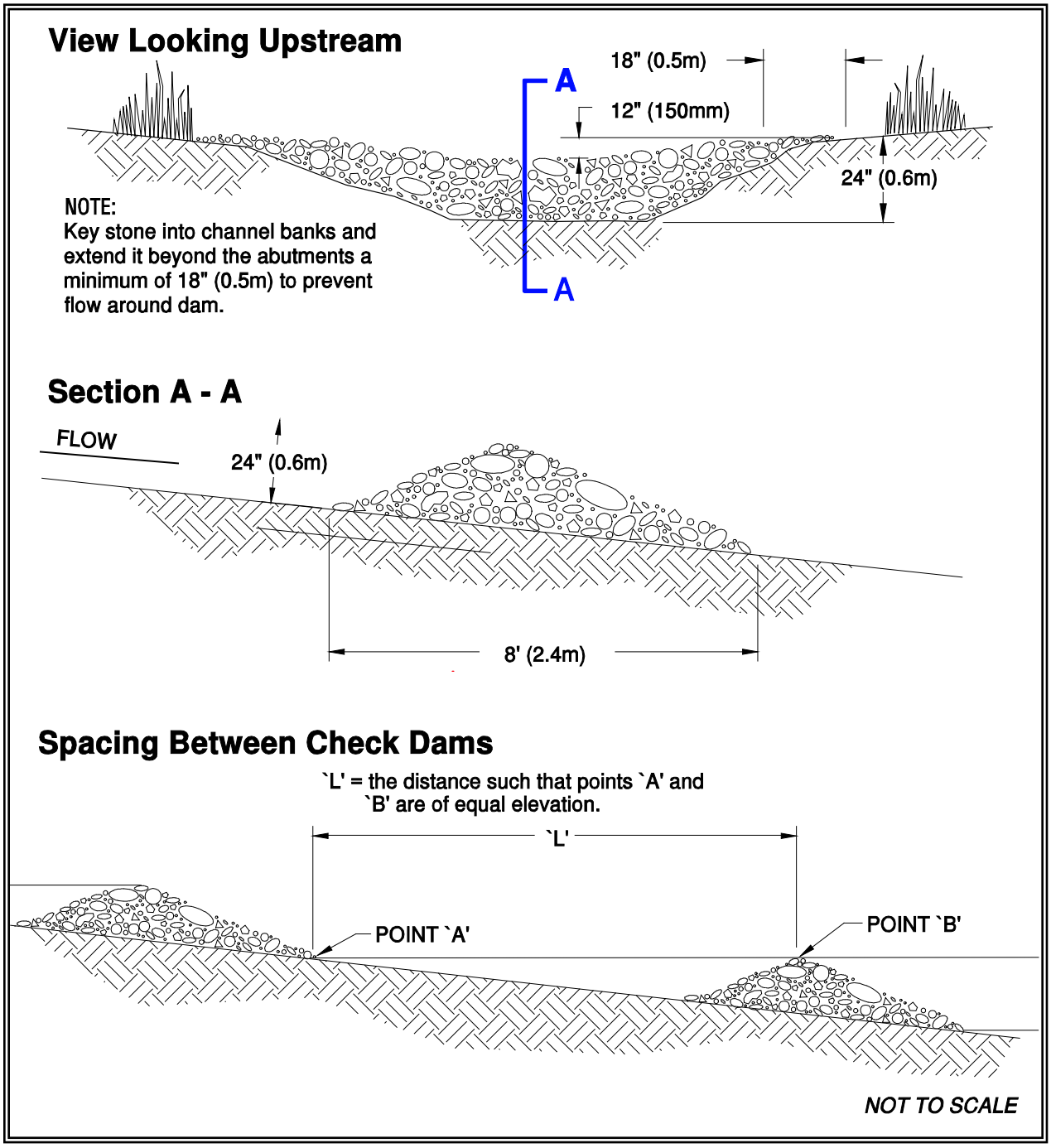


Figure 4.2.7 – Rock Check Dam

Standards

accumulation during and after each runoff producing rainfall. Sediment shall be removed when it reaches one half the height of the dam.

- Anticipate submergence and deposition above the triangular silt dam and erosion from high flows around the edges of the dam. Immediately repair any damage or any undercutting of the dam.

BMP C209: Outlet Protection

Purpose

Outlet protection prevents scour at conveyance outlets and minimizes the potential for downstream erosion by reducing the velocity of concentrated stormwater flows.

Conditions of use

Outlet protection is required at the outlets of all ponds, pipes, ditches, or other conveyances, and where runoff is conveyed to a natural or manmade drainage feature such as a stream, wetland, lake, or ditch.

Design and Installation Specifications

The receiving channel at the outlet of a culvert shall be protected from erosion by rock lining a minimum of 6 feet downstream and extending up the channel sides a minimum of 1–foot above the maximum tailwater elevation or 1-foot above the crown, whichever is higher. For large pipes (more than 18 inches in diameter), the outlet protection lining of the channel is lengthened to four times the diameter of the culvert.

- Standard wingwalls, and tapered outlets and paved channels should also be considered when appropriate for permanent culvert outlet protection. (See WSDOT Hydraulic Manual, available through WSDOT Engineering Publications).
- Organic or synthetic erosion blankets, with or without vegetation, are usually more effective than rock, cheaper, and easier to install. Materials can be chosen using manufacturer product specifications. ASTM test results are available for most products and the designer can choose the correct material for the expected flow.
- With low flows, vegetation (including sod) can be effective.
- The following guidelines shall be used for riprap outlet protection:
    1. If the discharge velocity at the outlet is less than 5 fps (pipe slope less than 1 percent), use 2-inch to 8-inch riprap. Minimum thickness is 1-foot.
    2. For 5 to 10 fps discharge velocity at the outlet (pipe slope less than 3 percent), use 24-inch to 48-inch riprap. Minimum thickness is 2 feet.
    3. For outlets at the base of steep slope pipes (pipe slope greater than 10 percent), an engineered energy dissipater shall be used.
- Filter fabric or erosion control blankets should always be used under riprap to prevent scour and channel erosion.

- New pipe outfalls can provide an opportunity for low-cost fish habitat improvements. For example, an alcove of low-velocity water can be created by constructing the pipe outfall and associated energy dissipater back from the stream edge and digging a channel, over-widened to the upstream side, from the outfall. Overwintering juvenile and migrating adult salmonids may use the alcove as shelter during high flows. Bank stabilization, bioengineering, and habitat features may be required for disturbed areas. This work may require a HPA. See Volume V for more information on outfall system design.

Maintenance Standards

- Inspect and repair as needed.
- Add rock as needed to maintain the intended function.
- Clean energy dissipater if sediment builds up.

BMP C220: Storm Drain Inlet Protection

Purpose

Storm drain inlet protection prevents coarse sediment from entering drainage systems prior to permanent stabilization of the disturbed area.

Conditions of Use

Use storm drain inlet protection at inlets that are operational before permanent stabilization of the disturbed drainage area. Provide protection for all storm drain inlets downslope and within 500 feet of a disturbed or construction area, unless conveying runoff entering catch basins to a sediment pond or trap.

Also consider inlet protection for lawn and yard drains on new home construction. These small and numerous drains coupled with lack of gutters in new home construction can add significant amounts of sediment into the roof drain system. If possible delay installing lawn and yard drains until just before landscaping or cap these drains to prevent sediment from entering the system until completion of landscaping. Provide 18-inches of sod around each finished lawn and yard drain.

Table 4.2.2 lists several options for inlet protection. All of the methods for storm drain inlet protection tend to plug and require a high frequency of maintenance. Limit drainage areas to one acre or less. Possibly provide emergency overflows with additional end-of-pipe treatment where stormwater ponding would cause a hazard.

Table 4.2.2
Storm Drain Inlet Protection

Type of Inlet Protection	Emergency Overflow	Applicable for Paved/ Earthen Surfaces	Conditions of Use
Drop Inlet Protection			
Excavated drop inlet protection	Yes, temporary flooding will occur	Earthen	Applicable for heavy flows. Easy to maintain. Large area Requirement: 30' X 30'/acre
Block and gravel drop inlet protection	Yes	Paved or Earthen	Applicable for heavy concentrated flows. Will not pond.
Gravel and wire drop inlet protection	No		Applicable for heavy concentrated flows. Will pond. Can withstand traffic.
Catch basin filters	Yes	Paved or Earthen	Frequent maintenance required.
Curb Inlet Protection			
Curb inlet protection with a wooden weir	Small capacity overflow	Paved	Used for sturdy, more compact installation.
Block and gravel curb inlet protection	Yes	Paved	Sturdy, but limited filtration.
Culvert Inlet Protection			
Culvert inlet sediment trap			18 month expected life.

Design and Installation Specifications

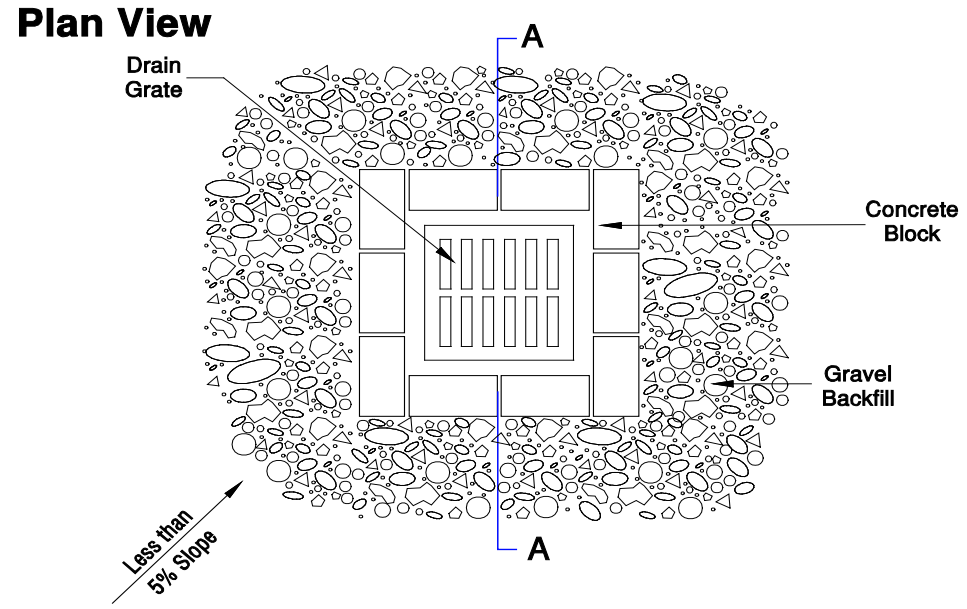
Excavated Drop Inlet Protection - An excavated impoundment around the storm drain. Sediment settles out of the stormwater prior to entering the storm drain.

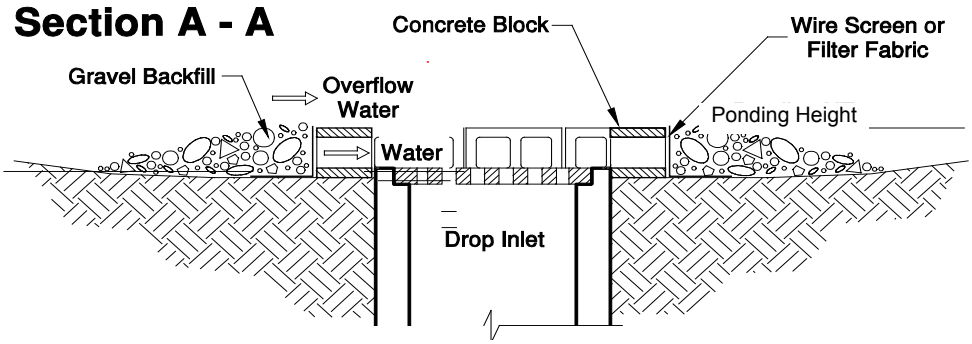
- Provide a depth of 1-2 ft as measured from the crest of the inlet structure.
- Slope sides of excavation no steeper than 2H:1V.
- Minimum volume of excavation 35 cubic yards.
- Shape basin to fit site with longest dimension oriented toward the longest inflow area.
- Install provisions for draining to prevent standing water problems.
- Clear the area of all debris.
- Grade the approach to the inlet uniformly.
- Drill weep holes into the side of the inlet.
- Protect weep holes with screen wire and washed aggregate.
- Seal weep holes when removing structure and stabilizing area.

- Build a temporary dike, if necessary, to the down slope side of the structure to prevent bypass flow.

Block and Gravel Filter - A barrier formed around the storm drain inlet with standard concrete blocks and gravel. See Figure 4.2.8.

- Provide a height of 1 to 2 feet above inlet.
- Recess the first row 2-inches into the ground for stability.
- Support subsequent courses by placing a 2x4 through the block opening.
- Do not use mortar.
- Lay some blocks in the bottom row on their side for dewatering the pool.
- Place hardware cloth or comparable wire mesh with ½-inch openings over all block openings.
- Place gravel just below the top of blocks on slopes of 2H:1V or flatter.
- An alternative design is a gravel donut.
- Provide an inlet slope of 3H:1V.
- Provide an outlet slope of 2H:1V.
- Provide a1-foot wide level stone area between the structure and the inlet.
- Use inlet slope stones 3 inches in diameter or larger.
- Use gravel ½- to ¾-inch at a minimum thickness of 1-foot for the outlet slope.





Notes:
1. Drop inlet sediment barriers are to be used for small, nearly level drainage areas. (less than 5%)
2. Excavate a basin of sufficient size adjacent to the drop inlet.
3. The top of the structure (ponding height) must be well below the ground elevation downslope to prevent runoff from bypassing the inlet. A temporary dike may be necessary on the downslope side of the structure.

Figure 4.2.8 – Block and Gravel Filter

Gravel and Wire Mesh Filter - A gravel barrier placed over the top of the inlet. This structure does not provide an overflow.

- Use a hardware cloth or comparable wire mesh with ½-inch openings.
- Use coarse aggregate.
- Provide a height 1-foot or more, 18-inches wider than inlet on all sides.
- Place wire mesh over the drop inlet so that the wire extends a minimum of 1-foot beyond each side of the inlet structure.
- Overlap the strips if more than one strip of mesh is necessary.

- Place coarse aggregate over the wire mesh.
- Provide at least a 12-inch depth of gravel over the entire inlet opening and extend at least 18-inches on all sides.

Catchbasin Filters – Use inserts designed by manufacturers for construction sites. The limited sediment storage capacity increases the amount of inspection and maintenance required, which may be daily for heavy sediment loads. To reduce maintenance requirements combine a catchbasin filter with another type of inlet protection. This type of inlet protection provides flow bypass without overflow and therefore may be a better method for inlets located along active rights-of-way.

- Provides 5 cubic feet of storage.
- Requires dewatering provisions.
- Provides a high-flow bypass that will not clog under normal use at a construction site.
- Insert the catchbasin filter in the catchbasin just below the grating.

Curb Inlet Protection with Wooden Weir – Barrier formed around a curb inlet with a wooden frame and gravel.

- Use wire mesh with ½-inch openings.
- Use extra strength filter cloth.
- Construct a frame.
- Attach the wire and filter fabric to the frame.
- Pile coarse washed aggregate against wire/fabric.
- Place weight on frame anchors.

Block and Gravel Curb Inlet Protection – Barrier formed around a curb inlet with concrete blocks and gravel. See Figure 4.2.9.

- Use wire mesh with ½-inch openings.
- Place two concrete blocks on their sides abutting the curb at either side of the inlet opening. These are spacer blocks.
- Place a 2x4 stud through the outer holes of each spacer block to align the front blocks.
- Place blocks on their sides across the front of the inlet and abutting the spacer blocks.
- Place wire mesh over the outside vertical face.
- Pile coarse aggregate against the wire to the top of the barrier.

Curb and Gutter Sediment Barrier – Sandbag or rock berm (riprap and aggregate) 3 feet high and 3 feet wide in a horseshoe shape. See Figure 4.2.10.

- Construct a horseshoe shaped berm, faced with coarse aggregate if using riprap, 3 feet high and 3 feet wide, at least 2 feet from the inlet.
- Construct a horseshoe shaped sedimentation trap on the outside of the berm sized to sediment trap standards for protecting a culvert inlet.

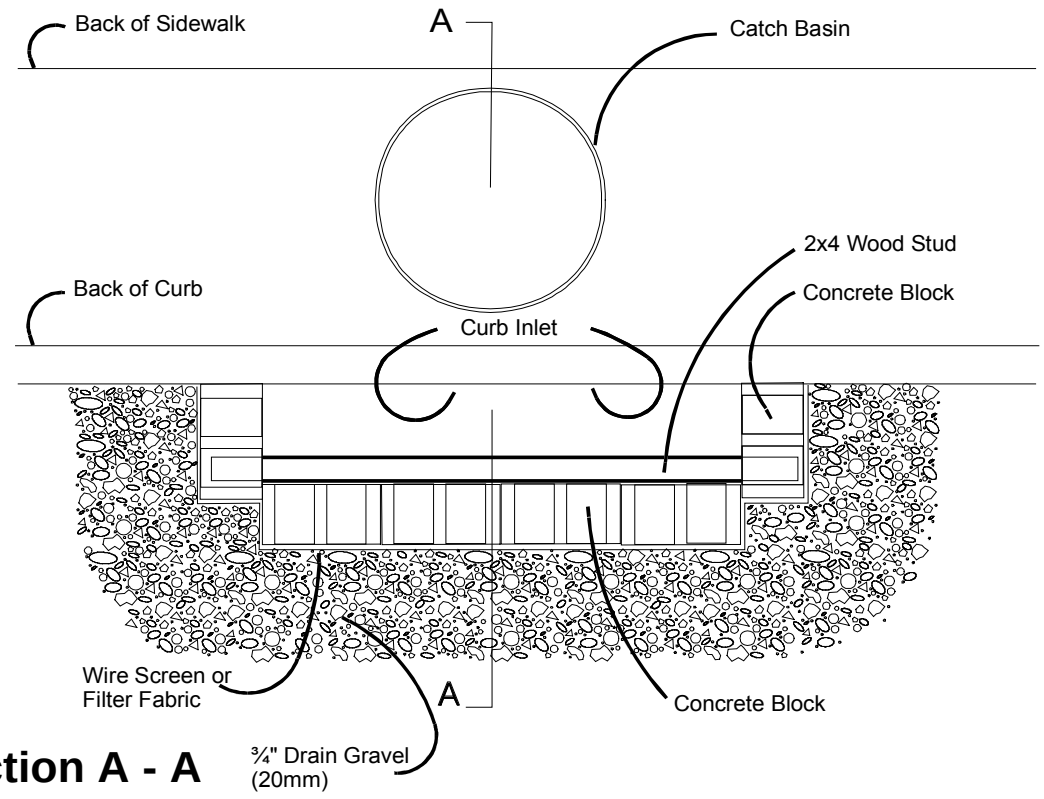
Maintenance Standards

- Inspect catch basin filters frequently, especially after storm events. Clean and replace clogged inserts. For systems with clogged stone filters: pull away the stones from the inlet and clean or replace. An alternative approach would be to use the clogged stone as fill and put fresh stone around the inlet.
- Do not wash sediment into storm drains while cleaning. Spread all excavated material evenly over the surrounding land area or stockpile and stabilize as appropriate.

Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C220. The products did not pass through the Technology Assessment Protocol – Ecology (TAPE) process. Local jurisdictions may choose not to accept this product approved as equivalent, or may require additional testing prior to consideration for local use. The products are available for review on Ecology's website at http://www.ecy.wa.gov/programs/wq/stormwater/newtech/equivalent.html

Plan View



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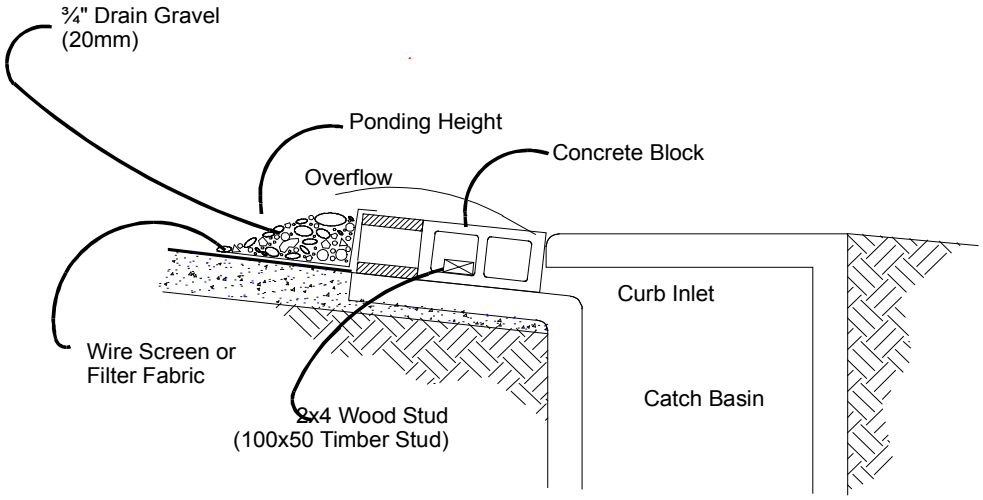
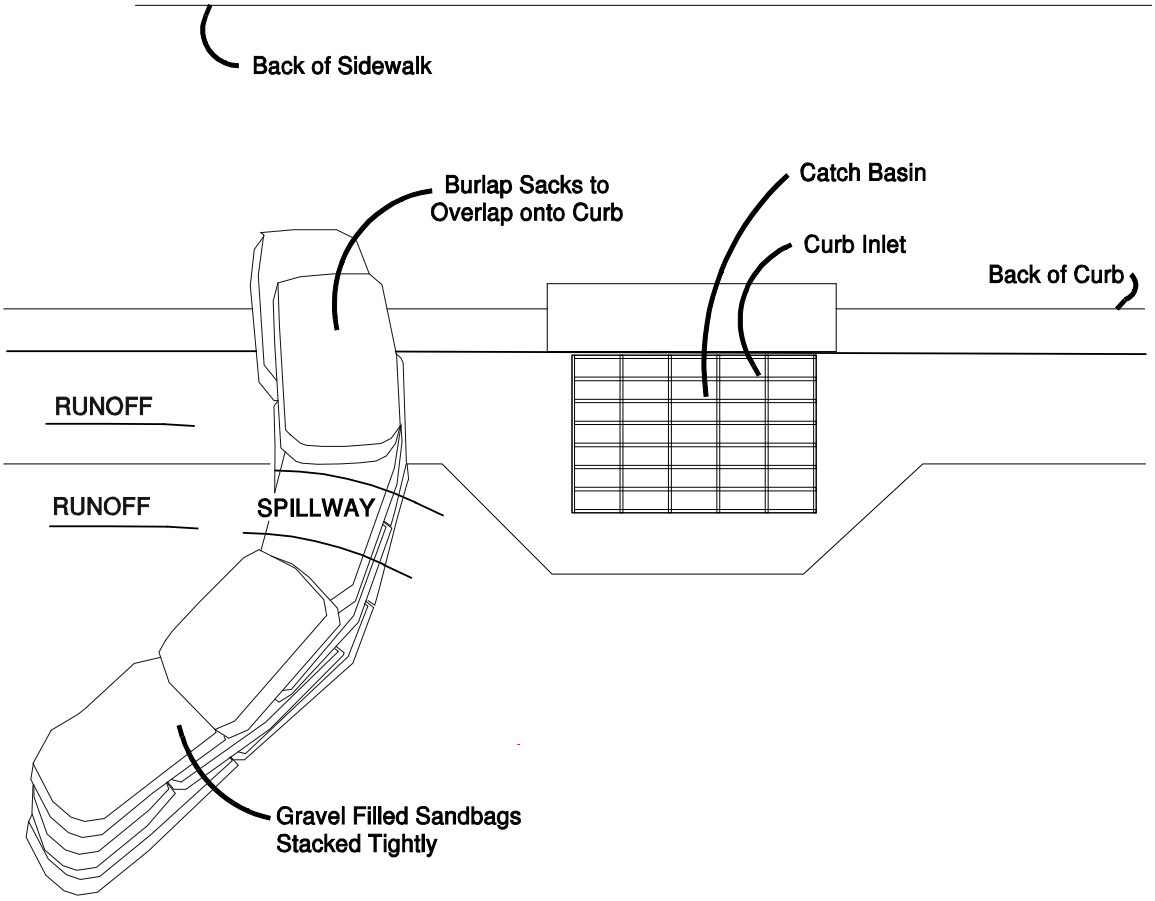


NOTES:
1. Use block and gravel type sediment barrier when curb inlet is located in gently sloping street segment, where water can pond and allow sediment to separate from runoff.
2. Barrier shall allow for overflow from severe storm event.
3. Inspect barriers and remove sediment after each storm event. Sediment and gravel must be removed from the traveled way immediately.

Figure 4.2.9 – Block and Gravel Curb Inlet Protection

Plan View



NOTES:
1. Place curb type sediment barriers on gently sloping street segments, where water can pond and allow sediment to separate from runoff.
2. Sandbags of either burlap or woven `geotextile' fabric, are filled with gravel, layered and packed tightly.
3. Leave a one sandbag gap in the top row to provide a spillway for overflow.
4. Inspect barriers and remove sediment after each storm event. Sediment and gravel must be removed from the traveled way immediately.

Figure 4.2.10 – Curb and Gutter Barrier

BMP C232: Gravel Filter Berm

Purpose

A gravel filter berm is constructed on rights-of-way or traffic areas within a construction site to retain sediment by using a filter berm of gravel or crushed rock.

Conditions of Use

Where a temporary measure is needed to retain sediment from rights-of-way or in traffic areas on construction sites.

Design and Installation Specifications

- Berm material shall be ¾ to 3 inches in size, washed well-grade gravel or crushed rock with less than 5 percent fines.
- Spacing of berms:
  - Every 300 feet on slopes less than 5 percent
  - Every 200 feet on slopes between 5 percent and 10 percent
  - Every 100 feet on slopes greater than 10 percent
- Berm dimensions:
  - 1 foot high with 3H:1V side slopes
  - 8 linear feet per 1 cfs runoff based on the 10-year, 24-hour design storm

Maintenance Standards

- Regular inspection is required. Sediment shall be removed and filter material replaced as needed.

BMP C233: Silt Fence

Purpose

Use of a silt fence reduces the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow. See Figure 4.2.12 for details on silt fence construction.

Conditions of Use

Silt fence may be used downslope of all disturbed areas.

- Silt fence shall prevent soil carried by runoff water from going beneath, through, or over the top of the silt fence, but shall allow the water to pass through the fence.
- Silt fence is not intended to treat concentrated flows, nor is it intended to treat substantial amounts of overland flow. Convey any concentrated flows through the drainage system to a sediment pond.
- Do not construct silt fences in streams or use in V-shaped ditches. Silt fences do not provide an adequate method of silt control for anything deeper than sheet or overland flow.

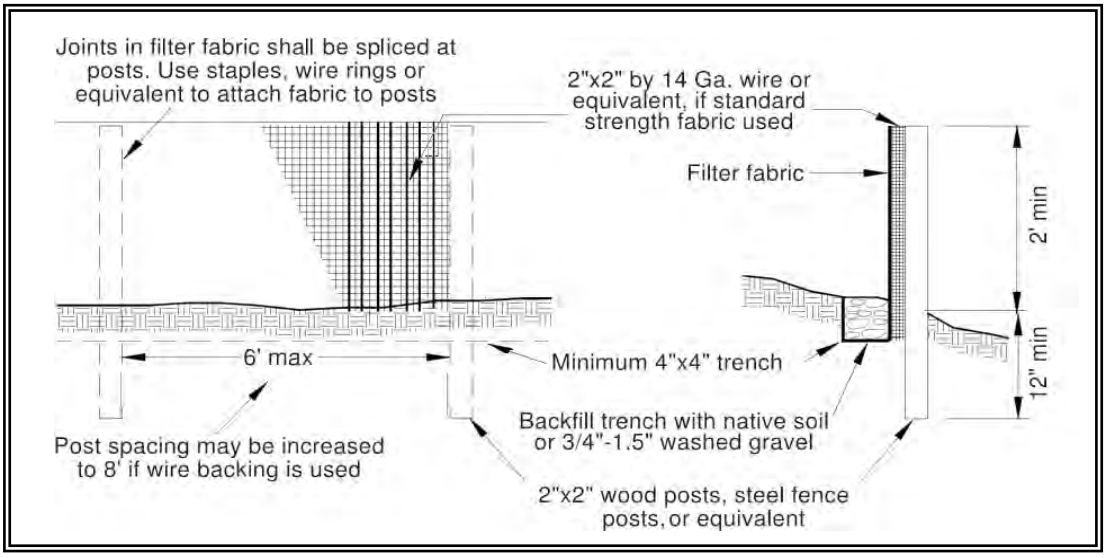


Figure 4.2.12 – Silt Fence

Design and Installation Specifications

- Use in combination with sediment basins or other BMPs.
- Maximum slope steepness (normal (perpendicular) to fence line) 1H:1V.
- Maximum sheet or overland flow path length to the fence of 100 feet.
- Do not allow flows greater than 0.5 cfs.
- The geotextile used shall meet the following standards. All geotextile properties listed below are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in Table 4.2.3):

Table 4.2.3
Geotextile Standards

Polymeric Mesh AOS (ASTM D4751)	0.60 mm maximum for slit film woven (#30 sieve). 0.30 mm maximum for all other geotextile types (#50 sieve). 0.15 mm minimum for all fabric types (#100 sieve).
Water Permittivity (ASTM D4491)	0.02 sec^{-1} minimum
Grab Tensile Strength (ASTM D4632)	180 lbs. Minimum for extra strength fabric. 100 lbs minimum for standard strength fabric.
Grab Tensile Strength (ASTM D4632)	30% maximum
Ultraviolet Resistance (ASTM D4355)	70% minimum

- Support standard strength fabrics with wire mesh, chicken wire, 2-inch x 2-inch wire, safety fence, or jute mesh to increase the strength of the

fabric. Silt fence materials are available that have synthetic mesh backing attached.

- Filter fabric material shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0°F. to 120°F.
- One-hundred percent biodegradable silt fence is available that is strong, long lasting, and can be left in place after the project is completed, if permitted by local regulations.
- Refer to Figure 4.2.12 for standard silt fence details. Include the following standard Notes for silt fence on construction plans and specifications:

  1. The contractor shall install and maintain temporary silt fences at the locations shown in the Plans.
  2. Construct silt fences in areas of clearing, grading, or drainage prior to starting those activities.
  3. The silt fence shall have a 2-feet min. and a 2½-feet max. height above the original ground surface.
  4. The filter fabric shall be sewn together at the point of manufacture to form filter fabric lengths as required. Locate all sewn seams at support posts. Alternatively, two sections of silt fence can be overlapped, provided the Contractor can demonstrate, to the satisfaction of the Engineer, that the overlap is long enough and that the adjacent fence sections are close enough together to prevent silt laden water from escaping through the fence at the overlap.
  5. Attach the filter fabric on the up-slope side of the posts and secure with staples, wire, or in accordance with the manufacturer's recommendations. Attach the filter fabric to the posts in a manner that reduces the potential for tearing.
  6. Support the filter fabric with wire or plastic mesh, dependent on the properties of the geotextile selected for use. If wire or plastic mesh is used, fasten the mesh securely to the up-slope side of the posts with the filter fabric up-slope of the mesh.
  7. Mesh support, if used, shall consist of steel wire with a maximum mesh spacing of 2-inches, or a prefabricated polymeric mesh. The strength of the wire or polymeric mesh shall be equivalent to or greater than 180 lbs. grab tensile strength. The polymeric mesh must be as resistant to the same level of ultraviolet radiation as the filter fabric it supports.
  8. Bury the bottom of the filter fabric 4-inches min. below the ground surface. Backfill and tamp soil in place over the buried portion of the filter fabric, so that no flow can pass beneath the fence and

scouring cannot occur. When wire or polymeric back-up support mesh is used, the wire or polymeric mesh shall extend into the ground 3-inches min.

9. Drive or place the fence posts into the ground 18-inches min. A 12–inch min. depth is allowed if topsoil or other soft subgrade soil is not present and 18-inches cannot be reached. Increase fence post min. depths by 6 inches if the fence is located on slopes of 3H:1V or steeper and the slope is perpendicular to the fence. If required post depths cannot be obtained, the posts shall be adequately secured by bracing or guying to prevent overturning of the fence due to sediment loading.
10. Use wood, steel or equivalent posts. The spacing of the support posts shall be a maximum of 6-feet. Posts shall consist of either:
    - Wood with dimensions of 2-inches by 2-inches wide min. and a 3-feet min. length. Wood posts shall be free of defects such as knots, splits, or gouges.
    - No. 6 steel rebar or larger.
    - ASTM A 120 steel pipe with a minimum diameter of 1-inch.
    - U, T, L, or C shape steel posts with a minimum weight of 1.35 lbs./ft.
    - Other steel posts having equivalent strength and bending resistance to the post sizes listed above.
11. Locate silt fences on contour as much as possible, except at the ends of the fence, where the fence shall be turned uphill such that the silt fence captures the runoff water and prevents water from flowing around the end of the fence.
12. If the fence must cross contours, with the exception of the ends of the fence, place gravel check dams perpendicular to the back of the fence to minimize concentrated flow and erosion. The slope of the fence line where contours must be crossed shall not be steeper than 3H:1V.
    - Gravel check dams shall be approximately 1-foot deep at the back of the fence. Gravel check dams shall be continued perpendicular to the fence at the same elevation until the top of the check dam intercepts the ground surface behind the fence.
    - Gravel check dams shall consist of crushed surfacing base course, gravel backfill for walls, or shoulder ballast. Gravel check dams shall be located every 10 feet along the fence where the fence must cross contours.

- Refer to Figure 4.2.13 for slicing method details. Silt fence installation using the slicing method specifications:

1. The base of both end posts must be at least 2- to 4-inches above the top of the filter fabric on the middle posts for ditch checks to drain properly. Use a hand level or string level, if necessary, to mark base points before installation.
2. Install posts 3- to 4-feet apart in critical retention areas and 6- to 7-feet apart in standard applications.
3. Install posts 24-inches deep on the downstream side of the silt fence, and as close as possible to the filter fabric, enabling posts to support the filter fabric from upstream water pressure.
4. Install posts with the nipples facing away from the filter fabric.
5. Attach the filter fabric to each post with three ties, all spaced within the top 8-inches of the filter fabric. Attach each tie diagonally 45 degrees through the filter fabric, with each puncture at least 1-inch vertically apart. Each tie should be positioned to hang on a post nipple when tightening to prevent sagging.
6. Wrap approximately 6-inches of fabric around the end posts and secure with 3 ties.
7. No more than 24-inches of a 36-inch filter fabric is allowed above ground level.

   Compact the soil immediately next to the filter fabric with the front wheel of the tractor, skid steer, or roller exerting at least 60 pounds per square inch. Compact the upstream side first and then each side twice for a total of four trips. Check and correct the silt fence installation for any deviation before compaction. Use a flat-bladed shovel to tuck fabric deeper into the ground if necessary.

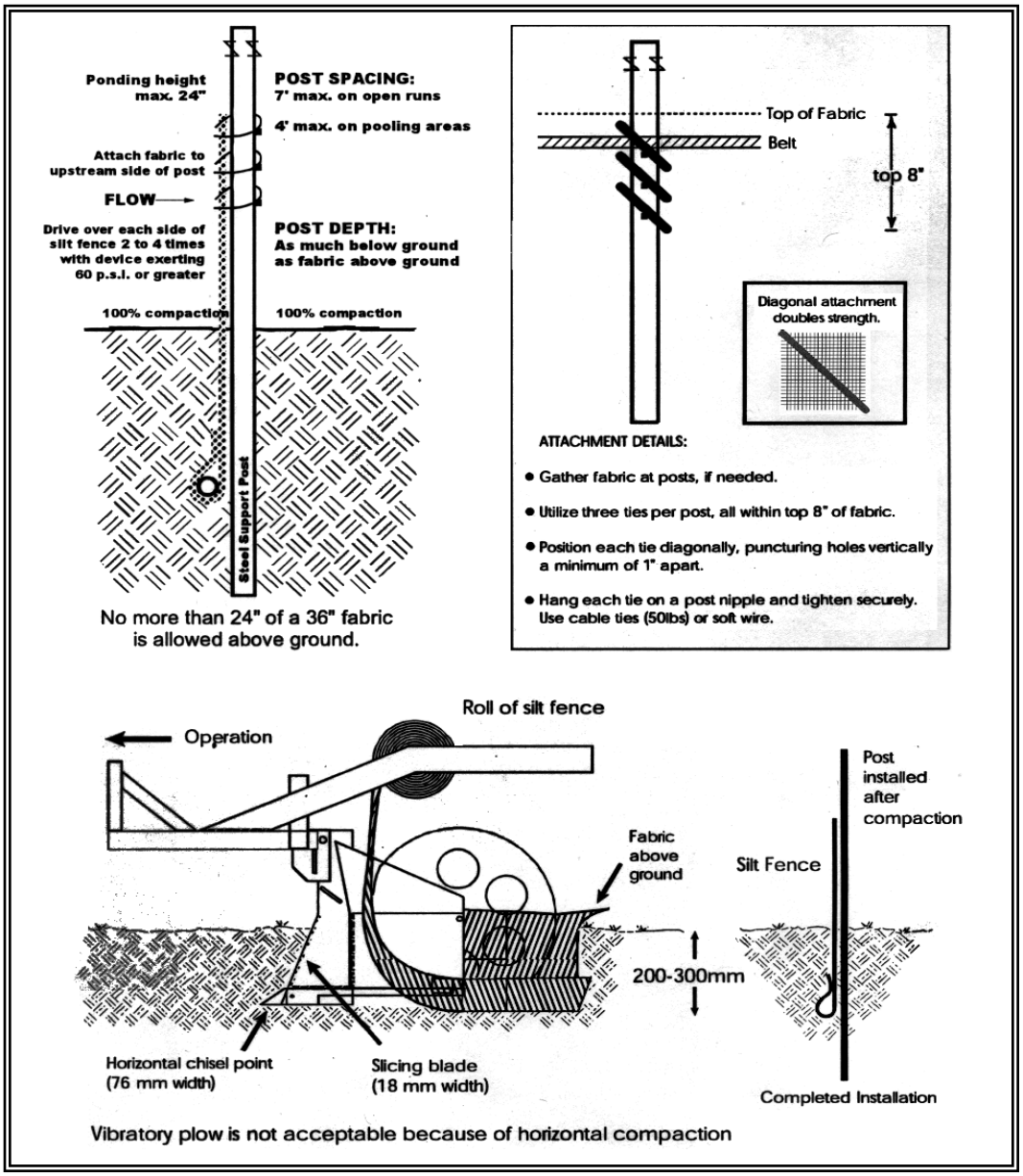


Figure 4.2.13 – Silt Fence Installation by Slicing Method

Maintenance Standards

- Repair any damage immediately.
- Intercept and convey all evident concentrated flows uphill of the silt fence to a sediment pond.
- Check the uphill side of the fence for signs of the fence clogging and acting as a barrier to flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence or remove the trapped sediment.

- Remove sediment deposits when the deposit reaches approximately one-third the height of the silt fence, or install a second silt fence.
- Replace filter fabric that has deteriorated due to ultraviolet breakdown.

BMP C234: Vegetated Strip

Purpose

Vegetated strips reduce the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow.

Conditions of Use

- Vegetated strips may be used downslope of all disturbed areas.
- Vegetated strips are not intended to treat concentrated flows, nor are they intended to treat substantial amounts of overland flow. Any concentrated flows must be conveyed through the drainage system to a sediment pond. The only circumstance in which overland flow can be treated solely by a strip, rather than by a sediment pond, is when the following criteria are met (see Table 4.2.4):

Table 4.2.4
Contributing Drainage Area for Vegetated Strips

Average Contributing area Slope	Average Contributing area Percent Slope	Max Contributing area Flowpath Length
1.5H:1V or flatter	67% or flatter	100 feet
2H:1V or flatter	50% or flatter	115 feet
4H:1V or flatter	25% or flatter	150 feet
6H:1V or flatter	16.7% or flatter	200 feet
10H:1V or flatter	10% or flatter	250 feet

Design and Installation Specifications

- The vegetated strip shall consist of a minimum of a 25-foot flowpath length continuous strip of dense vegetation with topsoil. Grass-covered, landscaped areas are generally not adequate because the volume of sediment overwhelms the grass. Ideally, vegetated strips shall consist of undisturbed native growth with a well-developed soil that allows for infiltration of runoff.
- The slope within the strip shall not exceed 4H:1V.
- The uphill boundary of the vegetated strip shall be delineated with clearing limits.

Maintenance Standards

- Any areas damaged by erosion or construction activity shall be seeded immediately and protected by mulch.
- If more than 5 feet of the original vegetated strip width has had vegetation removed or is being eroded, sod must be installed.
- If there are indications that concentrated flows are traveling across the buffer, surface water controls must be installed to reduce the flows

BMP C241: Temporary Sediment Pond

Purpose

Sediment ponds remove sediment from runoff originating from disturbed areas of the site. Sediment ponds are typically designed to remove sediment no smaller than medium silt (0.02 mm). Consequently, they usually reduce turbidity only slightly.

Conditions of Use

Prior to leaving a construction site, stormwater runoff must pass through a sediment pond or other appropriate sediment removal best management practice.

A sediment pond shall be used where the contributing drainage area is 3 acres or more. Ponds must be used in conjunction with erosion control practices to reduce the amount of sediment flowing into the basin.

Design and Installation Specifications

- Sediment basins must be installed only on sites where failure of the structure would not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities. Also, sediment traps and ponds are attractive to children and can be very dangerous. Compliance with local ordinances regarding health and safety must be addressed. If fencing of the pond is required, the type of fence and its location shall be shown on the ESC plan.
- Structures having a maximum storage capacity at the top of the dam of 10 acre-ft (435,600 ft^3) or more are subject to the Washington Dam Safety Regulations (Chapter 173-175 WAC).
- See Figures 4.2.18, 4.2.19, and 4.2.20 for details.
- If permanent runoff control facilities are part of the project, they should be used for sediment retention. The surface area requirements of the sediment basin must be met. This may require temporarily enlarging the permanent basin to comply with the surface area requirements. The permanent control structure must be temporarily replaced with a control structure that only allows water to leave the pond from the surface or by pumping. The permanent control structure must be installed after the site is fully stabilized. .
- Use of infiltration facilities for sedimentation basins during construction tends to clog the soils and reduce their capacity to infiltrate. If infiltration facilities are to be used, the sides and bottom of the facility must only be rough excavated to a minimum of 2 feet above final grade. Final grading of the infiltration facility shall occur only when all contributing drainage areas are fully stabilized. The infiltration pretreatment facility should be fully constructed and used with the sedimentation basin to help prevent clogging.
- Determining Pond Geometry

  Obtain the discharge from the hydrologic calculations of the peak flow for the 2-year runoff event (Q_2). The 10-year peak flow shall be used if

the project size, expected timing and duration of construction, or downstream conditions warrant a higher level of protection. If no hydrologic analysis is required, the Rational Method may be used.

Determine the required surface area at the top of the riser pipe with the equation:

$SA = 2 \times Q_2/0.00096$ or
2080 square feet per cfs of inflow

See BMP C240 for more information on the derivation of the surface area calculation.

The basic geometry of the pond can now be determined using the following design criteria:

- Required surface area SA (from Step 2 above) at top of riser.
- Minimum 3.5-foot depth from top of riser to bottom of pond.
- Maximum 3H:1V interior side slopes and maximum 2H:1V exterior slopes. The interior slopes can be increased to a maximum of 2H:1V if fencing is provided at or above the maximum water surface.
- One foot of freeboard between the top of the riser and the crest of the emergency spillway.
- Flat bottom.
- Minimum 1-foot deep spillway.
- Length-to-width ratio between 3:1 and 6:1.
- Sizing of Discharge Mechanisms.

  The outlet for the basin consists of a combination of principal and emergency spillways. These outlets must pass the peak runoff expected from the contributing drainage area for a 100-year storm. If, due to site conditions and basin geometry, a separate emergency spillway is not feasible, the principal spillway must pass the entire peak runoff expected from the 100-year storm. However, an attempt to provide a separate emergency spillway should always be made. The runoff calculations should be based on the site conditions during construction. The flow through the dewatering orifice cannot be utilized when calculating the 100-year storm elevation because of its potential to become clogged; therefore, available spillway storage must begin at the principal spillway riser crest.

  The principal spillway designed by the procedures contained in this standard will result in some reduction in the peak rate of runoff. However, the riser outlet design will not adequately control the basin discharge to the predevelopment discharge limitations as stated in Minimum Requirement #7: Flow Control. However, if the basin for a permanent stormwater detention pond is used for a temporary

sedimentation basin, the control structure for the permanent pond can be used to maintain predevelopment discharge limitations. The size of the basin, the expected life of the construction project, the anticipated downstream effects and the anticipated weather conditions during construction, should be considered to determine the need of additional discharge control. See Figure 4.2.21 for riser inflow curves.

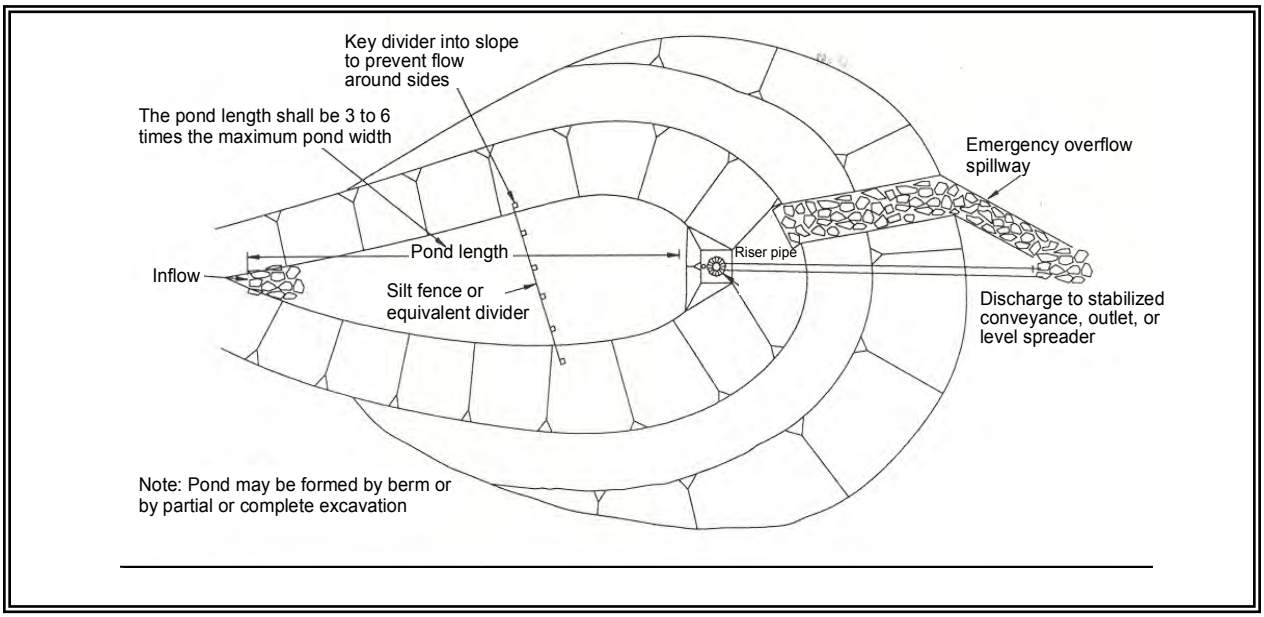


Figure 4.2.18 – Sediment Pond Plan View

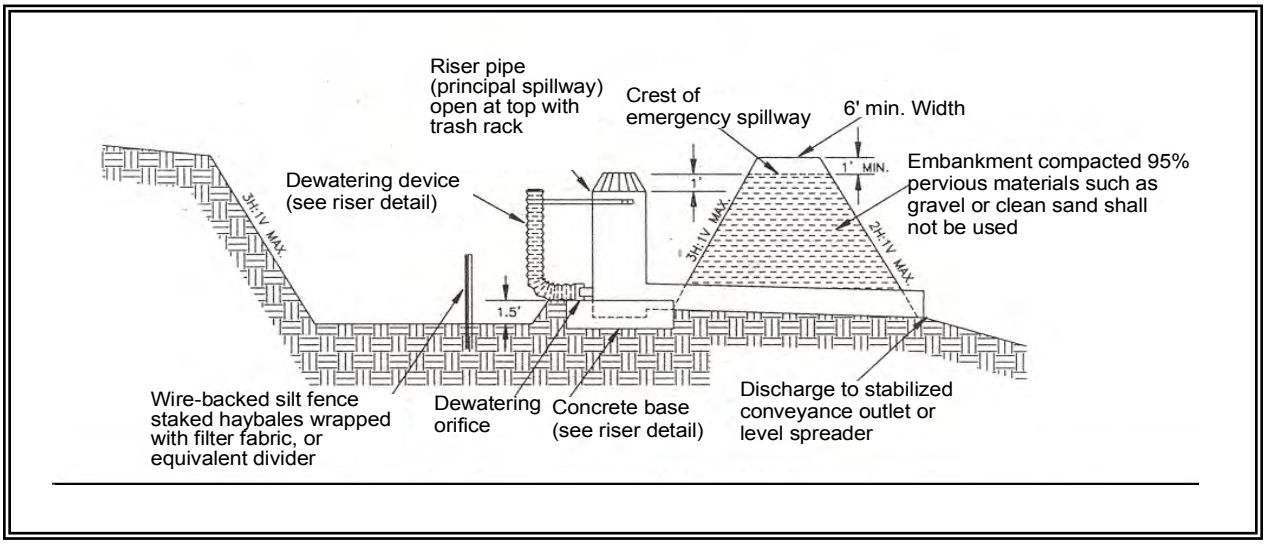


Figure 4.2.19 – Sediment Pond Cross Section

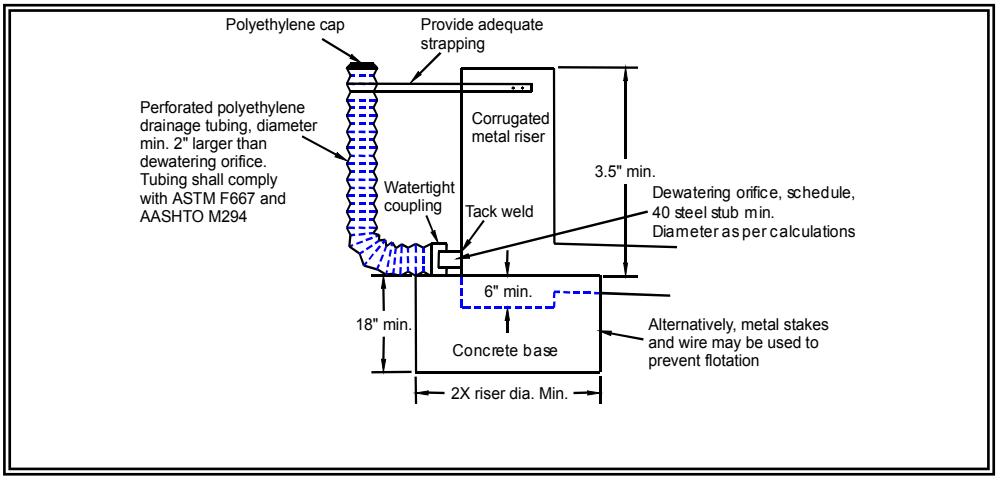


Figure 4.2.20 – Sediment Pond Riser Detail

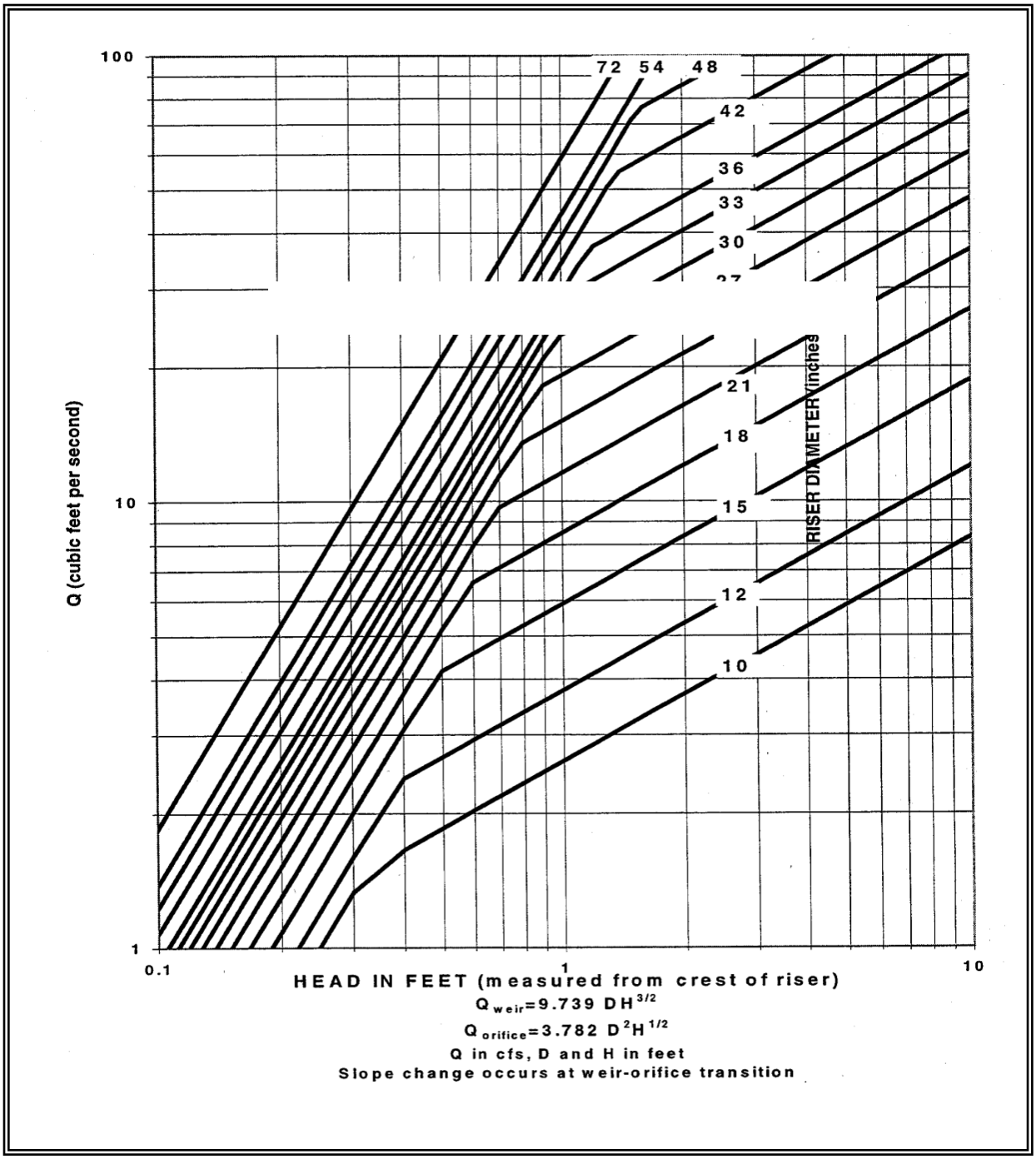


Figure 4.2.21 – Riser Inflow Curves

Principal Spillway: Determine the required diameter for the principal spillway (riser pipe). The diameter shall be the minimum necessary to pass the site's 15-minute, 10-year flowrate. If using the Western Washington Hydrology Model (WWHM), Version 2 or 3, design flow is the 10-year (1 hour) flow for the developed (unmitigated) site, multiplied by a factor of 1.6. Use Figure 4.2.21 to determine this diameter (h = 1-foot). *Note: A permanent control structure may be used instead of a temporary riser.*

Emergency Overflow Spillway: Determine the required size and design of the emergency overflow spillway for the developed 100-year peak flow using the method contained in Volume III.

Dewatering Orifice: Determine the size of the dewatering orifice(s) (minimum 1-inch diameter) using a modified version of the discharge equation for a vertical orifice and a basic equation for the area of a circular orifice. Determine the required area of the orifice with the following equation:

$$A_o = \frac{A_s (2h)^{0.5}}{0.6\text{x}3600Tg^{0.5}}$$

where A_O = orifice area (square feet)
A_S = pond surface area (square feet)
h = head of water above orifice (height of riser in feet)
T = dewatering time (24 hours)
g = acceleration of gravity (32.2 feet/second^2)

Convert the required surface area to the required diameter D of the orifice:

$$D = 24\text{x}\sqrt{\frac{A_o}{\pi}} = 13.54\text{x}\sqrt{A_o}$$

The vertical, perforated tubing connected to the dewatering orifice must be at least 2 inches larger in diameter than the orifice to improve flow characteristics. The size and number of perforations in the tubing should be large enough so that the tubing does not restrict flow. The orifice should control the flow rate.

- Additional Design Specifications

  The pond shall be divided into two roughly equal volume cells by a permeable divider that will reduce turbulence while allowing movement of water between cells. The divider shall be at least one-half the height of the riser and a minimum of one foot below the top of the riser. Wire-backed, 2- to 3-foot high, extra strength filter fabric supported by treated 4"x4"s can be used as a divider. Alternatively, staked straw bales wrapped with filter fabric (geotextile) may be used. If the pond is more than 6 feet deep, a different mechanism must be proposed. A riprap embankment is one acceptable method of

separation for deeper ponds. Other designs that satisfy the intent of this provision are allowed as long as the divider is permeable, structurally sound, and designed to prevent erosion under or around the barrier.

To aid in determining sediment depth, one-foot intervals shall be prominently marked on the riser.

If an embankment of more than 6 feet is proposed, the pond must comply with the criteria contained in Volume III regarding dam safety for detention BMPs.

- The most common structural failure of sedimentation basins is caused by piping. Piping refers to two phenomena: (1) water seeping through fine-grained soil, eroding the soil grain by grain and forming pipes or tunnels; and, (2) water under pressure flowing upward through a granular soil with a head of sufficient magnitude to cause soil grains to lose contact and capability for support.

  The most critical construction sequences to prevent piping will be:

  1. Tight connections between riser and barrel and other pipe connections.
  2. Adequate anchoring of riser.
  3. Proper soil compaction of the embankment and riser footing.
  4. Proper construction of anti-seep devices.

Maintenance Standards

- Sediment shall be removed from the pond when it reaches 1–foot in depth.
- Any damage to the pond embankments or slopes shall be repaired.

BMP C250: Construction Stormwater Chemical Treatment

Purpose

This BMP applies when using stormwater chemicals in batch treatment or flow-through treatment.

Turbidity is difficult to control once fine particles are suspended in stormwater runoff from a construction site. Sedimentation ponds are effective at removing larger particulate matter by gravity settling, but are ineffective at removing smaller particulates such as clay and fine silt. Traditional erosion and sediment control BMPs may not be adequate to ensure compliance with the water quality standards for turbidity in receiving water.

Chemical treatment can reliably provide exceptional reductions of turbidity and associated pollutants. Chemical treatment may be required to meet turbidity stormwater discharge requirements, especially when construction is to proceed through the wet season.

Conditions of Use

Formal written approval from Ecology is required for the use of chemical treatment regardless of site size. The Local Permitting Authority may also

Appendix C
Correspondence

Appendix D
Site Inspection Form

Construction Stormwater Site Inspection Form

Project Name _____ Permit # _____ Inspection Date _____ Time _____

Name of Certified Erosion Sediment Control Lead (CESCL) or qualified inspector if *less than one acre*
Print Name: _____

Approximate rainfall amount since the last inspection (in inches): _____

Approximate rainfall amount in the last 24 hours (in inches): _____

Current Weather Clear ☐ Cloudy ☐ Mist ☐ Rain ☐ Wind ☐ Fog ☐

A. Type of inspection: Weekly ☐ Post Storm Event ☐ Other ☐

B. Phase of Active Construction (*check all that apply*):

Pre Construction/installation of erosion/sediment controls	☐	Clearing/Demo/Grading	☐	Infrastructure/storm/roads	☐
Concrete pours	☐	Vertical Construction/buildings	☐	Utilities	☐
Offsite improvements	☐	Site temporary stabilized	☐	Final stabilization	☐

C. Questions:

1. Were all areas of construction and discharge points inspected? Yes ___ No ___
2. Did you observe the presence of suspended sediment, turbidity, discoloration, or oil sheen Yes ___ No ___
3. Was a water quality sample taken during inspection? (*refer to permit conditions S4 & S5*) Yes ___ No ___
4. Was there a turbid discharge 250 NTU or greater, or Transparency 6 cm or less?* Yes ___ No ___
5. If yes to #4 was it reported to Ecology? Yes ___ No ___
6. Is pH sampling required? pH range required is 6.5 to 8.5. Yes ___ No ___

If answering yes to a discharge, describe the event. Include when, where, and why it happened; what action was taken, and when.

_____

_____

_____

_____

*If answering yes to # 4 record NTU/Transparency with continual sampling daily until turbidity is 25 NTU or less/ transparency is 33 cm or greater.

Sampling Results: Date: _____

Parameter	Method (circle one)	Result			Other/Note
		NTU	cm	pH	
Turbidity	tube, meter, laboratory				
pH	Paper, kit, meter				

Construction Stormwater Site Inspection Form

D. Check the observed status of all items. Provide "Action Required "details and dates.

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
1 Clearing Limits	Before beginning land disturbing activities are all clearing limits, natural resource areas (streams, wetlands, buffers, trees) protected with barriers or similar BMPs? (high visibility recommended)						
2 Construction Access	Construction access is stabilized with quarry spalls or equivalent BMP to prevent sediment from being tracked onto roads?						
	Sediment tracked onto the road way was cleaned thoroughly at the end of the day or more frequent as necessary.						
3 Control Flow Rates	Are flow control measures installed to control stormwater volumes and velocity during construction and do they protect downstream properties and waterways from erosion?						
	If permanent infiltration ponds are used for flow control during construction, are they protected from siltation?						
4 Sediment Controls	All perimeter sediment controls (e.g. silt fence, wattles, compost socks, berms, etc.) installed, and maintained in accordance with the Stormwater Pollution Prevention Plan (SWPPP).						
	Sediment control BMPs (sediment ponds, traps, filters etc.) have been constructed and functional as the first step of grading.						
	Stormwater runoff from disturbed areas is directed to sediment removal BMP.						
5 Stabilize Soils	Have exposed un-worked soils been stabilized with effective BMP to prevent erosion and sediment deposition?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
5 Stabilize Soils Cont.	Are stockpiles stabilized from erosion, protected with sediment trapping measures and located away from drain inlet, waterways, and drainage channels?						
	Have soils been stabilized at the end of the shift, before a holiday or weekend if needed based on the weather forecast?						
6 Protect Slopes	Has stormwater and ground water been diverted away from slopes and disturbed areas with interceptor dikes, pipes and or swales?						
	Is off-site storm water managed separately from stormwater generated on the site?						
	Is excavated material placed on uphill side of trenches consistent with safety and space considerations?						
	Have check dams been placed at regular intervals within constructed channels that are cut down a slope?						
7 Drain Inlets	Storm drain inlets made operable during construction are protected.						
	Are existing storm drains within the influence of the project protected?						
8 Stabilize Channel and Outlets	Have all on-site conveyance channels been designed, constructed and stabilized to prevent erosion from expected peak flows?						
	Is stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes and downstream conveyance systems?						
9 Control Pollutants	Are waste materials and demolition debris handled and disposed of to prevent contamination of stormwater?						
	Has cover been provided for all chemicals, liquid products, petroleum products, and other material?						
	Has secondary containment been provided capable of containing 110% of the volume?						
	Were contaminated surfaces cleaned immediately after a spill incident?						
	Were BMPs used to prevent contamination of stormwater by a pH modifying sources?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
9 Cont.	Wheel wash wastewater is handled and disposed of properly.						
10 Control Dewatering	Concrete washout in designated areas. No washout or excess concrete on the ground.						
	Dewatering has been done to an approved source and in compliance with the SWPPP.						
	Were there any clean non turbid dewatering discharges?						
11 Maintain BMP	Are all temporary and permanent erosion and sediment control BMPs maintained to perform as intended?						
12 Manage the Project	Has the project been phased to the maximum degree practicable?						
	Has regular inspection, monitoring and maintenance been performed as required by the permit?						
	Has the SWPPP been updated, implemented and records maintained?						

E. Check all areas that have been inspected. ✔

All in place BMPs ☐ All disturbed soils ☐ All concrete wash out area ☐ All material storage areas ☐
All discharge locations ☐ All equipment storage areas ☐ All construction entrances/exits ☐

F. Elements checked "Action Required" (section D) describe corrective action to be taken. List the element number; be specific on location and work needed. Document, initial, and date when the corrective action has been completed and inspected.

Element #	Description and Location	Action Required	Completion Date	Initials

Attach additional page if needed

Sign the following certification:

"I certify that this report is true, accurate, and complete, to the best of my knowledge and belief"

Inspected by: (print) _____ (Signature) _____ Date: _____

Title/Qualification of Inspector: _____

Appendix E Construction Stormwater General Permit

Issuance Date: November 18, 2020
Effective Date: January 1, 2021
Expiration Date: December 31, 2025

CONSTRUCTION STORMWATER GENERAL PERMIT

National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for Stormwater Discharges Associated with Construction Activity

State of Washington
Department of Ecology
Olympia, Washington 98504

In compliance with the provisions of
Chapter 90.48 Revised Code of Washington
(State of Washington Water Pollution Control Act)
and
Title 33 United States Code, Section 1251 et seq.
The Federal Water Pollution Control Act (The Clean Water Act)

Until this permit expires, is modified, or revoked, Permittees that have properly obtained coverage under this general permit are authorized to discharge in accordance with the special and general conditions that follow.

Vincent McGowan, P.E.
Water Quality Program Manager
Washington State Department of Ecology

TABLE OF CONTENTS

LIST OF TABLES

SUMMARY OF PERMIT REPORT SUBMITTALS

Refer to the Special and General Conditions within this permit for additional submittal requirements. Appendix A provides a list of definitions. Appendix B provides a list of acronyms.

Table 1 Summary of Required Submittals

Permit Section	Submittal	Frequency	First Submittal Date
S5.A and S8	High Turbidity/Transparency Phone Reporting	As Necessary	Within 24 hours
S5.B	Discharge Monitoring Report	Monthly*	Within 15 days following the end of each month
S5.F and S8	Noncompliance Notification – Telephone Notification	As necessary	Within 24 hours
S5.F	Noncompliance Notification – Written Report	As necessary	Within 5 Days of non-compliance
S9.D	Request for Chemical Treatment Form	As necessary	Written approval from Ecology is required prior to using chemical treatment (with the exception of dry ice, CO_2 or food grade vinegar to adjust pH)
G2	Notice of Change in Authorization	As necessary	
G6	Permit Application for Substantive Changes to the Discharge	As necessary	
G8	Application for Permit Renewal	1/permit cycle	No later than 180 days before expiration
S2.A	Notice of Permit Transfer	As necessary	
G19	Notice of Planned Changes	As necessary	
G21	Reporting Anticipated Non-compliance	As necessary	

NOTE: *Permittees must submit electronic Discharge Monitoring Reports (DMRs) to the Washington State Department of Ecology monthly, regardless of site discharge, for the full duration of permit coverage. Refer to Section S5.B of this General Permit for more specific information regarding DMRs.

Table 2 Summary of Required On-site Documentation

Document Title	Permit Conditions
Permit Coverage Letter	See Conditions S2, S5
Construction Stormwater General Permit (CSWGP)	See Conditions S2, S5
Site Log Book	See Conditions S4, S5
Stormwater Pollution Prevention Plan (SWPPP)	See Conditions S5, S9
Site Map	See Conditions S5, S9

SPECIAL CONDITIONS

S1. PERMIT COVERAGE

A. Permit Area

This Construction Stormwater General Permit (CSWGP) covers all areas of Washington State, except for federal operators and Indian Country as specified in Special Condition S1.E.3 and 4.

B. Operators Required to Seek Coverage Under this General Permit

1. Operators of the following construction activities are required to seek coverage under this CSWGP:

    a. Clearing, grading and/or excavation that results in the disturbance of one or more acres (including off-site disturbance acreage related to construction-support activity as authorized in S1.C.2) and discharges stormwater to surface waters of the State; and clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more and discharge stormwater to surface waters of the State.

        i. This category includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, and discharge to surface waters of the State (that is, forest practices that prepare a site for construction activities); and

    b. Any size construction activity discharging stormwater to waters of the State that the Washington State Department of Ecology (Ecology):

        i. Determines to be a significant contributor of pollutants to waters of the State of Washington.

        ii. Reasonably expects to cause a violation of any water quality standard.

2. Operators of the following activities are not required to seek coverage under this CSWGP (unless specifically required under Special Condition S1.B.1.b, above):

    a. Construction activities that discharge all stormwater and non-stormwater to groundwater, sanitary sewer, or combined sewer, and have no point source discharge to either surface water or a storm sewer system that drains to surface waters of the State.

    b. Construction activities covered under an Erosivity Waiver (Special Condition S1.F).

    c. Routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

C. Authorized Discharges

1. ***Stormwater Associated with Construction Activity.*** Subject to compliance with the terms and conditions of this permit, Permittees are authorized to discharge stormwater associated with construction activity to surface waters of the State or to a storm sewer system that drains to surface waters of the State. (Note that "surface waters of the

State" may exist on a construction site as well as off site; for example, a creek running through a site.)

2. ***Stormwater Associated with Construction Support Activity.*** This permit also authorizes stormwater discharge from support activities related to the permitted construction site (for example, an on-site portable rock crusher, off-site equipment staging yards, material storage areas, borrow areas, etc.) provided:

    a. The support activity relates directly to the permitted construction site that is required to have an NPDES permit; and

    b. The support activity is not a commercial operation serving multiple unrelated construction projects, and does not operate beyond the completion of the construction activity; and

    c. Appropriate controls and measures are identified in the Stormwater Pollution Prevention Plan (SWPPP) for the discharges from the support activity areas.

3. ***Non-Stormwater Discharges.*** The categories and sources of non-stormwater discharges identified below are authorized conditionally, provided the discharge is consistent with the terms and conditions of this permit:

    a. Discharges from fire-fighting activities.

    b. Fire hydrant system flushing.

    c. Potable water, including uncontaminated water line flushing.

    d. Hydrostatic test water.

    e. Uncontaminated air conditioning or compressor condensate.

    f. Uncontaminated groundwater or spring water.

    g. Uncontaminated excavation dewatering water (in accordance with S9.D.10).

    h. Uncontaminated discharges from foundation or footing drains.

    i. Uncontaminated or potable water used to control dust. Permittees must minimize the amount of dust control water used.

    j. Routine external building wash down that does not use detergents.

    k. Landscape irrigation water.

The SWPPP must adequately address all authorized non-stormwater discharges, except for discharges from fire-fighting activities, and must comply with Special Condition S3. At a minimum, discharges from potable water (including water line flushing), fire hydrant system flushing, and pipeline hydrostatic test water must undergo the following: dechlorination to a concentration of 0.1 parts per million (ppm) or less, and pH adjustment to within 6.5 – 8.5 standard units (su), if necessary.

D. Prohibited Discharges

The following discharges to waters of the State, including groundwater, are prohibited:

1. Concrete wastewater

2. Wastewater from washout and clean-up of stucco, paint, form release oils, curing compounds and other construction materials.

3. Process wastewater as defined by 40 Code of Federal Regulations (CFR) 122.2 (See Appendix A of this permit).

4. Slurry materials and waste from shaft drilling, including process wastewater from shaft drilling for construction of building, road, and bridge foundations unless managed according to Special Condition S9.D.9.j.

5. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.

6. Soaps or solvents used in vehicle and equipment washing.

7. Wheel wash wastewater, unless managed according to Special Condition S9.D.9.

8. Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, unless managed according to Special Condition S9.D.10.

E. Limits on Coverage

Ecology may require any discharger to apply for and obtain coverage under an individual permit or another more specific general permit. Such alternative coverage will be required when Ecology determines that this CSWGP does not provide adequate assurance that water quality will be protected, or there is a reasonable potential for the project to cause or contribute to a violation of water quality standards.

The following stormwater discharges are not covered by this permit:

1. Post-construction stormwater discharges that originate from the site after completion of construction activities and the site has undergone final stabilization.

2. Non-point source silvicultural activities such as nursery operations, site preparation, reforestation and subsequent cultural treatment, thinning, prescribed burning, pest and fire control, harvesting operations, surface drainage, or road construction and maintenance, from which there is natural runoff as excluded in 40 CFR Subpart 122.

3. Stormwater from any federal operator.

4. Stormwater from facilities located on ***Indian Country*** as defined in 18 U.S.C.§1151, except portions of the Puyallup Reservation as noted below.

   Indian Country includes:

   a. All land within any Indian Reservation notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation. This includes all federal, tribal, and Indian and non-Indian privately owned land within the reservation.

   b. All off-reservation Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same.

   c. All off-reservation federal trust lands held for Native American Tribes.

Puyallup Exception: Following the *Puyallup Tribes of Indians Land Settlement Act of 1989*, 25 U.S.C. §1773; the permit does apply to land within the Puyallup Reservation except for discharges to surface water on land held in trust by the federal government.

5. Stormwater from any site covered under an existing NPDES individual permit in which stormwater management and/or treatment requirements are included for all stormwater discharges associated with construction activity.

6. Stormwater from a site where an applicable Total Maximum Daily Load (TMDL) requirement specifically precludes or prohibits discharges from construction activity.

F. Erosivity Waiver

Construction site operators may qualify for an Erosivity Waiver from the CSWGP if the following conditions are met:

1. The site will result in the disturbance of fewer than five (5) acres and the site is not a portion of a common plan of development or sale that will disturb five (5) acres or greater.

2. Calculation of Erosivity "R" Factor and Regional Timeframe:

    a. The project's calculated rainfall erosivity factor ("R" Factor) must be less than five (5) during the period of construction activity, (See the CSWGP homepage http://www.ecy.wa.gov/programs/wq/stormwater/construction/index.html for a link to the EPA's calculator and step by step instructions on computing the "R" Factor in the *EPA Erosivity Waiver Fact Sheet*). The period of construction activity starts when the land is first disturbed and ends with final stabilization. In addition:

    b. The entire period of construction activity must fall within the following timeframes:

        i. For sites west of the Cascades Crest: June 15 – September 15.

        ii. For sites east of the Cascades Crest, excluding the Central Basin: June 15 – October 15.

        iii. For sites east of the Cascades Crest, within the Central Basin: no timeframe restrictions apply. The Central Basin is defined as the portions of Eastern Washington with mean annual precipitation of less than 12 inches. For a map of the Central Basin (Average Annual Precipitation Region 2), refer to: http://www.ecy.wa.gov/programs/wq/stormwater/construction/resourcesguidance.html.

3. Construction site operators must submit a complete Erosivity Waiver certification form at least one week before disturbing the land. Certification must include statements that the operator will:

    a. Comply with applicable local stormwater requirements; and

    b. Implement appropriate erosion and sediment control BMPs to prevent violations of water quality standards.

4. This waiver is not available for facilities declared significant contributors of pollutants as defined in Special Condition S1.B.1.b or for any size construction activity that could

reasonably expect to cause a violation of any water quality standard as defined in Special Condition S1.B.1.b.ii.

5. This waiver does not apply to construction activities which include non-stormwater discharges listed in Special Condition S1.C.3.

6. If construction activity extends beyond the certified waiver period for any reason, the operator must either:

   a. Recalculate the rainfall erosivity "R" factor using the original start date and a new projected ending date and, if the "R" factor is still under 5 *and* the entire project falls within the applicable regional timeframe in Special Condition S1.F.2.b, complete and submit an amended waiver certification form before the original waiver expires; *or*

   b. Submit a complete permit application to Ecology in accordance with Special Condition S2.A and B before the end of the certified waiver period.

S2. APPLICATION REQUIREMENTS

A. Permit Application Forms

1. *Notice of Intent Form*

a. Operators of new or previously unpermitted construction activities must submit a complete and accurate permit application (Notice of Intent, or NOI) to Ecology.

b. Operators must apply using the electronic application form (NOI) available on Ecology's website (http://ecy.wa.gov/programs/wq/stormwater/construction/index.html). Permittees unable to submit electronically (for example, those who do not have an internet connection) must contact Ecology to request a waiver and obtain instructions on how to obtain a paper NOI.

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PO Box 47696
Olympia, Washington 98504-7696

c. The operator must submit the NOI at least 60 days before discharging stormwater from construction activities and must submit it prior to the date of the first public notice (See Special Condition S2.B, below, for details). The 30-day public comment period begins on the publication date of the second public notice. Unless Ecology responds to the complete application in writing, coverage under the general permit will automatically commence on the 31st day following receipt by Ecology of a *completed* NOI, or the issuance date of this permit, whichever is later; unless Ecology specifies a later date in writing as required by WAC173-226-200(2). See S8.B for Limits on Coverage for New Discharges to TMDL or 303(d)-Listed Waters.

d. If an applicant intends to use a Best Management Practice (BMP) selected on the basis of Special Condition S9.C.4 ("demonstrably equivalent" BMPs), the applicant must notify Ecology of its selection as part of the NOI. In the event the applicant selects BMPs after submission of the NOI, the applicant must provide notice of the

selection of an equivalent BMP to Ecology at least 60 days before intended use of the equivalent BMP.

e. Applicants must notify Ecology if they are aware of contaminated soils and/or groundwater associated with the construction activity. Provide detailed information with the NOI (as known and readily available) on the nature and extent of the contamination (concentrations, locations, and depth), as well as pollution prevention and/or treatment BMPs proposed to control the discharge of soil and/or groundwater contaminants in stormwater. Examples of such detail may include, but are not limited to:

   i. List or table of all known contaminants with laboratory test results showing concentration and depth,

   ii. Map with sample locations,

   iii. Related portions of the Stormwater Pollution Prevention Plan (SWPPP) that address the management of contaminated and potentially contaminated construction stormwater and dewatering water,

   iv. Dewatering plan and/or dewatering contingency plan.

2. ***Transfer of Coverage Form***

The Permittee can transfer current coverage under this permit to one or more new operators, including operators of sites within a Common Plan of Development, provided:

   i. The Permittee submits a complete Transfer of Coverage Form to Ecology, signed by the current and new discharger and containing a specific date for transfer of permit responsibility, coverage and liability (including any Administrative Orders associated with the permit); and

   ii. Ecology does not notify the current discharger and new discharger of intent to revoke coverage under the general permit. If this notice is not given, the transfer is effective on the date specified in the written agreement.

When a current discharger (Permittee) transfers a portion of a permitted site, the current discharger must also indicate the remaining permitted acreage after the transfer. Transfers do not require public notice.

3. ***Modification of Coverage Form***

Permittees must notify Ecology regarding any changes to the information provided on the NOI by submitting an Update/Modification of Permit Coverage form in accordance with General Conditions G6 and G19. Examples of such changes include, but are not limited to:

   i. Changes to the Permittee's mailing address,

   ii. Changes to the on-site contact person information, and

   iii. Changes to the area/acreage affected by construction activity.

B. Public Notice

For new or previously unpermitted construction activities, the applicant must publish a public notice at least one time each week for two consecutive weeks, at least 7 days apart, in a newspaper with general circulation in the county where the construction is to take place. The notice must be run after the NOI has been submitted and must contain:

1. A statement that "*The applicant is seeking coverage under the Washington State Department of Ecology's Construction Stormwater NPDES and State Waste Discharge General Permit*."
2. The name, address, and location of the construction site.
3. The name and address of the applicant.
4. The type of construction activity that will result in a discharge (for example, residential construction, commercial construction, etc.), and the total number of acres to be disturbed over the lifetime of the project.
5. The name of the receiving water(s) (that is, the surface water(s) to which the site will discharge), or, if the discharge is through a storm sewer system, the name of the operator of the system and the receiving water(s) the system discharges to.
6. The statement: *Any persons desiring to present their views to the Washington State Department of Ecology regarding this application, or interested in Ecology's action on this application, may notify Ecology in writing no later than 30 days of the last date of publication of this notice. Ecology reviews public comments and considers whether discharges from this project would cause a measurable change in receiving water quality, and, if so, whether the project is necessary and in the overriding public interest according to Tier II antidegradation requirements under WAC 173-201A-320. Comments can be submitted to: Department of Ecology, PO Box 47696, Olympia, Washington 98504-7696 Attn: Water Quality Program, Construction Stormwater*.

S3. COMPLIANCE WITH STANDARDS

A. Discharges must not cause or contribute to a violation of surface water quality standards (Chapter 173-201A WAC), groundwater quality standards (Chapter 173-200 WAC), sediment management standards (Chapter 173-204 WAC), and human health-based criteria in the Federal water quality criteria applicable to Washington. (40 CFR Part 131.45) Discharges that are not in compliance with these standards are prohibited.

B. Prior to the discharge of stormwater and non-stormwater to waters of the State, the Permittee must apply All Known, Available, and Reasonable methods of prevention, control, and Treatment (AKART). This includes the preparation and implementation of an adequate SWPPP, with all appropriate BMPs installed and maintained in accordance with the SWPPP and the terms and conditions of this permit.

C. Ecology presumes that a Permittee complies with water quality standards unless discharge monitoring data or other site-specific information demonstrates that a discharge causes or contributes to a violation of water quality standards, when the Permittee complies with the following conditions. The Permittee must fully:

1. Comply with all permit conditions, including; planning, sampling, monitoring, reporting, and recordkeeping conditions.

2. Implement stormwater BMPs contained in stormwater management manuals published or approved by Ecology, or BMPs that are demonstrably equivalent to BMPs contained in stormwater management manuals published or approved by Ecology, including the proper selection, implementation, and maintenance of all applicable and appropriate BMPs for on-site pollution control. (For purposes of this section, the stormwater manuals listed in Appendix 10 of the *Phase I Municipal Stormwater Permit* are approved by Ecology.)

D. Where construction sites also discharge to groundwater, the groundwater discharges must also meet the terms and conditions of this CSWGP. Permittees who discharge to groundwater through an injection well must also comply with any applicable requirements of the Underground Injection Control (UIC) regulations, Chapter 173-218 WAC.

S4. MONITORING REQUIREMENTS, BENCHMARKS, AND REPORTING TRIGGERS

A. Site Log Book

The Permittee must maintain a site log book that contains a record of the implementation of the SWPPP and other permit requirements, including the installation and maintenance of BMPs, site inspections, and stormwater monitoring.

B. Site Inspections

Construction sites one (1) acre or larger that discharge stormwater to surface waters of the State must have site inspections conducted by a Certified Erosion and Sediment Control Lead (CESCL). Sites less than one (1) acre may have a person without CESCL certification conduct inspections. (See Special Conditions S4.B.3 and B.4, below, for detailed requirements of the Permittee's CESCL.)

Site inspections must include all areas disturbed by construction activities, all BMPs, and all stormwater discharge points under the Permittee's operational control.

1. The Permittee must have staff knowledgeable in the principles and practices of erosion and sediment control. The CESCL (sites one acre or more) or inspector (sites less than one acre) must have the skills to assess the:

    a. Site conditions and construction activities that could impact the quality of stormwater; and

    b. Effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges. The SWPPP must identify the CESCL or inspector, who must be present on site or on-call at all times. The CESCL (sites one (1) acre or more) must obtain this certification through an approved erosion and sediment control training program that meets the minimum training standards established by Ecology. (See BMP C160 in the manual, referred to in Special Condition S9.C.1 and 2.)

2. The CESCL or inspector must examine stormwater visually for the presence of suspended sediment, turbidity, discoloration, and oil sheen. BMP effectiveness must be evaluated to

determine if it is necessary to install, maintain, or repair BMPs to improve the quality of stormwater discharges.

Based on the results of the inspection, the Permittee must correct the problems identified, by:

a. Reviewing the SWPPP for compliance with Special Condition S9 and making appropriate revisions within 7 days of the inspection.

b. Immediately beginning the process of fully implementing and maintaining appropriate source control and/or treatment BMPs, within 10 days of the inspection. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when an extension is requested by a Permittee within the initial 10-day response period.

c. Documenting BMP implementation and maintenance in the site log book.

3. The CESCL or inspector must inspect all areas disturbed by construction activities, all BMPs, and all stormwater discharge points at least once every calendar week and within 24 hours of any discharge from the site. (For purposes of this condition, individual discharge events that last more than one (1) day do not require daily inspections. For example, if a stormwater pond discharges continuously over the course of a week, only one (1) inspection is required that week.) Inspection frequency may be reduced to once every calendar month for inactive sites that are temporarily stabilized.

4. The Permittee must summarize the results of each inspection in an inspection report or checklist and enter the report/checklist into, or attach it to, the site log book. At a minimum, each inspection report or checklist must include:

   a. Inspection date and time.

   b. Weather information.

   c. The general conditions during inspection.

   d. The approximate amount of precipitation since the last inspection.

   e. The approximate amount of precipitation within the last 24 hours.

   f. A summary or list of all implemented BMPs, including observations of all erosion/sediment control structures or practices.

   g. A description of:

      i. BMPs inspected (including location).

      ii. BMPs that need maintenance and why.

      iii. BMPs that failed to operate as designed or intended, and

      iv. Where additional or different BMPs are needed, and why.

   h. A description of stormwater discharged from the site. The Permittee must note the presence of suspended sediment, turbidity, discoloration, and oil sheen, as applicable.

i. Any water quality monitoring performed during inspection.

j. General comments and notes, including a brief description of any BMP repairs, maintenance, or installations made following the inspection.

k. An implementation schedule for the remedial actions that the Permittee plans to take if the site inspection indicates that the site is out of compliance. The remedial actions taken must meet the requirements of the SWPPP and the permit.

l. A summary report of the inspection.

m. The name, title, and signature of the person conducting the site inspection, a phone number or other reliable method to reach this person, and the following statement: *I certify that this report is true, accurate, and complete to the best of my knowledge and belief.*

Table 3 Summary of Primary Monitoring Requirements

Size of Soil Disturbance[1]	Weekly Site Inspections	Weekly Sampling w/ Turbidity Meter	Weekly Sampling w/ Transparency Tube	Weekly pH Sampling[2]	CESCL Required for Inspections?
Sites that disturb less than 1 acre, but are part of a larger Common Plan of Development	Required	Not Required	Not Required	Not Required	No
Sites that disturb 1 acre or more, but fewer than 5 acres	Required	Sampling Required – either method[3]		Required	Yes
Sites that disturb 5 acres or more	Required	Required	Not Required[4]	Required	Yes

[1] Soil disturbance is calculated by adding together all areas that will be affected by construction activity. Construction activity means clearing, grading, excavation, and any other activity that disturbs the surface of the land, including ingress/egress from the site.

[2] If construction activity results in the disturbance of 1 acre or more, and involves significant concrete work (1,000 cubic yards of concrete or recycled concrete placed or poured over the life of a project) or the use of engineered soils (soil amendments including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD], or fly ash), and stormwater from the affected area drains to surface waters of the State or to a storm sewer stormwater collection system that drains to other surface waters of the State, the Permittee must conduct pH sampling in accordance with Special Condition S4.D.

[3] Sites with one or more acres, but fewer than 5 acres of soil disturbance, must conduct turbidity or transparency sampling in accordance with Special Condition S4.C.4.a or b.

[4] Sites equal to or greater than 5 acres of soil disturbance must conduct turbidity sampling using a turbidity meter in accordance with Special Condition S4.C.4.a.

C. Turbidity/Transparency Sampling Requirements

1. Sampling Methods

    a. If construction activity involves the disturbance of five (5) acres or more, the Permittee must conduct turbidity sampling per Special Condition S4.C.4.a, below.

    b. If construction activity involves one (1) acre or more but fewer than five (5) acres of soil disturbance, the Permittee must conduct either transparency sampling *or* turbidity sampling per Special Condition S4.C.4.a or b, below.

2. Sampling Frequency

    a. The Permittee must sample all discharge points at least once every calendar week when stormwater (or authorized non-stormwater) discharges from the site or enters any on-site surface waters of the state (for example, a creek running through a site); sampling is not required on sites that disturb less than an acre.

    b. Samples must be representative of the flow and characteristics of the discharge.

    c. Sampling is not required when there is no discharge during a calendar week.

    d. Sampling is not required outside of normal working hours or during unsafe conditions.

    e. If the Permittee is unable to sample during a monitoring period, the Permittee must include a brief explanation in the monthly Discharge Monitoring Report (DMR).

    f. Sampling is not required before construction activity begins.

    g. The Permittee may reduce the sampling frequency for temporarily stabilized, inactive sites to once every calendar month.

3. Sampling Locations

    a. Sampling is required at all points where stormwater associated with construction activity (or authorized non-stormwater) is discharged off site, including where it enters any on-site surface waters of the state (for example, a creek running through a site).

    b. The Permittee may discontinue sampling at discharge points that drain areas of the project that are fully stabilized to prevent erosion.

    c. The Permittee must identify all sampling point(s) in the SWPPP and on the site map and clearly mark these points in the field with a flag, tape, stake or other visible marker.

    d. Sampling is not required for discharge that is sent directly to sanitary or combined sewer systems.

    e. The Permittee may discontinue sampling at discharge points in areas of the project where the Permittee no longer has operational control of the construction activity.

4. Sampling and Analysis Methods

   a. The Permittee performs turbidity analysis with a calibrated turbidity meter (turbidimeter) either on site or at an accredited lab. The Permittee must record the results in the site log book in nephelometric turbidity units (NTUs).

   b. The Permittee performs transparency analysis on site with a 1¾ inch diameter, 60 centimeter (cm)-long transparency tube. The Permittee will record the results in the site log book in centimeters (cm).

Table 4 Monitoring and Reporting Requirements

Parameter	Unit	Analytical Method	Sampling Frequency	Benchmark Value
Turbidity	NTU	SM2130	Weekly, if discharging	25 NTUs
Transparency	Cm	Manufacturer instructions, or Ecology guidance	Weekly, if discharging	33 cm

5. Turbidity/Transparency Benchmark Values and Reporting Triggers

   The benchmark value for turbidity is 25 NTUs. The benchmark value for transparency is 33 centimeters (cm). Note: Benchmark values do not apply to discharges to segments of water bodies on Washington State's 303(d) list (Category 5) for turbidity, fine sediment, or phosphorus; these discharges are subject to a numeric effluent limit for turbidity. Refer to Special Condition S8 for more information and follow S5.F – Noncompliance Notification for reporting requirements applicable to discharges which exceed the numeric effluent limit for turbidity.

   a. Turbidity 26 – 249 NTUs, or Transparency 32 – 7 cm:

      If the discharge turbidity is 26 to 249 NTUs; or if discharge transparency is 32 to 7 cm, the Permittee must:

      i. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs, and no later than 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.

      ii. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within 7 days of the date the discharge exceeded the benchmark.

      iii. Document BMP implementation and maintenance in the site log book.

   b. Turbidity 250 NTUs or greater, or Transparency 6 cm or less:

      If a discharge point's turbidity is 250 NTUs or greater, or if discharge transparency is less than or equal to 6 cm, the Permittee must complete the reporting and adaptive

management process described below. For discharges which are subject to a numeric effluent limit for turbidity, see S5.F – Noncompliance Notification.

i. Within 24 hours, telephone or submit an electronic report to the applicable Ecology Region's Environmental Report Tracking System (ERTS) number (or through Ecology's Water Quality Permitting Portal [WQWebPortal] – Permit Submittals when the form is available), in accordance with Special Condition S5.A.

- **Central Region** (Okanogan, Chelan, Douglas, Kittitas, Yakima, Klickitat, Benton): (509) 575-2490
- **Eastern Region** (Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman): (509) 329-3400
- **Northwest Region** (Kitsap, Snohomish, Island, King, San Juan, Skagit, Whatcom): (425) 649-7000
- **Southwest Region** (Grays Harbor, Lewis, Mason, Thurston, Pierce, Clark, Cowlitz, Skamania, Wahkiakum, Clallam, Jefferson, Pacific): (360) 407-6300

These numbers and a link to the ERTS reporting page are also listed at the following website: http://www.ecy.wa.gov/programs/wq/stormwater/construction/index.html.

ii. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, addressing the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.

iii. Sample discharges daily until:

a) Turbidity is 25 NTUs (or lower); or

b) Transparency is 33 cm (or greater); or

c) The Permittee has demonstrated compliance with the water quality standard for turbidity:

1) No more than 5 NTUs over background turbidity, if background is less than 50 NTUs, or

2) No more than 10% over background turbidity, if background is 50 NTUs or greater; or

*Note: background turbidity in the receiving water must be measured immediately upstream (upgradient) or outside of the area of influence of the discharge.

d) The discharge stops or is eliminated.

iv. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within seven (7) days of the date the discharge exceeded the benchmark.

v. Document BMP implementation and maintenance in the site log book.

Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with permit benchmarks.

D. pH Sampling Requirements – Significant Concrete Work or Engineered Soils

If construction activity results in the disturbance of 1 acre or more, *and* involves significant concrete work (significant concrete work means greater than 1000 cubic yards placed or poured concrete or recycled concrete used over the life of a project) or the use of engineered soils (soil amendments including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD], or fly ash), and stormwater from the affected area drains to surface waters of the State or to a storm sewer system that drains to surface waters of the State, the Permittee must conduct pH sampling as set forth below. Note: In addition, discharges to segments of water bodies on Washington State's 303(d) list (Category 5) for high pH are subject to a numeric effluent limit for pH; refer to Special Condition S8.

1. The Permittee must perform pH analysis on site with a calibrated pH meter, pH test kit, or wide range pH indicator paper. The Permittee must record pH sampling results in the site log book.

2. During the applicable pH monitoring period defined below, the Permittee must obtain a representative sample of stormwater and conduct pH analysis at least once per week.

    a. For sites with significant concrete work, the Permittee must begin the pH sampling period when the concrete is first placed or poured and exposed to precipitation, and continue weekly throughout and after the concrete placement, pour and curing period, until stormwater pH is in the range of 6.5 to 8.5 (su).

    b. For sites with recycled concrete where monitoring is required, the Permittee must begin the weekly pH sampling period when the recycled concrete is first exposed to precipitation and must continue until the recycled concrete is fully stabilized with the stormwater pH in the range of 6.5 to 8.5 (su).

    c. For sites with engineered soils, the Permittee must begin the pH sampling period when the soil amendments are first exposed to precipitation and must continue until the area of engineered soils is fully stabilized.

3. The Permittee must sample pH in the sediment trap/pond(s) or other locations that receive stormwater runoff from the area of significant concrete work or engineered soils before the stormwater discharges to surface waters.

4. The benchmark value for pH is 8.5 standard units. Anytime sampling indicates that pH is 8.5 or greater, the Permittee must either:

    a. Prevent the high pH water (8.5 or above) from entering storm sewer systems or surface waters of the state; *or*

    b. If necessary, adjust or neutralize the high pH water until it is in the range of pH 6.5 to 8.5 (su) using an appropriate treatment BMP such as carbon dioxide (CO_2) sparging, dry ice or food grade vinegar. The Permittee must obtain written approval from Ecology before using any form of chemical treatment other than CO_2 sparging, dry ice or food grade vinegar.

S5. REPORTING AND RECORDKEEPING REQUIREMENTS

A. High Turbidity Reporting

Anytime sampling performed in accordance with Special Condition S4.C indicates turbidity has reached the 250 NTUs or more (or transparency less than or equal to 6 cm), high turbidity reporting level, the Permittee must notify Ecology within 24 hours of analysis either by calling the applicable Ecology Region's Environmental Report Tracking System (ERTS) number by phone or by submitting an electronic ERTS report (through Ecology's Water Quality Permitting Portal (WQWebPortal) – Permit Submittals when the form is available). See the CSWGP website for links to ERTS and the WQWebPortal. (http://www.ecy.wa.gov/programs/wq/stormwater/construction/index.html) Also, see phone numbers in Special Condition S4.C.5.b.i.

B. Discharge Monitoring Reports (DMRs)

Permittees required to conduct water quality sampling in accordance with Special Conditions S4.C (Turbidity/Transparency), S4.D (pH), S8 (303[d]/TMDL sampling), and/or G12 (Additional Sampling) must submit the results to Ecology.

Permittees must submit monitoring data using Ecology's WQWebDMR web application accessed through Ecology's Water Quality Permitting Portal.

Permittees unable to submit electronically (for example, those who do not have an internet connection) must contact Ecology to request a waiver and obtain instructions on how to obtain a paper copy DMR at:

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

Permittees who obtain a waiver not to use WQWebDMR must use the forms provided to them by Ecology; submittals must be mailed to the address above. Permittees must submit DMR forms to be received by Ecology within 15 days following the end of each month.

If there was no discharge during a given monitoring period, all Permittees must submit a DMR as required with "no discharge" entered in place of the monitoring results. DMRs are required for the full duration of permit coverage (from the first full month following the effective date of permit coverage up until Ecology has approved termination of the coverage). For more information, contact Ecology staff using information provided at the following website: www.ecy.wa.gov/programs/wq/permits/paris/contacts.html.

C. Records Retention

The Permittee must retain records of all monitoring information (site log book, sampling results, inspection reports/checklists, etc.), Stormwater Pollution Prevention Plan, copy of the permit coverage letter (including Transfer of Coverage documentation) and any other documentation of compliance with permit requirements for the entire life of the construction project and for a minimum of five (5) years following the termination of permit coverage. Such information must include all calibration and maintenance records, and records of all data used to complete the application for this permit. This period of retention must be extended during

the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by Ecology.

D. Recording Results

For each measurement or sample taken, the Permittee must record the following information:

1. Date, place, method, and time of sampling or measurement.
2. The first and last name of the individual who performed the sampling or measurement.
3. The date(s) the analyses were performed.
4. The first and last name of the individual who performed the analyses.
5. The analytical techniques or methods used.
6. The results of all analyses.

E. Additional Monitoring by the Permittee

If the Permittee samples or monitors any pollutant more frequently than required by this permit using test procedures specified by Special Condition S4 of this permit, the sampling results for this monitoring must be included in the calculation and reporting of the data submitted in the Permittee's DMR.

F. Noncompliance Notification

In the event the Permittee is unable to comply with any part of the terms and conditions of this permit, and the resulting noncompliance may cause a threat to human health or the environment (such as but not limited to spills or fuels or other materials, catastrophic pond or slope failure, and discharges that violate water quality standards), or exceed numeric effluent limitations (see S8 – Discharges to 303(d) or TMDL Waterbodies), the Permittee must, upon becoming aware of the circumstance:

1. Notify Ecology within 24 hours of the failure to comply by calling the applicable Regional office ERTS phone number (refer to Special Condition S4.C.5.b.i, or go to https://ecology.wa.gov/About-us/Get-involved/Report-an-environmental-issue to find contact information for the regional offices.)
2. Immediately take action to prevent the discharge/pollution, or otherwise stop or correct the noncompliance, and, if applicable, repeat sampling and analysis of any noncompliance immediately and submit the results to Ecology within five (5) days of becoming aware of the violation (See S5.F.3, below, for details on submitting results in a report).
3. Submit a detailed written report to Ecology within five (5) days of the time the Permittee becomes aware of the circumstances, unless requested earlier by Ecology. The report must be submitted using Ecology's Water Quality Permitting Portal (WQWebPortal) – Permit Submittals, unless a waiver from electronic reporting has been granted according to S5.B. The report must contain a description of the noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

The Permittee must report any unanticipated bypass and/or upset that exceeds any effluent limit in the permit in accordance with the 24-hour reporting requirement contained in 40 C.F.R. 122.41(l)(6).

Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply. Upon request of the Permittee, Ecology may waive the requirement for a written report on a case-by-case basis, if the immediate notification is received by Ecology within 24 hours.

G. Access to Plans and Records

1. The Permittee must retain the following permit documentation (plans and records) on site, or within reasonable access to the site, for use by the operator or for on-site review by Ecology or the local jurisdiction:

    a. General Permit

    b. Permit Coverage Letter

    c. Stormwater Pollution Prevention Plan (SWPPP)

    d. Site Log Book

    e. Erosivity Waiver (if applicable)

2. The Permittee must address written requests for plans and records listed above (Special Condition S5.G.1) as follows:

    a. The Permittee must provide a copy of plans and records to Ecology within 14 days of receipt of a written request from Ecology.

    b. The Permittee must provide a copy of plans and records to the public when requested in writing. Upon receiving a written request from the public for the Permittee's plans and records, the Permittee must either:

        i. Provide a copy of the plans and records to the requester within 14 days of a receipt of the written request; *or*

        ii. Notify the requester within 10 days of receipt of the written request of the location and times within normal business hours when the plans and records may be viewed; and provide access to the plans and records within 14 days of receipt of the written request; *or*

            Within 14 days of receipt of the written request, the Permittee may submit a copy of the plans and records to Ecology for viewing and/or copying by the requester at an Ecology office, or a mutually agreed location. If plans and records are viewed and/or copied at a location other than at an Ecology office, the Permittee will provide reasonable access to copying services for which a reasonable fee may be charged. The Permittee must notify the requester within 10 days of receipt of the request where the plans and records may be viewed and/or copied.

S6. PERMIT FEES

The Permittee must pay permit fees assessed by Ecology. Fees for stormwater discharges covered under this permit are established by Chapter 173-224 WAC. Ecology continues to assess permit fees until the permit is terminated in accordance with Special Condition S10 or revoked in accordance with General Condition G5.

S7. SOLID AND LIQUID WASTE DISPOSAL

The Permittee must handle and dispose of solid and liquid wastes generated by construction activity, such as demolition debris, construction materials, contaminated materials, and waste materials from maintenance activities, including liquids and solids from cleaning catch basins and other stormwater facilities, in accordance with:

A. Special Condition S3, Compliance with Standards.

B. WAC 173-216-110.

C. Other applicable regulations.

S8. DISCHARGES TO 303(d) OR TMDL WATERBODIES

A. Sampling and Numeric Effluent Limits For Certain Discharges to 303(d)-Listed Water Bodies

1. Permittees who discharge to segments of water bodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, high pH, or phosphorus, must conduct water quality sampling according to the requirements of this section, and Special Conditions S4.C.2.b-f and S4.C.3.b-d, and must comply with the applicable numeric effluent limitations in S8.C and S8.D.

2. All references and requirements associated with Section 303(d) of the Clean Water Act mean the most current listing by Ecology of impaired waters (Category 5) that exists on January 1, 2021, or the date when the operator's complete permit application is received by Ecology, whichever is later.

B. Limits on Coverage for New Discharges to TMDL or 303(d)-Listed Waters

Construction sites that discharge to a TMDL or 303(d)-listed waterbody are not eligible for coverage under this permit *unless* the operator:

1. Prevents exposing stormwater to pollutants for which the waterbody is impaired, and retains documentation in the SWPPP that details procedures taken to prevent exposure on site; *or*

2. Documents that the pollutants for which the waterbody is impaired are not present at the site, and retains documentation of this finding within the SWPPP; *or*

3. Provides Ecology with data indicating the discharge is not expected to cause or contribute to an exceedance of a water quality standard, and retains such data on site with the SWPPP. The operator must provide data and other technical information to Ecology that sufficiently demonstrate:

    a. For discharges to waters without an EPA-approved or -established TMDL, that the discharge of the pollutant for which the water is impaired will meet in-stream water quality criteria at the point of discharge to the waterbody; *or*

    b. For discharges to waters with an EPA-approved or -established TMDL, that there is sufficient remaining wasteload allocation in the TMDL to allow construction stormwater discharge and that existing dischargers to the waterbody are subject to compliance schedules designed to bring the waterbody into attainment with water quality standards.

    Operators of construction sites are eligible for coverage under this permit only after Ecology makes an affirmative determination that the *discharge will not cause or contribute to the existing impairment or exceed the TMDL.*

C. Sampling and Numeric Effluent Limits for Discharges to Water Bodies on the 303(d) List for Turbidity, Fine Sediment, or Phosphorus

1. Permittees who discharge to segments of water bodies on the 303(d) list (Category 5) for turbidity, fine sediment, or phosphorus must conduct turbidity sampling in accordance with Special Condition S4.C.2 and comply with either of the numeric effluent limits noted in Table 5 below.

2. As an alternative to the 25 NTUs effluent limit noted in Table 5 below (applied at the point where stormwater [or authorized non-stormwater] is discharged off-site), Permittees may choose to comply with the surface water quality standard for turbidity. The standard is: no more than 5 NTUs over background turbidity when the background turbidity is 50 NTUs or less, or no more than a 10% increase in turbidity when the background turbidity is more than 50 NTUs. In order to use the water quality standard requirement, the sampling must take place at the following locations:

    a. Background turbidity in the 303(d)-listed receiving water immediately upstream (upgradient) or outside the area of influence of the discharge.

    b. Turbidity at the point of discharge into the 303(d)-listed receiving water, inside the area of influence of the discharge**.**

3. Discharges that exceed the numeric effluent limit for turbidity constitute a violation of this permit.

4. Permittees whose discharges exceed the numeric effluent limit must sample discharges daily until the violation is corrected and comply with the non-compliance notification requirements in Special Condition S5.F.

Table 5 Turbidity, Fine Sediment & Phosphorus Sampling and Limits for 303(d)-Listed Waters

Parameter identified in 303(d) listing	Parameter Sampled	Unit	Analytical Method	Sampling Frequency	Numeric Effluent Limit[1]
• Turbidity • Fine Sediment • Phosphorus	Turbidity	NTU	SM2130	Weekly, if discharging	25 NTUs, at the point where stormwater is discharged from the site; ***OR*** In compliance with the surface water quality standard for turbidity (S8.C.2.a)

[1] Permittees subject to a numeric effluent limit for turbidity may, at their discretion, choose either numeric effluent limitation based on site-specific considerations including, but not limited to, safety, access and convenience.

D. Discharges to Water Bodies on the 303(d) List for High pH

1. Permittees who discharge to segments of water bodies on the 303(d) list (Category 5) for high pH must conduct pH sampling in accordance with the table below, and comply with the numeric effluent limit of pH 6.5 to 8.5 su (Table 6).

Table 6 pH Sampling and Limits for 303(d)-Listed Waters

Parameter identified in 303(d) listing	Parameter Sampled/Units	Analytical Method	Sampling Frequency	Numeric Effluent Limit
High pH	pH /Standard Units	pH meter	Weekly, if discharging	In the range of 6.5 – 8.5 su

2. At the Permittee's discretion, compliance with the limit shall be assessed at one of the following locations:

   a. Directly in the 303(d)-listed waterbody segment, inside the immediate area of influence of the discharge; *or*

   b. Alternatively, the Permittee may measure pH at the point where the discharge leaves the construction site, rather than in the receiving water.

3. Discharges that exceed the numeric effluent limit for pH (outside the range of 6.5 – 8.5 su) constitute a violation of this permit.

4. Permittees whose discharges exceed the numeric effluent limit must sample discharges daily until the violation is corrected and comply with the non-compliance notification requirements in Special Condition S5.F.

E. Sampling and Limits for Sites Discharging to Waters Covered by a TMDL or another Pollution Control Plan

1. Discharges to a waterbody that is subject to a Total Maximum Daily Load (TMDL) for turbidity, fine sediment, high pH, or phosphorus must be consistent with the TMDL. Refer to http://www.ecy.wa.gov/programs/wq/tmdl/TMDLsbyWria/TMDLbyWria.html for more information on TMDLs.

    a. Where an applicable TMDL sets specific waste load allocations or requirements for discharges covered by this permit, discharges must be consistent with any specific waste load allocations or requirements established by the applicable TMDL.

        i. The Permittee must sample discharges weekly, unless otherwise specified by the TMDL, to evaluate compliance with the specific waste load allocations or requirements.

        ii. Analytical methods used to meet the monitoring requirements must conform to the latest revision of the *Guidelines Establishing Test Procedures for the Analysis of Pollutants* contained in 40 CFR Part 136.

        iii. Turbidity and pH methods need not be accredited or registered unless conducted at a laboratory which must otherwise be accredited or registered.

    b. Where an applicable TMDL has established a general waste load allocation for construction stormwater discharges, but has not identified specific requirements, compliance with Special Conditions S4 (Monitoring) and S9 (SWPPPs) will constitute compliance with the approved TMDL.

    c. Where an applicable TMDL has not specified a waste load allocation for construction stormwater discharges, but has not excluded these discharges, compliance with Special Conditions S4 (Monitoring) and S9 (SWPPPs) will constitute compliance with the approved TMDL.

    d. Where an applicable TMDL specifically precludes or prohibits discharges from construction activity, the operator is not eligible for coverage under this permit.

S9. STORMWATER POLLUTION PREVENTION PLAN

The Permittee must prepare and properly implement an adequate Stormwater Pollution Prevention Plan (SWPPP) for construction activity in accordance with the requirements of this permit beginning with initial soil disturbance and until final stabilization.

A. The Permittee's SWPPP must meet the following objectives:

1. To identify best management practices (BMPs) which prevent erosion and sedimentation, and to reduce, eliminate or prevent stormwater contamination and water pollution from construction activity.

2. To prevent violations of surface water quality, groundwater quality, or sediment management standards.

3. To control peak volumetric flow rates and velocities of stormwater discharges.

B. General Requirements

1. The SWPPP must include a narrative and drawings. All BMPs must be clearly referenced in the narrative and marked on the drawings. The SWPPP narrative must include documentation to explain and justify the pollution prevention decisions made for the project. Documentation must include:

    a. Information about existing site conditions (topography, drainage, soils, vegetation, etc.).

    b. Potential erosion problem areas.

    c. The 13 elements of a SWPPP in Special Condition S9.D.1-13, including BMPs used to address each element.

    d. Construction phasing/sequence and general BMP implementation schedule.

    e. The actions to be taken if BMP performance goals are not achieved—for example, a contingency plan for additional treatment and/or storage of stormwater that would violate the water quality standards if discharged.

    f. Engineering calculations for ponds, treatment systems, and any other designed structures. When a treatment system requires engineering calculations, these calculations must be included in the SWPPP. Engineering calculations do not need to be included in the SWPPP for treatment systems that do not require such calculations.

2. The Permittee must modify the SWPPP if, during inspections or investigations conducted by the owner/operator, or the applicable local or state regulatory authority, it is determined that the SWPPP is, or would be, ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site. The Permittee must then:

    a. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within 7 days of the inspection or investigation.

    b. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, addressing the problems no later than 10 days from the inspection or investigation. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when an extension is requested by a Permittee within the initial 10-day response period.

    c. Document BMP implementation and maintenance in the site log book.

    The Permittee must modify the SWPPP whenever there is a change in design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the State.

C. Stormwater Best Management Practices (BMPs)

BMPs must be consistent with:

1. *Stormwater Management Manual for Western Washington* (most current approved edition at the time this permit was issued), for sites west of the crest of the Cascade Mountains; *or*

2. *Stormwater Management Manual for Eastern Washington* (most current approved edition at the time this permit was issued), for sites east of the crest of the Cascade Mountains; *or*

3. Revisions to the manuals listed in Special Condition S9.C.1 & 2, or other stormwater management guidance documents or manuals which provide an equivalent level of pollution prevention, that are approved by Ecology and incorporated into this permit in accordance with the permit modification requirements of WAC 173-226-230; *or*

4. Documentation in the SWPPP that the BMPs selected provide an equivalent level of pollution prevention, compared to the applicable stormwater management manuals, including:

    a. The technical basis for the selection of all stormwater BMPs (scientific, technical studies, and/or modeling) that support the performance claims for the BMPs being selected.

    b. An assessment of how the selected BMP will satisfy AKART requirements and the applicable federal technology-based treatment requirements under 40 CFR part 125.3.

D. SWPPP – Narrative Contents and Requirements

The Permittee must include each of the 13 elements below in Special Condition S9.D.1-13 in the narrative of the SWPPP and implement them unless site conditions render the element unnecessary and the exemption from that element is clearly justified in the SWPPP.

1. Preserve Vegetation/Mark Clearing Limits

    a. Before beginning land-disturbing activities, including clearing and grading, clearly mark all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area.

    b. Retain the duff layer, native topsoil, and natural vegetation in an undisturbed state to the maximum degree practicable.

2. Establish Construction Access

    a. Limit construction vehicle access and exit to one route, if possible.

    b. Stabilize access points with a pad of quarry spalls, crushed rock, or other equivalent BMPs, to minimize tracking sediment onto roads.

    c. Locate wheel wash or tire baths on site, if the stabilized construction entrance is not effective in preventing tracking sediment onto roads.

    d. If sediment is tracked off site, clean the affected roadway thoroughly at the end of each day, or more frequently as necessary (for example, during wet weather). Remove sediment from roads by shoveling, sweeping, or pickup and transport of the sediment to a controlled sediment disposal area.

    e. Conduct street washing only after sediment removal in accordance with Special Condition S9.D.2.d.

    f. Control street wash wastewater by pumping back on site or otherwise preventing it from discharging into systems tributary to waters of the State.

3. Control Flow Rates

    a. Protect properties and waterways downstream of construction sites from erosion and the associated discharge of turbid waters due to increases in the velocity and peak volumetric flow rate of stormwater runoff from the project site, as required by local plan approval authority.

    b. Where necessary to comply with Special Condition S9.D.3.a, construct stormwater infiltration or detention BMPs as one of the first steps in grading. Assure that detention BMPs function properly before constructing site improvements (for example, impervious surfaces).

    c. If permanent infiltration ponds are used for flow control during construction, protect these facilities from sedimentation during the construction phase.

4. Install Sediment Controls

    The Permittee must design, install and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants. At a minimum, the Permittee must:

    a. Construct sediment control BMPs (sediment ponds, traps, filters, infiltration facilities, etc.) as one of the first steps in grading. These BMPs must be functional before other land disturbing activities take place.

    b. Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site.

    c. Direct stormwater runoff from disturbed areas through a sediment pond or other appropriate sediment removal BMP, before the runoff leaves a construction site or before discharge to an infiltration facility. Runoff from fully stabilized areas may be discharged without a sediment removal BMP, but must meet the flow control performance standard of Special Condition S9.D.3.a.

    d. Locate BMPs intended to trap sediment on site in a manner to avoid interference with the movement of juvenile salmonids attempting to enter off-channel areas or drainages.

    e. Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible.

    f. Where feasible, design outlet structures that withdraw impounded stormwater from the surface to avoid discharging sediment that is still suspended lower in the water column.

5. Stabilize Soils

    a. The Permittee must stabilize exposed and unworked soils by application of effective BMPs that prevent erosion. Applicable BMPs include, but are not limited to: temporary and permanent seeding, sodding, mulching, plastic covering, erosion

control fabrics and matting, soil application of polyacrylamide (PAM), the early application of gravel base on areas to be paved, and dust control.

b. The Permittee must control stormwater volume and velocity within the site to minimize soil erosion.

c. The Permittee must control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion.

d. Depending on the geographic location of the project, the Permittee must not allow soils to remain exposed and unworked for more than the time periods set forth below to prevent erosion.

West of the Cascade Mountains Crest
During the dry season (May 1 - September 30): 7 days
During the wet season (October 1 - April 30): 2 days

East of the Cascade Mountains Crest, except for Central Basin*
During the dry season (July 1 - September 30): 10 days
During the wet season (October 1 - June 30): 5 days

The Central Basin*, East of the Cascade Mountains Crest
During the dry Season (July 1 - September 30): 30 days
During the wet season (October 1 - June 30): 15 days

***Note: The Central Basin** is defined as the portions of Eastern Washington with mean annual precipitation of less than 12 inches.

e. The Permittee must stabilize soils at the end of the shift before a holiday or weekend if needed based on the weather forecast.

f. The Permittee must stabilize soil stockpiles from erosion, protected with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways, and drainage channels.

g. The Permittee must minimize the amount of soil exposed during construction activity.

h. The Permittee must minimize the disturbance of steep slopes.

i. The Permittee must minimize soil compaction and, unless infeasible, preserve topsoil.

6. Protect Slopes

a. The Permittee must design and construct cut-and-fill slopes in a manner to minimize erosion. Applicable practices include, but are not limited to, reducing continuous length of slope with terracing and diversions, reducing slope steepness, and roughening slope surfaces (for example, track walking).

b. The Permittee must divert off-site stormwater (run-on) or groundwater away from slopes and disturbed areas with interceptor dikes, pipes, and/or swales. Off-site stormwater should be managed separately from stormwater generated on the site.

c. At the top of slopes, collect drainage in pipe slope drains or protected channels to prevent erosion.

i. West of the Cascade Mountains Crest: Temporary pipe slope drains must handle the peak 10-minute flow rate from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate predicted by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the Western Washington Hydrology Model (WWHM) to predict flows, bare soil areas should be modeled as "landscaped area."

ii. East of the Cascade Mountains Crest: Temporary pipe slope drains must handle the expected peak flow rate from a 6-month, 3-hour storm for the developed condition, referred to as the short duration storm.

d. Place excavated material on the uphill side of trenches, consistent with safety and space considerations.

e. Place check dams at regular intervals within constructed channels that are cut down a slope.

7. Protect Drain Inlets

a. Protect all storm drain inlets made operable during construction so that stormwater runoff does not enter the conveyance system without first being filtered or treated to remove sediment.

b. Clean or remove and replace inlet protection devices when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).

8. Stabilize Channels and Outlets

a. Design, construct and stabilize all on-site conveyance channels to prevent erosion from the following expected peak flows:

i. West of the Cascade Mountains Crest: Channels must handle the peak 10-minute flow rate from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate indicated by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the WWHM to predict flows, bare soil areas should be modeled as "landscaped area."

ii. East of the Cascade Mountains Crest: Channels must handle the expected peak flow rate from a 6-month, 3-hour storm for the developed condition, referred to as the short duration storm.

b. Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches at the outlets of all conveyance systems.

9. Control Pollutants

Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants. The Permittee must:

a. Handle and dispose of all pollutants, including waste materials and demolition debris that occur on site in a manner that does not cause contamination of stormwater.

b. Provide cover, containment, and protection from vandalism for all chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health or the environment. Minimize storage of hazardous materials on-site. Safety Data Sheets (SDS) should be supplied for all materials stored. Chemicals should be kept in their original labeled containers. On-site fueling tanks must include secondary containment. Secondary containment means placing tanks or containers within an impervious structure capable of containing 110% of the volume of the largest tank within the containment structure. Double-walled tanks do not require additional secondary containment.

c. Conduct maintenance, fueling, and repair of heavy equipment and vehicles using spill prevention and control measures. Clean contaminated surfaces immediately following any spill incident.

d. Discharge wheel wash or tire bath wastewater to a separate on-site treatment system that prevents discharge to surface water, such as closed-loop recirculation or upland land application, or to the sanitary sewer with local sewer district approval.

e. Apply fertilizers and pesticides in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Follow manufacturers' label requirements for application rates and procedures.

f. Use BMPs to prevent contamination of stormwater runoff by pH-modifying sources. The sources for this contamination include, but are not limited to: bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, recycled concrete stockpiles, waste streams generated from concrete grinding and sawing, exposed aggregate processes, dewatering concrete vaults, concrete pumping and mixer washout waters. (Also refer to the definition for "concrete wastewater" in Appendix A – Definitions.)

g. Adjust the pH of stormwater or authorized non-stormwater if necessary to prevent an exceedance of groundwater and/or surface water quality standards.

h. Assure that washout of concrete trucks is performed off-site or in designated concrete washout areas only. Do not wash out concrete truck drums onto the ground, or into storm drains, open ditches, streets, or streams. Washout of small concrete handling equipment may be disposed of in a formed area awaiting concrete where it will not contaminate surface or groundwater. Do not dump excess concrete on site, except in designated concrete washout areas. Concrete spillage or concrete discharge directly to groundwater or surface waters of the State is

prohibited. At no time shall concrete be washed off into the footprint of an area where an infiltration BMP will be installed.

i. Obtain written approval from Ecology before using any chemical treatment, with the exception of CO_2, dry ice or food grade vinegar, to adjust pH.

j. Uncontaminated water from water-only based shaft drilling for construction of building, road, and bridge foundations may be infiltrated provided the wastewater is managed in a way that prohibits discharge to surface waters. Prior to infiltration, water from water-only based shaft drilling that comes into contact with curing concrete must be neutralized until pH is in the range of 6.5 to 8.5 (su).

10. Control Dewatering

a. Permittees must discharge foundation, vault, and trench dewatering water, which have characteristics similar to stormwater runoff at the site, in conjunction with BMPs to reduce sedimentation before discharge to a sediment trap or sediment pond.

b. Permittees may discharge clean, non-turbid dewatering water, such as well-point groundwater, to systems tributary to, or directly into surface waters of the State, as specified in Special Condition S9.D.8, provided the dewatering flow does not cause erosion or flooding of receiving waters. Do not route clean dewatering water through stormwater sediment ponds. Note that "surface waters of the State" may exist on a construction site as well as off site; for example, a creek running through a site.

c. Other dewatering treatment or disposal options may include:

i. Infiltration

ii. Transport off site in a vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters.

iii. Ecology-approved on-site chemical treatment or other suitable treatment technologies (See S9.D.9.i, regarding chemical treatment written approval).

iv. Sanitary or combined sewer discharge with local sewer district approval, if there is no other option.

v. Use of a sedimentation bag with discharge to a ditch or swale for small volumes of localized dewatering.

d. Permittees must handle highly turbid or contaminated dewatering water separately from stormwater.

11. Maintain BMPs

a. Permittees must maintain and repair all temporary and permanent erosion and sediment control BMPs as needed to assure continued performance of their intended function in accordance with BMP specifications.

b. Permittees must remove all temporary erosion and sediment control BMPs within 30 days after achieving final site stabilization or after the temporary BMPs are no longer needed.

12. Manage the Project

    a. Phase development projects to the maximum degree practicable and take into account seasonal work limitations.

    b. Inspect, maintain and repair all BMPs as needed to assure continued performance of their intended function. Conduct site inspections and monitoring in accordance with Special Condition S4.

    c. Maintain, update, and implement the SWPPP in accordance with Special Conditions S3, S4, and S9.

13. Protect Low Impact Development (LID) BMPs

    The primary purpose of on-site LID Stormwater Management is to reduce the disruption of the natural site hydrology through infiltration. LID BMPs are permanent facilities.

    a. Permittees must protect all LID BMPs (including, but not limited to, Bioretention and Rain Garden facilities) from sedimentation through installation and maintenance of erosion and sediment control BMPs on portions of the site that drain into the Bioretention and/or Rain Garden facilities. Restore the BMPs to their fully functioning condition if they accumulate sediment during construction. Restoring the facility must include removal of sediment and any sediment-laden bioretention/ rain garden soils, and replacing the removed soils with soils meeting the design specification.

    b. Permittees must maintain the infiltration capabilities of LID BMPs by protecting against compaction by construction equipment and foot traffic. Protect completed lawn and landscaped areas from compaction due to construction equipment.

    c. Permittees must control erosion and avoid introducing sediment from surrounding land uses onto permeable pavements. Do not allow muddy construction equipment on the base material or pavement. Do not allow sediment-laden runoff onto permeable pavements or base materials.

    d. Permittees must clean permeable pavements fouled with sediments or no longer passing an initial infiltration test using local stormwater manual methodology or the manufacturer's procedures.

    e. Permittees must keep all heavy equipment off existing soils under LID BMPs that have been excavated to final grade to retain the infiltration rate of the soils.

E. SWPPP – Map Contents and Requirements

The Permittee's SWPPP must also include a vicinity map or general location map (for example, a USGS quadrangle map, a portion of a county or city map, or other appropriate map) with enough detail to identify the location of the construction site and receiving waters within one mile of the site.

The SWPPP must also include a legible site map (or maps) showing the entire construction site. The following features must be identified, unless not applicable due to site conditions.

1. The direction of north, property lines, and existing structures and roads.

2. Cut and fill slopes indicating the top and bottom of slope catch lines.

3. Approximate slopes, contours, and direction of stormwater flow before and after major grading activities.

4. Areas of soil disturbance and areas that will not be disturbed.

5. Locations of structural and nonstructural controls (BMPs) identified in the SWPPP.

6. Locations of off-site material, stockpiles, waste storage, borrow areas, and vehicle/equipment storage areas.

7. Locations of all surface water bodies, including wetlands.

8. Locations where stormwater or non-stormwater discharges off-site and/or to a surface waterbody, including wetlands.

9. Location of water quality sampling station(s), if sampling is required by state or local permitting authority.

10. Areas where final stabilization has been accomplished and no further construction-phase permit requirements apply.

11. Location or proposed location of LID facilities.

S10. NOTICE OF TERMINATION

Partial terminations of permit coverage are not authorized.

A. The site is eligible for termination of coverage when it has met any of the following conditions:

1. The site has undergone final stabilization, the Permittee has removed all temporary BMPs (except biodegradable BMPs clearly manufactured with the intention for the material to be left in place and not interfere with maintenance or land use), and all stormwater discharges associated with construction activity have been eliminated; *or*

2. All portions of the site that have not undergone final stabilization per Special Condition S10.A.1 have been sold and/or transferred (per Special Condition S2.A), and the Permittee no longer has operational control of the construction activity; *or*

3. For residential construction only, the Permittee has completed temporary stabilization and the homeowners have taken possession of the residences.

B. When the site is eligible for termination, the Permittee must submit a complete and accurate Notice of Termination (NOT) form, signed in accordance with General Condition G2, to:

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

When an electronic termination form is available, the Permittee may choose to submit a complete and accurate Notice of Termination (NOT) form through the Water Quality Permitting Portal rather than mailing a hardcopy as noted above.

The termination is effective on the 31st calendar day following the date Ecology receives a complete NOT form, unless Ecology notifies the Permittee that termination request is denied because the Permittee has not met the eligibility requirements in Special Condition S10.A.

Permittees are required to comply with all conditions and effluent limitations in the permit until the permit has been terminated.

Permittees transferring the property to a new property owner or operator/Permittee are required to complete and submit the Notice of Transfer form to Ecology, but are not required to submit a Notice of Termination form for this type of transaction.

GENERAL CONDITIONS

G1. DISCHARGE VIOLATIONS

All discharges and activities authorized by this general permit must be consistent with the terms and conditions of this general permit. Any discharge of any pollutant more frequent than or at a level in excess of that identified and authorized by the general permit must constitute a violation of the terms and conditions of this permit.

G2. SIGNATORY REQUIREMENTS

A. All permit applications must bear a certification of correctness to be signed:

1. In the case of corporations, by a responsible corporate officer.
2. In the case of a partnership, by a general partner of a partnership.
3. In the case of sole proprietorship, by the proprietor.
4. In the case of a municipal, state, or other public facility, by either a principal executive officer or ranking elected official.

B. All reports required by this permit and other information requested by Ecology (including NOIs, NOTs, and Transfer of Coverage forms) must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1. The authorization is made in writing by a person described above and submitted to Ecology.
2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters.

C. Changes to authorization. If an authorization under paragraph G2.B.2 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph G2.B.2 above must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.

D. Certification. Any person signing a document under this section must make the following certification:

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 gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering 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.

G3. RIGHT OF INSPECTION AND ENTRY

The Permittee must allow an authorized representative of Ecology, upon the presentation of credentials and such other documents as may be required by law:

A. To enter upon the premises where a discharge is located or where any records are kept under the terms and conditions of this permit.

B. To have access to and copy, at reasonable times and at reasonable cost, any records required to be kept under the terms and conditions of this permit.

C. To inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, methods, or operations regulated or required under this permit.

D. To sample or monitor, at reasonable times, any substances or parameters at any location for purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act.

G4. GENERAL PERMIT MODIFICATION AND REVOCATION

This permit may be modified, revoked and reissued, or terminated in accordance with the provisions of Chapter 173-226 WAC. Grounds for modification, revocation and reissuance, or termination include, but are not limited to, the following:

A. When a change occurs in the technology or practices for control or abatement of pollutants applicable to the category of dischargers covered under this permit.

B. When effluent limitation guidelines or standards are promulgated pursuant to the CWA or Chapter 90.48 RCW, for the category of dischargers covered under this permit.

C. When a water quality management plan containing requirements applicable to the category of dischargers covered under this permit is approved, or

D. When information is obtained that indicates cumulative effects on the environment from dischargers covered under this permit are unacceptable.

G5. REVOCATION OF COVERAGE UNDER THE PERMIT

Pursuant to Chapter 43.21B RCW and Chapter 173-226 WAC, the Director may terminate coverage for any discharger under this permit for cause. Cases where coverage may be terminated include, but are not limited to, the following:

A. Violation of any term or condition of this permit.

B. Obtaining coverage under this permit by misrepresentation or failure to disclose fully all relevant facts.

C. A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.

D. Failure or refusal of the Permittee to allow entry as required in RCW 90.48.090.

E. A determination that the permitted activity endangers human health or the environment, or contributes to water quality standards violations.

F. Nonpayment of permit fees or penalties assessed pursuant to RCW 90.48.465 and Chapter 173-224 WAC.

G. Failure of the Permittee to satisfy the public notice requirements of WAC 173-226-130(5), when applicable.

The Director may require any discharger under this permit to apply for and obtain coverage under an individual permit or another more specific general permit. Permittees who have their coverage revoked for cause according to WAC 173-226-240 may request temporary coverage under this permit during the time an individual permit is being developed, provided the request is made within ninety (90) days from the time of revocation and is submitted along with a complete individual permit application form.

G6. REPORTING A CAUSE FOR MODIFICATION

The Permittee must submit a new application, or a supplement to the previous application, whenever a material change to the construction activity or in the quantity or type of discharge is anticipated which is not specifically authorized by this permit. This application must be submitted at least sixty (60) days prior to any proposed changes. Filing a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not relieve the Permittee of the duty to comply with the existing permit until it is modified or reissued.

G7. COMPLIANCE WITH OTHER LAWS AND STATUTES

Nothing in this permit will be construed as excusing the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G8. DUTY TO REAPPLY

The Permittee must apply for permit renewal at least 180 days prior to the specified expiration date of this permit. The Permittee must reapply using the electronic application form (NOI) available on Ecology's website. Permittees unable to submit electronically (for example, those who do not have an internet connection) must contact Ecology to request a waiver and obtain instructions on how to obtain a paper NOI.

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

G9. REMOVED SUBSTANCE

The Permittee must not re-suspend or reintroduce collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of stormwater to the final effluent stream for discharge to state waters.

G10. DUTY TO PROVIDE INFORMATION

The Permittee must submit to Ecology, within a reasonable time, all information that Ecology may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to Ecology, upon request, copies of records required to be kept by this permit [40 CFR 122.41(h)].

G11. OTHER REQUIREMENTS OF 40 CFR

All other requirements of 40 CFR 122.41 and 122.42 are incorporated in this permit by reference.

G12. ADDITIONAL MONITORING

Ecology may establish specific monitoring requirements in addition to those contained in this permit by administrative order or permit modification.

G13. PENALTIES FOR VIOLATING PERMIT CONDITIONS

Any person who is found guilty of willfully violating the terms and conditions of this permit shall be deemed guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars ($10,000) and costs of prosecution, or by imprisonment at the discretion of the court. Each day upon which a willful violation occurs may be deemed a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit shall incur, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars ($10,000) for every such violation. Each and every such violation shall be a separate and distinct offense, and in case of a continuing violation, every day's continuance shall be deemed to be a separate and distinct violation.

G14. UPSET

Definition – "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of the following paragraph are met.

A Permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that: 1) an upset occurred and that the Permittee can identify the cause(s) of the upset; 2) the permitted facility was being properly operated at the time of the upset; 3) the Permittee submitted notice of the upset as required in Special Condition S5.F, and; 4) the Permittee complied with any remedial measures required under this permit.

In any enforcement proceeding, the Permittee seeking to establish the occurrence of an upset has the burden of proof.

G15. PROPERTY RIGHTS

This permit does not convey any property rights of any sort, or any exclusive privilege.

G16. DUTY TO COMPLY

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

G17. TOXIC POLLUTANTS

The Permittee must comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if this permit has not yet been modified to incorporate the requirement.

G18. PENALTIES FOR TAMPERING

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this condition, punishment shall be a fine of not more than $20,000 per day of violation, or imprisonment of not more than four (4) years, or both.

G19. REPORTING PLANNED CHANGES

The Permittee must, as soon as possible, give notice to Ecology of planned physical alterations, modifications or additions to the permitted construction activity. The Permittee should be aware that, depending on the nature and size of the changes to the original permit, a new public notice and other permit process requirements may be required. Changes in activities that require reporting to Ecology include those that will result in:

A. The permitted facility being determined to be a new source pursuant to 40 CFR 122.29(b).

B. A significant change in the nature or an increase in quantity of pollutants discharged, including but not limited to: a 20% or greater increase in acreage disturbed by construction activity.

C. A change in or addition of surface water(s) receiving stormwater or non-stormwater from the construction activity.

D. A change in the construction plans and/or activity that affects the Permittee's monitoring requirements in Special Condition S4.

Following such notice, permit coverage may be modified, or revoked and reissued pursuant to 40 CFR 122.62(a) to specify and limit any pollutants not previously limited. Until such modification is effective, any new or increased discharge in excess of permit limits or not specifically authorized by this permit constitutes a violation.

G20. REPORTING OTHER INFORMATION

Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to Ecology, it must promptly submit such facts or information.

G21. REPORTING ANTICIPATED NON-COMPLIANCE

The Permittee must give advance notice to Ecology by submission of a new application or supplement thereto at least forty-five (45) days prior to commencement of such discharges, of any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility or activity which may result in noncompliance with permit limits or conditions. Any maintenance of facilities, which might necessitate unavoidable interruption of

operation and degradation of effluent quality, must be scheduled during non-critical water quality periods and carried out in a manner approved by Ecology.

G22. REQUESTS TO BE EXCLUDED FROM COVERAGE UNDER THE PERMIT

Any discharger authorized by this permit may request to be excluded from coverage under the general permit by applying for an individual permit. The discharger must submit to the Director an application as described in WAC 173-220-040 or WAC 173-216-070, whichever is applicable, with reasons supporting the request. These reasons will fully document how an individual permit will apply to the applicant in a way that the general permit cannot. Ecology may make specific requests for information to support the request. The Director will either issue an individual permit or deny the request with a statement explaining the reason for the denial. When an individual permit is issued to a discharger otherwise subject to the construction stormwater general permit, the applicability of the construction stormwater general permit to that Permittee is automatically terminated on the effective date of the individual permit.

G23. APPEALS

A. The terms and conditions of this general permit, as they apply to the appropriate class of dischargers, are subject to appeal by any person within 30 days of issuance of this general permit, in accordance with Chapter 43.21B RCW, and Chapter 173-226 WAC.

B. The terms and conditions of this general permit, as they apply to an individual discharger, are appealable in accordance with Chapter 43.21B RCW within 30 days of the effective date of coverage of that discharger. Consideration of an appeal of general permit coverage of an individual discharger is limited to the general permit's applicability or nonapplicability to that individual discharger.

C. The appeal of general permit coverage of an individual discharger does not affect any other dischargers covered under this general permit. If the terms and conditions of this general permit are found to be inapplicable to any individual discharger(s), the matter shall be remanded to Ecology for consideration of issuance of an individual permit or permits.

G24. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

G25. BYPASS PROHIBITED

A. Bypass Procedures

Bypass, which is the intentional diversion of waste streams from any portion of a treatment facility, is prohibited for stormwater events below the design criteria for stormwater management. Ecology may take enforcement action against a Permittee for bypass unless one of the following circumstances (1, 2, 3 or 4) is applicable.

1. Bypass of stormwater is consistent with the design criteria and part of an approved management practice in the applicable stormwater management manual.

2. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

Bypass is authorized if it is for essential maintenance and does not have the potential to cause violations of limitations or other conditions of this permit, or adversely impact public health.

3. Bypass of stormwater is unavoidable, unanticipated, and results in noncompliance of this permit.

   This bypass is permitted only if:

   a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.

   b. There are no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, maintenance during normal periods of equipment downtime (but not if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance), or transport of untreated wastes to another treatment facility.

   c. Ecology is properly notified of the bypass as required in Special Condition S5.F of this permit.

4. A planned action that would cause bypass of stormwater and has the potential to result in noncompliance of this permit during a storm event.

   The Permittee must notify Ecology at least thirty (30) days before the planned date of bypass. The notice must contain:

   a. A description of the bypass and its cause

   b. An analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing.

   c. A cost-effectiveness analysis of alternatives including comparative resource damage assessment.

   d. The minimum and maximum duration of bypass under each alternative.

   e. A recommendation as to the preferred alternative for conducting the bypass.

   f. The projected date of bypass initiation.

   g. A statement of compliance with SEPA.

   h. A request for modification of water quality standards as provided for in WAC 173-201A-110, if an exceedance of any water quality standard is anticipated.

   i. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.

5. For probable construction bypasses, the need to bypass is to be identified as early in the planning process as possible. The analysis required above must be considered during

preparation of the Stormwater Pollution Prevention Plan (SWPPP) and must be included to the extent practical. In cases where the probable need to bypass is determined early, continued analysis is necessary up to and including the construction period in an effort to minimize or eliminate the bypass.

Ecology will consider the following before issuing an administrative order for this type bypass:

a. If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.

b. If there are feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.

c. If the bypass is planned and scheduled to minimize adverse effects on the public and the environment.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, Ecology will approve, conditionally approve, or deny the request. The public must be notified and given an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Approval of a request to bypass will be by administrative order issued by Ecology under RCW 90.48.120.

B. Duty to Mitigate

The Permittee is required to take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

APPENDIX A – DEFINITIONS

AKART is an acronym for "**A**ll **K**nown, **A**vailable, and **R**easonable methods of prevention, control, and **T**reatment." AKART represents the most current methodology that can be reasonably required for preventing, controlling, or abating the pollutants and controlling pollution associated with a discharge.

Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus, which was completed and approved by EPA before January 1, 2021, or before the date the operator's complete permit application is received by Ecology, whichever is later. TMDLs completed after a complete permit application is received by Ecology become applicable to the Permittee only if they are imposed through an administrative order by Ecology, or through a modification of permit coverage.

Applicant means an *operator* seeking coverage under this permit.

Benchmark means a pollutant concentration used as a permit threshold, below which a pollutant is considered unlikely to cause a water quality violation, and above which it may. When pollutant concentrations exceed benchmarks, corrective action requirements take effect. Benchmark values are not water quality standards and are not numeric effluent limitations; they are indicator values.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control stormwater associated with construction activity, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Buffer means an area designated by a local jurisdiction that is contiguous to and intended to protect a sensitive area.

Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

Calendar Day A period of 24 consecutive hours starting at 12:00 midnight and ending the following 12:00 midnight.

Calendar Week (same as **Week**) means a period of seven consecutive days starting at 12:01 a.m. (0:01 hours) on Sunday.

Certified Erosion and Sediment Control Lead (CESCL) means a person who has current certification through an approved erosion and sediment control training program that meets the minimum training standards established by Ecology (See BMP C160 in the SWMM).

Chemical Treatment means the addition of chemicals to stormwater and/or authorized non-stormwater prior to filtration and discharge to surface waters.

Clean Water Act (CWA) means the Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, and 97-117; USC 1251 et seq.

Combined Sewer means a sewer which has been designed to serve as a sanitary sewer and a storm sewer, and into which inflow is allowed by local ordinance.

Common Plan of Development or Sale means a site where multiple separate and distinct construction activities may be taking place at different times on different schedules and/or by different contractors, but still under a single plan. Examples include: 1) phased projects and projects with multiple filings or lots, even if the separate phases or filings/lots will be constructed under separate contract or by separate owners (e.g., a development where lots are sold to separate builders); 2) a development plan that may be phased over multiple years, but is still under a consistent plan for long-term development; 3) projects in a contiguous area that may be unrelated but still under the same contract, such as construction of a building extension and a new parking lot at the same facility; and 4) linear projects such as roads, pipelines, or utilities. If the project is part of a common plan of development or sale, the disturbed area of the entire plan must be used in determining permit requirements.

Composite Sample means a mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increases while maintaining a constant time interval between the aliquots.

Concrete Wastewater means any water used in the production, pouring and/or clean-up of concrete or concrete products, and any water used to cut, grind, wash, or otherwise modify concrete or concrete products. Examples include water used for or resulting from concrete truck/mixer/pumper/tool/chute rinsing or washing, concrete saw cutting and surfacing (sawing, coring, grinding, roughening, hydro-demolition, bridge and road surfacing). When stormwater comingles with concrete wastewater, the resulting water is considered concrete wastewater and must be managed to prevent discharge to waters of the State, including groundwater.

Construction Activity means land disturbing operations including clearing, grading or excavation which disturbs the surface of the land (including off-site disturbance acreage related to construction-support activity). Such activities may include road construction, construction of residential houses, office buildings, or industrial buildings, site preparation, soil compaction, movement and stockpiling of topsoils, and demolition activity.

Construction Support Activity means off-site acreage that will be disturbed as a direct result of the construction project and will discharge stormwater. For example, off-site equipment staging yards, material storage areas, borrow areas, and parking areas.

Contaminant means any hazardous substance that does not occur naturally or occurs at greater than natural background levels. See definition of “hazardous substance” and WAC 173-340-200.

Contaminated soil means soil which contains contaminants, pollutants, or hazardous substances that do not occur naturally or occur at levels greater than natural background.

Contaminated groundwater means groundwater which contains contaminants, pollutants, or hazardous substances that do not occur naturally or occur at levels greater than natural background.

Demonstrably Equivalent means that the technical basis for the selection of all stormwater BMPs is documented within a SWPPP, including:

1. The method and reasons for choosing the stormwater BMPs selected.
2. The pollutant removal performance expected from the BMPs selected.

3. The technical basis supporting the performance claims for the BMPs selected, including any available data concerning field performance of the BMPs selected.
4. An assessment of how the selected BMPs will comply with state water quality standards.
5. An assessment of how the selected BMPs will satisfy both applicable federal technology-based treatment requirements and state requirements to use all known, available, and reasonable methods of prevention, control, and treatment (AKART).

Department means the Washington State Department of Ecology.

Detention means the temporary storage of stormwater to improve quality and/or to reduce the mass flow rate of discharge.

Dewatering means the act of pumping groundwater or stormwater away from an active construction site.

Director means the Director of the Washington State Department of Ecology or his/her authorized representative.

Discharger means an owner or operator of any facility or activity subject to regulation under Chapter 90.48 RCW or the Federal Clean Water Act.

Domestic Wastewater means water carrying human wastes, including kitchen, bath, and laundry wastes from residences, buildings, industrial establishments, or other places, together with such groundwater infiltration or surface waters as may be present.

Ecology means the Washington State Department of Ecology.

Engineered Soils means the use of soil amendments including, but not limited, to Portland cement treated base (CTB), cement kiln dust (CKD), or fly ash to achieve certain desirable soil characteristics.

Equivalent BMPs means operational, source control, treatment, or innovative BMPs which result in equal or better quality of stormwater discharge to surface water or to groundwater than BMPs selected from the SWMM.

Erosion means the wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep.

Erosion and Sediment Control BMPs means BMPs intended to prevent erosion and sedimentation, such as preserving natural vegetation, seeding, mulching and matting, plastic covering, filter fences, sediment traps, and ponds. Erosion and sediment control BMPs are synonymous with stabilization and structural BMPs.

Federal Operator is an entity that meets the definition of "Operator" in this permit and is either any department, agency or instrumentality of the executive, legislative, and judicial branches of the Federal government of the United States, or another entity, such as a private contractor, performing construction activity for any such department, agency, or instrumentality.

Final Stabilization (same as **fully stabilized** or **full stabilization**) means the completion of all soil disturbing activities at the site and the establishment of permanent vegetative cover, or equivalent permanent stabilization measures (such as pavement, riprap, gabions, or geotextiles) which will prevent erosion. See the applicable Stormwater Management Manual for more information on vegetative cover expectations and equivalent permanent stabilization measures.

Groundwater means water in a saturated zone or stratum beneath the land surface or a surface waterbody.

Hazardous Substance means any dangerous or extremely hazardous waste as defined in RCW 70.105.010 (5) and (6), or any dangerous or extremely dangerous waste as designated by rule under chapter 70.105 RCW; any hazardous sub-stance as defined in RCW 70.105.010(14) or any hazardous substance as defined by rule under chapter 70.105 RCW; any substance that, on the effective date of this section, is a hazardous substance under section 101(14) of the federal cleanup law, 42U.S.C., Sec. 9601(14); petroleum or petroleum products; and any substance or category of substances, including solid waste decomposition products, determined by the director by rule to present a threat to human health or the environment if released into the environment. The term hazardous substance does not include any of the following when contained in an underground storage tank from which there is not a release: crude oil or any fraction thereof or petroleum, if the tank is in compliance with all applicable federal, state, and local law.

Injection Well means a well that is used for the subsurface emplacement of fluids. (See **Well**.)

Jurisdiction means a political unit such as a city, town or county; incorporated for local self-government.

National Pollutant Discharge Elimination System (NPDES) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the Federal Clean Water Act, for the discharge of pollutants to surface waters of the State from point sources. These permits are referred to as NPDES permits and, in Washington State, are administered by the Washington State Department of Ecology.

Notice of Intent (NOI) means the application for, or a request for coverage under this general permit pursuant to WAC 173-226-200.

Notice of Termination (NOT) means a request for termination of coverage under this general permit as specified by Special Condition S10 of this permit.

Operator means any party associated with a construction project that meets either of the following two criteria:

- The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
- The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with a SWPPP for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

Permittee means individual or entity that receives notice of coverage under this general permit.

pH means a liquid's measure of acidity or alkalinity. A pH of 7 is defined as neutral. Large variations above or below this value are considered harmful to most aquatic life.

pH Monitoring Period means the time period in which the pH of stormwater runoff from a site must be tested a minimum of once every seven days to determine if stormwater pH is between 6.5 and 8.5.

Point Source means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, and container from which pollutants are or may be discharged to surface waters of the State. This term does not include return flows from irrigated agriculture. (See the Fact Sheet for further explanation)

Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, domestic sewage sludge (biosolids), munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste. This term does not include sewage from vessels within the meaning of section 312 of the CWA, nor does it include dredged or fill material discharged in accordance with a permit issued under section 404 of the CWA.

Pollution means contamination or other alteration of the physical, chemical, or biological properties of waters of the State; including change in temperature, taste, color, turbidity, or odor of the waters; or such discharge of any liquid, gaseous, solid, radioactive or other substance into any waters of the State as will or is likely to create a nuisance or render such waters harmful, detrimental or injurious to the public health, safety or welfare; or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses; or to livestock, wild animals, birds, fish or other aquatic life.

Process Wastewater means any non-stormwater which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product. If stormwater commingles with process wastewater, the commingled water is considered process wastewater.

Receiving Water means the waterbody at the point of discharge. If the discharge is to a storm sewer system, either surface or subsurface, the receiving water is the waterbody to which the storm system discharges. Systems designed primarily for other purposes such as for groundwater drainage, redirecting stream natural flows, or for conveyance of irrigation water/return flows that coincidentally convey stormwater are considered the receiving water.

Representative means a stormwater or wastewater sample which represents the flow and characteristics of the discharge. Representative samples may be a grab sample, a time-proportionate *composite sample*, or a flow proportionate sample. Ecology's Construction Stormwater Monitoring Manual provides guidance on representative sampling.

Responsible Corporate Officer for the purpose of signatory authority means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Sanitary Sewer means a sewer which is designed to convey domestic wastewater.

Sediment means the fragmented material that originates from the weathering and erosion of rocks or unconsolidated deposits, and is transported by, suspended in, or deposited by water.

Sedimentation means the depositing or formation of sediment.

Sensitive Area means a waterbody, wetland, stream, aquifer recharge area, or channel migration zone.

SEPA (State Environmental Policy Act) means the Washington State Law, RCW 43.21C.020, intended to prevent or eliminate damage to the environment.

Significant Amount means an amount of a pollutant in a discharge that is amenable to available and reasonable methods of prevention or treatment; or an amount of a pollutant that has a reasonable potential to cause a violation of surface or groundwater quality or sediment management standards.

Significant Concrete Work means greater than 1000 cubic yards placed or poured concrete or recycled concrete used over the life of a project.

Significant Contributor of Pollutants means a facility determined by Ecology to be a contributor of a significant amount(s) of a pollutant(s) to waters of the State of Washington.

Site means the land or water area where any "facility or activity" is physically located or conducted.

Source Control BMPs means physical, structural or mechanical devices or facilities that are intended to prevent pollutants from entering stormwater. A few examples of source control BMPs are erosion control practices, maintenance of stormwater facilities, constructing roofs over storage and working areas, and directing wash water and similar discharges to the sanitary sewer or a dead end sump.

Stabilization means the application of appropriate BMPs to prevent the erosion of soils, such as, temporary and permanent seeding, vegetative covers, mulching and matting, plastic covering and sodding. See also the definition of Erosion and Sediment Control BMPs.

Storm Drain means any drain which drains directly into a *storm sewer system*, usually found along roadways or in parking lots.

Storm Sewer System means a means a conveyance, or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains designed or used for collecting or conveying stormwater. This does not include systems which are part of *a combined sewer* or Publicly Owned Treatment Works (POTW), as defined at 40 CFR 122.2.

Stormwater means that portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface waterbody, or a constructed infiltration facility.

Stormwater Management Manual (SWMM) or **Manual** means the technical Manual published by Ecology for use by local governments that contain descriptions of and design criteria for BMPs to prevent, control, or treat pollutants in stormwater.

Stormwater Pollution Prevention Plan (SWPPP) means a documented plan to implement measures to identify, prevent, and control the contamination of point source discharges of stormwater.

Surface Waters of the State includes lakes, rivers, ponds, streams, inland waters, salt waters, and all other surface waters and water courses within the jurisdiction of the state of Washington.

Temporary Stabilization means the exposed ground surface has been covered with appropriate materials to provide temporary stabilization of the surface from water or wind erosion. Materials include, but are not limited to, mulch, riprap, erosion control mats or blankets and temporary cover crops. Seeding alone is not considered stabilization. Temporary stabilization is not a substitute for the more permanent “final stabilization.”

Total Maximum Daily Load (TMDL) means a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet state water quality standards. Percentages of the total maximum daily load are allocated to the various pollutant sources. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The TMDL calculations must include a "margin of safety" to ensure that the waterbody can be protected in case there are unforeseen events or unknown sources of the pollutant. The calculation must also account for seasonable variation in water quality.

Transfer of Coverage (TOC) means a request for transfer of coverage under this general permit as specified by Special Condition S2.A of this permit.

Treatment BMPs means BMPs that are intended to remove pollutants from stormwater. A few examples of treatment BMPs are detention ponds, oil/water separators, biofiltration, and constructed wetlands.

Transparency means a measurement of water clarity in centimeters (cm), using a 60 cm transparency tube. The transparency tube is used to estimate the relative clarity or transparency of water by noting the depth at which a black and white Secchi disc becomes visible when water is released from a value in the bottom of the tube. A transparency tube is sometimes referred to as a “turbidity tube.”

Turbidity means the clarity of water expressed as nephelometric turbidity units (NTUs) and measured with a calibrated turbidimeter.

Uncontaminated means free from any contaminant. See definition of “contaminant” and WAC 173-340-200.

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

Waste Load Allocation (WLA) means the portion of a receiving water’s loading capacity that is allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality based effluent limitation (40 CFR 130.2[h]).

Water-Only Based Shaft Drilling is a shaft drilling process that uses water only and no additives are involved in the drilling of shafts for construction of building, road, or bridge foundations.

Water Quality means the chemical, physical, and biological characteristics of water, usually with respect to its suitability for a particular purpose.

Waters of the State includes those waters as defined as "waters of the United States" in 40 CFR Subpart 122.2 within the geographic boundaries of Washington State and "waters of the State" as defined in Chapter 90.48 RCW, which include lakes, rivers, ponds, streams, inland waters, underground waters, salt

waters, and all other surface waters and water courses within the jurisdiction of the state of Washington.

Well means a bored, drilled or driven shaft, or dug hole whose depth is greater than the largest surface dimension. (See **Injection Well**.)

Wheel Wash Wastewater means any water used in, or resulting from the operation of, a tire bath or wheel wash (BMP C106: Wheel Wash), or other structure or practice that uses water to physically remove mud and debris from vehicles leaving a construction site and prevent track-out onto roads. When stormwater comingles with wheel wash wastewater, the resulting water is considered wheel wash wastewater and must be managed according to Special Condition S9.D.9.

APPENDIX B – ACRONYMS

AKART	All Known, Available, and Reasonable Methods of Prevention, Control, and Treatment
BMP	Best Management Practice
CESCL	Certified Erosion and Sediment Control Lead
CFR	Code of Federal Regulations
CKD	Cement Kiln Dust
cm	Centimeters
CPD	Common Plan of Development
CTB	Cement-Treated Base
CWA	Clean Water Act
DMR	Discharge Monitoring Report
EPA	Environmental Protection Agency
ERTS	Environmental Report Tracking System
ESC	Erosion and Sediment Control
FR	Federal Register
LID	Low Impact Development
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Unit
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SWMM	Stormwater Management Manual
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
UIC	Underground Injection Control
USC	United States Code
USEPA	United States Environmental Protection Agency
WAC	Washington Administrative Code
WQ	Water Quality
WWHM	Western Washington Hydrology Model

Appendix F 303(d) and TMDL Waterbodies Information

Listing ID: 10862

Main Listing Information

Listing ID: 10862
Waterbody Name: PUYALLUP RIVER
Medium: Water
Parameter: Temperature
WQI Project: None Assigned
Designated Use: None Assigned

2014 Category: 5
2012 Category: 3
2008 Category: 3
2004 Category: 1
On 1998 303(d) List?: N
On 1996 303(d) List?: N

Assessment Unit

Assessment Unit ID: 17110014000028

Location Identification

Counties: Pierce
WRIA: 10 - Puyallup-White
Waterbody ID (WBID): None Assigned
Waterbody Class: RA
Town/Range/Section (Legacy): 20N-4E-18

Basis

Location ID: 10A050 -- In 2003, between 7/25/2003 and 9/24/2003, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 39 of 62 da (63%); The maximum exceedance during this period was 18.4°C for the 7-day period centere 7/29/2003;

Location ID: 10A050 -- In 2002, between 7/18/2002 and 9/25/2002, the 7-day mean of daily maximum values (7DADmax) exceeded the criterion for this waterbody (16°C) on 19 of 70 da (27%); The maximum exceedance during this period was 17.46°C for the 7-day period cente on 8/11/2002;

Puyallup Tribe of Indians unpublished data at RM 10.3 (submitted by Char Naylor on 3 Marc 2003) show a 7-day mean of maximum daily temperature of 17.48 degrees C for the week e 15 August 2002, with a maximum daily maximum temperature of 18.18 degrees C collected August 2002.

Ebbert, 2002. Shows no excursions beyond the criterion from measurements collected in 20 and 2001.

Hallock (2001) Dept. of Ecology Ambient Monitoring Station 10A070 (PUYALLUP RIVER AT MERIDIAN ST) shows 0 excursions beyond the criterion out of 62 samples collected betwee 1993 - 2001.

Hallock (2001) Dept. of Ecology Ambient Monitoring Station 10A050 (Puyallup R @ Puyallup (USGS)) shows 0 excursions beyond the criterion out of 6 samples collected between 1993 - 2001.

Remarks

Remark	Modified By	Modified On	Visib

Combined Listing: Listing IDs 36172, 10871 were rolled into this listing	Chad Brown	9/24/2015	Public
As a result of merging of three stream reaches into a single assessment unit in 2014, this record was merged with the records formerly associated with Listing IDs 10871 and 36172.	Patrick Lizon	10/29/2014	Public
The Category 5 impairment determination is based on the application of the current temperature criterion to data from the years 2003 and 2003.	Patrick Lizon	10/29/2014	Public
Data for 2002 and 2003 does not cover the core critical season for temperature. Maximum temperatures may be higher than observed data;	Nicholas Groebner	4/24/2014	Public

EIM

User Study ID:	User Location ID:
AMS001E	10A070
AMS004	10A050

Print

Listing ID: 10874

Main Listing Information

Listing ID: 10874
Waterbody Name: PUYALLUP RIVER
Medium: Water
Parameter: Mercury
WQI Project: None Assigned
Designated Use: None Assigned

2014 Category: 5
2012 Category: 5
2008 Category: 5
2004 Category: 2
On 1998 303(d) List?: N
On 1996 303(d) List?: N

Assessment Unit

Assessment Unit ID: 17110014000028

Location Identification

Counties: Pierce
WRIA: 10 - Puyallup-White
Waterbody ID (WBID): None Assigned
Waterbody Class: RA
Town/Range/Section (Legacy): 20N-4E-22

Basis

Location ID(s) [10A070] -- In 2006, 1 of 3 sample event(s) exceeded Washington's Aquatic Life Chronic criterion.
Location ID(s) [10A070] -- In 2005, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Chronic criterion.
Location ID(s) [10A050] -- In 2003, 1 of 4 sample event(s) exceeded Washington's Aquatic Life Chronic criterion.
Location ID(s) [10A050] -- In 2002, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Chronic criterion.

Puyallup Tribe of Indians unpublished data (submitted by Char Naylor on 3 March 2003) show 1 excursion beyond the chronic criterion from 3 samples collected in 2002 at RM 5.8 and no excursions beyond the chronic criterion from 2 samples collected in 2002 at RM 10.3.

Hallock (2001) Dept. of Ecology Ambient Monitoring Station 10A070 (PUYALLUP RIVER AT MERIDIAN ST) shows 1 excursions beyond the criterion out of 11 samples collected between 1993 - 2001.

Location ID(s) [10A070] -- A sample collected on 09/28/1994 exceeded the chronic criterion: 0.017 ug/L.

Remarks

Remark	Modified By	Modified On	Visibility
Combined Listing: Listing IDs 45375, 35421, 35332 were rolled into this listing	Chad Brown	9/24/2015	Public
Two or more samples collected in a three-year period exceeded the Aquatic Life criterion; therefore the Assessment Unit meets the requirements for a Category 5 determination.	Brandee Era-Miller	12/15/2014	Public
Samples obtained after 1996 must be collected using EPA Method 1669 for sampling and EPA Method 1631 for analysis of the sample. As a result, this listing is moved from Category 5 to Category 3 - insufficient data.	Jessica Archer	10/27/2014	Private

EIM	
User Study ID:	**User Location ID:**
AMS001	10A070
AMS001	10A070
AMS001E	10A070

Print

Appendix G Contaminated Site Information

No site contamination is known.

Appendix H
Engineering Calculations

SIZE THE EMERGENCY OVERFLOW SPILLWAY

Length = $(Q_{100}/(3.21H^{3/2})) - 2.4\ H$

Let H = 0.3 feet

Q_{100} = 1.25 cfs

So Length = $(1.25/(3.21(0.3^{3/2})) - 2.4\ (0.3)$

Length = 1.65 feet

Use 6 feet

TESC POND VOLUME, FLOW CONTROL RISER, AND ORIFICE SIZING

Volume = 100-year, 24-hour
Flow Control Structure Release = $Q_{5\text{-year, 24-hour}}$

SBUH Hydrograph Synthesis

Input:				24-hour	7-day
Pervious Area	0.320	(acres)	CN	86.0	76.3
Impervious Area	1.320	(acres)	CN	98.0	96.3
Total Area:	1.64	(acres)	S	1.63	3.11
Time of Concentration	6.0	(min.)	S	0.20	0.38
			w	0.4545	0.8333

	5-year	100-year
Precipitation (in.)	2.5	4.1

Results:

Event	Peak Flow	Volume	Peak Time
5-year, 24-hour	0.91	12,325	7.67
100-year, 24-hour	1.59	21,582	7.67

The proposed detention pond Volume (V) = 0.743 ac-ft = 32,365 **>** 21,582 **OK**
Pond volume is to maximum water surface elevation = 63.5
Reference stage storage table from Civil3d Contours for storage

TESC Riser

Head Required to Pass Q_{100} through an **12** inch diameter riser

A	0.79	ft^2
Q_{100}	1.59	cfs
$H_{Required}$	0.17	ft

$$H = \frac{\left(\frac{Q}{C_d A_o}\right)^2}{2g}$$

TESC Orifice

Q	0.91	cfs
Cd	0.62	
h	6.000	ft
A	0.0747	ft^2
D	3.7	in

$$A_o = \frac{Q}{C_d\sqrt{2gH}}$$

Q	*Flow (cfs)*
A	*Area (ft^2)*
Cd	*Coefficient of Discharge (0.62 for sharp orifice)*
g	*Accelleration of Gravity (32.2 ft/s2)*
H	*Head (ft)*

Exhibit I
Operations and Maintenance Manual

OPERATIONS AND MAINTENANCE MANUAL

Proposed Best Parking Lot
2412 Inter Avenue
Puyallup, WA 98371

Parcel Nos. 2105200320, 2105200350,
2105200340 and 2105200361

Prepared for:
Best Parking Lot Cleaning, Inc.
2412 Inter Ave
Puyallup, WA 98372
Contact: Rich Hamilton
rich@bestparkinglot.com

February 14, 2020
BCE Job No. 20220

Site Address:

2412 Inter Avenue, Puyallup, Pierce County, Washington.

Introduction:

The proposed Best Parking Lot development consists of approximately 1.6 acres of land located between Inter Avenue and the railroad tracks within the City of Puyallup. The existing site is a gravel parking and storage yard associated with the Best Parking Lot business.

The proposed project site will redevelop the site per City of Puyallup requirements. Detention will be an open pond. A new water quality unit is proposed to treat the runoff prior to being discharged to the pond. The following pages of this report delineate maintenance requirements for each feature of the storm drainage facilities constructed on site. Each feature delineated in the appendix of this report should be monitored twice per year at a minimum, and more often if maintenance requirements appear to indicate further review of each system is required.

Plan Goal:

The specific purpose for the stormwater facility is to minimize pollution that is typically associated with modern development. In general, pollution from motor vehicles and pollution generated from erosion. Attached to this narrative is a maintenance manual, which offers guidelines to the owner for stormwater facility maintenance.

Prevention BMPs:

The catch basins and conveyance pipes within the right-of-way should be inspected and maintained by the city. The water quality unit, detention pond, emergency overflow spillway and conveyance pipes will be inspected by the property owner or tenant(s).

- Maintenance Standards for Drainage Facilities
  - No. 1 – Catch Basins and Inlets
  - No. 2 – Conveyance Systems
  - No. 3 - Ponds
  - No. 5 – Access Roads/Easements
  - No. 7 - Control Structures
  - No. 8 - Energy Dissipaters
  - No. 9 – Fencing/Landscaping
  - No. 10 – Grounds/Landscaping
  - BioPod Water Quality Vault

Treatment BMPs:

A BioPod Biofilter vault has been installed onsite to treat storm water runoff from the site. Manufacturer recommendations are included in this report for maintenance.

The City of Puyallup is to review and approve any changes to this stormwater Maintenance Plan prior to changes in its implementation. Additionally, any changes in ownership or person of responsibility are to be reported to the City of Puyallup.

Inspection / Maintenance:

Regular inspections of the drainage facilities should be carried out twice per year, in the spring and fall. One inspection should be during the month of September to identify and correct any problems prior to the winter rainy season. The responsible party should keep records of these inspections available for review by the City. Additional inspections may be required after severe seasonal storms.

Routine maintenance of the site will include mowing, care of landscaping and the removal of trash and debris from the drainage system. The streets and driveways should be kept clean and in good repair. Events such as major storms (more than 1 inch of rain in a 24 hour period) or heavy winds will require immediate inspections for damages.

To ensure proper water quality and treatment, the BioPod Biofilter must be properly maintained. Be careful to avoid introducing landscape fertilizer to receiving waters or groundwater. If site slopes become eroded over 2 inches deep, stabilize by using appropriate erosion control measures (e.g., rock reinforcement, planting of grass, compaction).

Use photocopies of these pages to check out the problems you should look for during an inspection. Copies of the included construction plan sheets would be useful during field inspections to identify areas that need maintenance and to make sure all facilities are inspected. Add comments in the Inspection Results field and note the actions taken. Keep these check sheets in your files. The maintenance records must be kept on file to be reviewed by the City of Puyallup personnel at their discretion.

Person of Responsibility:

Best Parking Lot Cleaning, Inc.
2412 Inter Ave
Puyallup, WA 98372
Contact: Rich Hamilton
rich@bestparkinglot.com

Design Engineer:

Barghausen Consulting Engineers, Inc.
18215 - 72nd Avenue South
Kent, WA 98032
(425) 251-6222

Plan and / or Information Updates:

The City of Puyallup is to review and approve any changes to this stormwater Maintenance Plan prior to changes in its implementation. Additionally, any changes in ownership or person of responsibility are to be reported to the city.

INSPECTION/MAINTENANCE CHECKLIST

STRUCTURE	DATE OF INSPECTION/MAINTENANCE		
	Results/ Maintenance	**Date**	**COMMENTS**
BioPod Biofilter Vault	Inspection Results		
	Maintenance Done		
Catch Basins/Pipe System	Inspection Results		
	Maintenance Done		
Grounds	Inspection Results		
	Maintenance Done		
Pond Access Road	Inspection Results		
	Maintenance Done		
Open Pond	Inspection Results		
	Maintenance Done		

Maintenance Standards for Drainage Facilities

The facility-specific maintenance standards contained in this section are intended to be conditions for determining if maintenance actions are required as identified through inspection. They are not intended to be measures of the facility's required condition at all times between inspections. In other words, exceeding these conditions at any time between inspections and/or maintenance does not automatically constitute a violation of these standards. However, based upon inspection observations, the inspection and maintenance schedules shall be adjusted to minimize the length of time that a facility is in a condition that requires a maintenance action.

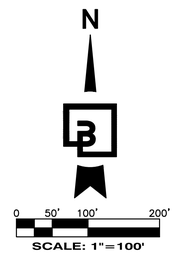
Appendix A
Stormwater Plans

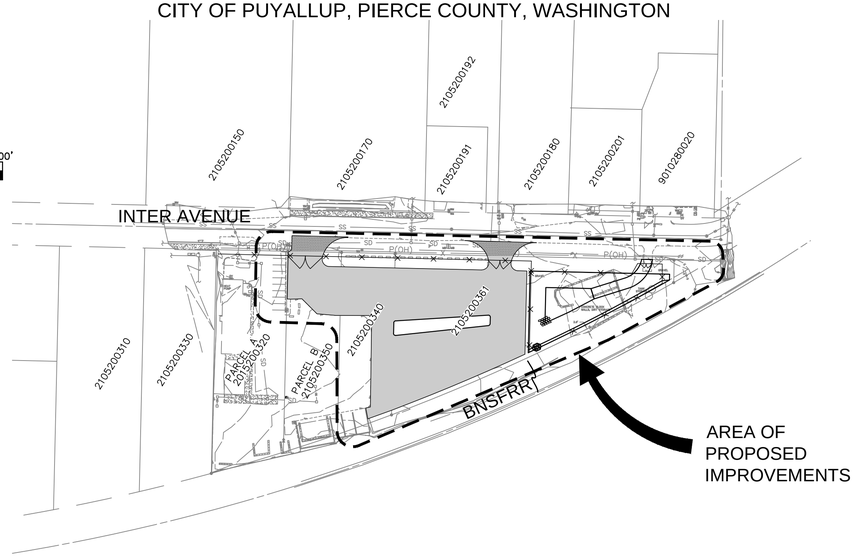
COVER SHEET

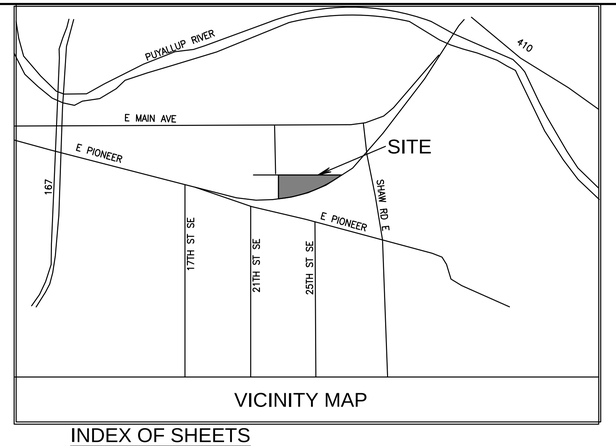
PORTIONS OF SE AND SW QUARTER OF SEC 26, TWP 20 N, RGE. 4 E, W.M.
CITY OF PUYALLUP, PIERCE COUNTY, WASHINGTON

GENERAL SITE NOTES:

1. THE CONTRACTOR SHALL OBTAIN AND HAVE AVAILABLE COPIES OF THE APPLICABLE GOVERNING AGENCY STANDARDS AT THE JOB SITE DURING THE RELATED CONSTRUCTION OPERATIONS.
2. CONTRACTOR SHALL ASSURE THAT ALL NECESSARY PERMITS HAVE BEEN OBTAINED PRIOR TO COMMENCING WORK.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION, DIMENSION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION WHETHER SHOWN ON THESE PLANS OR NOT. UTILITIES OTHER THAN THOSE SHOWN MAY EXIST ON THIS SITE. ONLY THOSE UTILITIES WITH EVIDENCE OF THEIR INSTALLATION VISIBLE AT GROUND SURFACE OR SHOWN ON RECORD DRAWING PROVIDED BY OTHERS ARE SHOWN HEREON. EXISTING UNDERGROUND UTILITY LOCATIONS SHOWN ARE APPROXIMATE ONLY AND ARE SUBJECT TO A DEGREE OF UNKNOWN VARIATION. SOME UNDERGROUND LOCATIONS SHOWN HEREON MAY HAVE BEEN TAKEN FROM PUBLIC RECORDS. BARGHAUSEN CONSULTING ENGINEERS, INC. ASSUMES NO LIABILITY FOR THE ACCURACY OF PUBLIC RECORDS OR RECORDS OF OTHERS. IF CONFLICTS SHOULD OCCUR, THE CONTRACTOR SHALL CONSULT BARGHAUSEN CONSULTING ENGINEERS, INC., TO RESOLVE ALL PROBLEMS PRIOR TO PROCEEDING WITH CONSTRUCTION.
4. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW ALL OF THE DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THE PROJECT WORK SCOPE PRIOR TO THE INITIATION OF CONSTRUCTION. SHOULD THE CONTRACTOR FIND A CONFLICT WITH THE DOCUMENTS RELATIVE TO THE SPECIFICATIONS OR THE RELATIVE CODES, IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE PROJECT ENGINEER OF RECORD IN WRITING PRIOR TO THE START OF CONSTRUCTION. FAILURE BY THE CONTRACTOR TO NOTIFY THE PROJECT ENGINEER SHALL CONSTITUTE ACCEPTANCE OF FULL RESPONSIBILITY BY THE CONTRACTOR TO COMPLETE THE SCOPE OF WORK AS DEFINED BY THE DRAWINGS AND IN FULL COMPLIANCE WITH LOCAL REGULATIONS AND CODES.
5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE APPROPRIATE UTILITIES INVOLVED PRIOR TO CONSTRUCTION.
6. INSPECTION OF SITE WORK WILL BE ACCOMPLISHED BY A REPRESENTATIVE OF THE COVERNING JURISDICTION. INSPECTION OF PRIVATE FACILITIES WILL BE ACCOMPLISHED BY A REPRESENTATIVE OF THE OWNER. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE INSPECTOR 24 HOURS IN ADVANCE OF BACKFILLING ALL CONSTRUCTION.
7. PRIOR TO ANY CONSTRUCTION OR DEVELOPMENT ACTIVITY THE CONTRACTOR SHALL CONTACT THE AGENCY AND/OR UTILITY INSPECTION PERSONNEL AND ARRANGE ANY REQUIRED PRE-CONSTRUCTION MEETING(S). CONTRACTOR SHALL PROVIDE ONE WEEK MIN. ADVANCE NOTIFICATION TO OWNER, FIELD ENGINEER AND ENGINEER OF PRE-CONSTRUCTION MEETINGS.
8. THE CONTRACTOR IS RESPONSIBLE FOR WORKER AND SITE SAFETY AND SHALL COMPLY WITH THE LATEST OSHA STANDARDS AND REGULATIONS, OR ANY OTHER AGENCY HAVING JURISDICTION FOR EXCAVATION AND TRENCHING PROCEDURES. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE "MEANS AND METHODS" REQUIRED TO MEET THE INTENT AND PERFORMANCE CRITERIA OF OSHA, AS WELL AS ANY OTHER ENTITY THAT HAS JURISDICTION FOR EXCAVATION AND/OR TRENCHING PROCEDURES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACTOR. ANY WORK WITHIN THE TRAVELED RIGHT-OF-WAY THAT MAY INTERRUPT NORMAL TRAFFIC FLOW SHALL REQUIRE AT LEAST ONE FLAGGER FOR EACH LANE OF TRAFFIC AFFECTED.
10. PROTECTIVE MEASURES SHALL BE TAKEN BY THE CONTRACTOR TO PROTECT ALL ADJACENT PUBLIC AND PRIVATE PROPERTIES AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF ALL EXISTING UTILITY SERVICES THAT ARE TO REMAIN OPERATIONAL WITHIN THE CONSTRUCTION AREA WHETHER SHOWN OR NOT SHOWN ON THE PLANS.
11. TWO (2) COPIES OF THESE APPROVED PLANS MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS. ONE (1) SET WITH RECORDS OF AS-BUILT INFORMATION SHALL BE SUBMITTED TO BARGHAUSEN CONSULTING ENGINEERS, INC. AT COMPLETION OF PROJECT.
12. CONTRACTOR SHALL OBTAIN SERVICES OF A LICENSED LAND SURVEYOR TO STAKE HORIZONTAL CONTROL FOR ALL NEW IMPROVEMENTS. STAKING CONTROL SHALL BE TAKEN FROM ELECTRONIC PLAN FILES PROVIDED BY BARGHAUSEN CONSULTING ENGINEERS, INC.
13. CONTRACTOR SHALL REQUEST FROM BARGHAUSEN CONSULTING ENGINEERS INC., PRIOR TO ANY CONSTRUCTION STAKING OR CONSTRUCTION WORK, A FORMAL CONSTRUCTION RELEASE PLAN SET OR SPECIFIC RELEASE IN WRITING. THE APPROVED AGENCY PERMIT DRAWINGS WILL NOT BE CONSIDERED CONSTRUCTION RELEASE PLANS BY BARGHAUSEN CONSULTING ENGINEERS, INC UNLESS BARGHAUSEN CONSULTING ENGINEERS, INC HAS GIVEN A FORMAL WRITTEN RELEASE OR ISSUED A CONSTRUCTION RELEASE PLAN SET.







INDEX OF SHEETS

UTILITIES/SERVICES

WATER:
CITY OF PUYALLUP WATER DIVISION
1100 39TH AVE. SE
PUYALLUP, WA 98374
(253) 841-5505

GAS:
PUGET SOUND ENERGY
8001 SOUTH 212TH STREET
KENT, WA 98032
(253) 395-7065

POWER:
PUGET SOUND ENERGY
8001 SOUTH 212TH STREET
KENT, WA 98032
(253) 395-7065

CONSTRUCTION SEQUENCE

1. HOLD A PRE-CONSTRUCTION MEETING WITH THE CITY AND OBTAIN REQUIRED PERMITS.
2. ESTABLISH CLEARING AND GRADING LIMITS.
3. CONSTRUCT TEMPORARY CONSTRUCTION ENTRANCE. CONTRACTOR SHALL COORDINATE ASPHALT REMOVAL AND UTILITY INSTALLATION, AS NECESSARY TO ACCOMMODATE REQUIRED TESC MEASURES.
4. INSTALL CATCH BASIN INLET PROTECTION ON ALL CATCH BASINS IN PROJECT VICINITY, AS SHOWN.
4. CONSTRUCT POND, SILT FENCES, V-DITCHES, AND ROCK CHECK DAMS AS SHOWN.
5. SCHEDULE AN EROSION CONTROL INSPECTION WITH THE CITY.
6. CONSTRUCT STORM DRAINAGE DETENTION POND (CONTROL AND STORAGE) FACILITIES WITH EMERGENCY OVERFLOW PER EROSION CONTROL PLAN/DETAILS).
7. ALL DITCHES AND SWALES AS SHOWN SHALL BE PROVIDED TO DIRECT ALL SURFACE WATER TO THE DETENTION AND SEDIMENTATION POND AS CLEARING AND GRADING PROGRESSES. NO UNCONTROLLED SURFACE WATER SHALL BE ALLOWED TO LEAVE THE SITE OR BE DISCHARGED TO A CRITICAL AREA AT ANY TIME DURING THE GRADING OPERATIONS.
8. BEGIN DEMOLITION AND GRADING ACTIVITIES ONLY AFTER ALL DRAINAGE AND EROSION CONTROL MEASURES ARE IN PLACE AND INSPECTED BY CITY.
9. WITH EACH LAYER OF FILL MATERIAL, INTERCEPTOR DITCHES AND T.E.S.C. FACILITIES MUST BE GRADED AND MAINTAINED TO PROVIDE POSITIVE SLOPE FOR DRAINAGE TO DISCHARGE POINT.
10. CONTINUOUS MAINTENANCE AND UPGRADE OF T.E.S.C. MEASURES, INCLUDING DUST CONTROL, SHALL BE PROVIDED THROUGHOUT ALL PHASES OF CONSTRUCTION.
11. MAINTAIN E.S.C. FACILITIES UNTIL ALL RISK OF EROSION/SEDIMENTATION DRAINAGE HAS PASSED. DO NOT CONVEY SEDIMENT-LADEN WATER INTO STORM DRAINAGE SYSTEM. TEMPORARY EROSION & SEDIMENTATION CONTROL FACILITIES CAN BE REMOVED ONLY UPON FINAL SITE STABILIZATION AND APPROVAL FROM CITY OFFICIAL. SEDIMENT THAT HAS ACCUMULATED WITHIN CATCH BASINS AND THE DETENTION POND SHALL BE REMOVED.
12. COMPLETE INSPECTION/ PUNCHLIST

LEGEND:

PROPOSED		EXISTING			
ASPHALT		CURB		LUMINAIRE (LUM.)	
SAWCUT		PAINT STRIPE		YARD LIGHT	
CONTOUR	--- 66 ---	CONCRETE		POWER METER	
STORM DRAIN PIPE		CONTOUR	432	POWER POLE	
TYPE 1 CATCH BASIN		WATER	-W- -W-	JUNCTION BOX (AS NOTED)	
TYPE 2 CATCH BASIN		STORM	SD	CATCH BASIN (CB)	
SPOT ELEVATION	65.00	TYPE 1 CATCH BASIN		STORM MANHOLE (SDMH)	
		SANITARY	SS	SANITARY SEWER MANHOLE (SSMH)	
		SS MANHOLE		CLEANOUT (AS NOTED)	
		GAS	G	GAS METER	
		POWER OVERHEAD	P (OH)	GAS VALVE	
		POWER UNDERGROUND	P (UG)	WATER VALVE (WV)	
		GRAVEL/SAND (AS NOTED)		FIRE HYDRANT(FH)	
		ASPHALT		CONNECTION(FDC)	
		BUILDING LINE		WATER METER	
		WATER LINE	W	SIGN	
		OH/UG TEL. LINE	T(XX)	DIRECTIONAL ARROW	
				BOLLARD	
				CONIFEROUS TREE	
				DECIDUOUS TREE	

ESTIMATED EARTHWORK QUANTITIES:

CUT: 1,500 CY
FILL: 1,500 CY
EXPORT: 0 CY

AREA TO BE DISTURBED = 68,550 SF (1.57 AC)

EARTHWORK QUANTITIES ARE APPROXIMATE AND HIGHLY DEPENDANT ON SOIL CONDITIONS ENCOUNTERED DURING CONSTRUCTION. CONTRACTOR SHOULD PERFORM INDEPENDENT ESTIMATE FOR BIDDING.

SITE ADDRESS

2412 INTER AVENUE
PUYALLUP, WA 98371-3306

TAX PARCEL NUMBERS

2015200320, 2105200350, 2105200340, 2105200361

ZONING

ML - LIMITED MANUFACTURING

CONTACTS

OWNER/APPLICANT

BEST PARKING LOT CLEANING, INC.
2412 INTER AVENUE
PUYALLUP, WA 98372
CONTACT: RICH HAMILTON
EMAIL: rich@bestparkinglot.com

CIVIL ENGINEERING CONSULTANT:

BARGHAUSEN CONSULTING ENGINEERS
18215 72ND AVENUE SOUTH
KENT, WA. 98032
(425) 251-6222
(425) 251-8782 (FAX)
JASON HUBBELL
EMAIL: jhubbell@barghausen.com

SITE SURVEY CONSULTANT:

C.E.S. NW INC.
310 29TH ST N.E., SUITE 101
PUYALLUP, WA 98372
CONTACT: SETH O'HARE
(253) 848-4282

SOILS REPORT NOTES

1. THE FOLLOWING SOILS REPORTS/ASSESSMENTS WERE PREPARED FOR THE SITE: GEOTECHNICAL EVALUATION, REPORT NO. ES-6481 DATED: FEB 12TH 2019, APRIL 27TH 2021, AND AUGUST 3, 2021:

   BEST PARKING LOT CLEANING, INC
   2412 INTER AVENUE
   PUYALLUP, WA 98372

   PREPARED BY:
   EARTH SOLUTIONS NW, LLC
   1805-136TH PL N.E., SUITE 201
   BELLEVUE, WA 98005
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL PROVISIONS OF THE SOILS REPORT FOR THE SITE BE OBSERVED AND COMPLIED WITH DURING ALL PHASES OF THE SITE PREPARATION, GRADING OPERATIONS, AND PAVING CONSTRUCTION.
3. ANY PROVISIONS OF THE SOILS REPORT WHICH CONFLICT WITH INFORMATION SHOWN ELSEWHERE ON THESE DRAWINGS, OR WHICH REQUIRE FURTHER CLARIFICATION, SHALL BE BROUGHT TO THE ATTENTION OF BARGHAUSEN ENGINEERS.
4. A REPRESENTATIVE FOR THE SOILS ENGINEER SHALL OBSERVE AND APPROVE THE EARTHWORK OPERATIONS AND TO VERIFY FIELD CONDITIONS AS WORK PROCEEDS. THE SOILS ENGINEER SHALL SUBMIT FIELD REPORTS CERTIFYING THAT THE METHODS AND MATERIALS OF THE EARTHWORK OPERATIONS WERE IN ACCORDANCE WITH THE RECOMMENDATION OF THE SOILS INVESTIGATION AND THAT THE WORK WAS PERFORMED TO THE SATISFACTION OF THE ENGINEER.
5. THE SOILS ENGINEER SHOULD BE NOTIFIED AT LEAST FIVE (5) WORKING DAYS PRIOR TO ANY SITE CLEARING OR GRADING.

BASIS OF PLAN

THIS SITE PLAN IS BASED ON LIMITED TOPOGRAPHIC AND BOUNDARY SURVEY, PREPARED BY C.E.S. NW INC. DATED 05/30/2019

THE EXISTING CULTURAL AND TOPOGRAPHIC DATA SHOWN ON THESE DRAWINGS HAS BEEN PREPARED, IN PART, BASED UPON INFORMATION FURNISHED BY OTHERS. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, BCE, INC. CANNOT ENSURE ACCURACY AND THUS IS NOT RESPONSIBLE FOR THE ACCURACY OF THAT INFORMATION OR FOR ANY ERRORS OR OMISSIONS WHICH MAY HAVE BEEN INCORPORATED INTO THESE DRAWINGS AS A RESULT.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE OWNER TO HAVE ALL IMPROVEMENTS FIELD VERIFIED PRIOR TO CONSTRUCTION. DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF BARGHAUSEN CONSULTING ENGINEERS, INC. PRIOR TO WORK.

SURVEY INFORMATION

LEGAL DESCRIPTION: (PER QUIT CLAIM DEED FILED UNDER RECORDING NUMBER 200105070774)

PARCEL A (2105200320)
EAST 100 FEET OF BLOCK 19, ACKERSON'S SECOND ADDITION TO PUYALLUP, ACCORDING TO PLAT RECORDED IN BOOK 8 OF PLATS, AT GAME 25, IN PIERCE COUNTY, WASHINGTON.

PARCEL B (2105200350)
WEST 75 FEET OF THAT PART OF BLOCK 20, ACKERSON'S SECOND ADDITION TO PUYALLUP, SITUATED IN THE CITY OF PUYALLUP, ACCORDING TO PLAT RECORDED IN BOOK 8 OF PLATS, AT PAGE 25, IN PIERCE COUNTY, WASHINGTON.
(PER ALTA COMMITMENT FOR TITLE INSURANCE ISSUED BY CHICAGO TITLE COMMITMENT NUMBER 0012400-TC DATED MARCH 25, 2014)

2105200361
BLOCK 20, ACKERSON'S SECOND ADDITION TO PUYALLUP. ACCORDING TO PLAT RECORDED IN VOLUME 8 OF PLATS, PAGE 25, RECORDS OF PIERCE COUNTY AUDITOR.
EXCEPT THE WEST 150 FEET THEREOF.
SITUATE IN THE CITY OF PUYALLUP, COUNTY OF PIERCE, STATE OF WASHINGTON.
(PER REAL ESTATE EXCISE TAX AFFIDAVIT FILED UNDER RECORDING NUMBER 4337181)

(2105200340)
THE EAST 75 FEET OF THE WEST 150 FEET OF BLOCK 20, ACKERSON'S SECOND ADDITION TO PUYALLUP, ACCORDING TO PLAT THEREOF RECORDED IN VOLUME 9 OF PLATS, AT PAGE 25, RECORDS OF PIERCE COUNTY AUDITOR.
SITUATE IN THE CITY OF PUYALLUP, COUNTY OF PIERCE, STATE OF WASHINGTON

BASIS OF BEARINGS:
NAD 83-2011 (EPOCH 2010.00), WASHINGTON STATE PLACE, SOUTH ZONE, (PER THE WASHINGTON STATE REFERENCE NETWORK).

VERTICAL DATUM:
NAD 88 (PER THE WASHINGTON STATE REFERENCE NETWORK)

UTILITY CONFLICT NOTE:

CAUTION:
THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION, DIMENSION, AND DEPTH OF ALL EXISTING UTILITIES WHETHER SHOWN ON THESE PLANS OR NOT BY POTHOLING THE UTILITIES AND SURVEYING THE HORIZONTAL AND VERTICAL LOCATION PRIOR TO CONSTRUCTION. THIS SHALL INCLUDE CALLING UTILITY LOCATE @ 811 AND THEN POTHOLING ALL OF THE EXISTING UTILITIES AT LOCATIONS OF NEW UTILITY CROSSINGS TO PHYSICALLY VERIFY WHETHER OR NOT CONFLICTS EXIST. LOCATIONS OF SAID UTILITIES AS SHOWN ON THESE PLANS ARE BASED UPON THE UNVERIFIED PUBLIC INFORMATION AND ARE SUBJECT TO VARIATION. IF CONFLICTS SHOULD OCCUR, THE CONTRACTOR SHALL CONSULT BARGHAUSEN CONSULTING ENGINEERS, INC. TO RESOLVE ALL PROBLEMS PRIOR TO PROCEEDING WITH CONSTRUCTION.

CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR OBTAINING PERMITS FROM THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES FOR REMOVING AND REPLACING ALL SURVEY MONUMENTATION THAT MAY BE AFFECTED BY CONSTRUCTION ACTIVITY, PURSUANT TO WAC 332-120. APPLICATIONS MUST BE COMPLETED BY A REGISTERED LAND SURVEYOR. APPLICATIONS FOR PERMITS TO REMOVE MONUMENTS MAY BE OBTAINED FROM THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES, OR BY CONTACTING THEIR OFFICE BY TELEPHONE AT (360) 902-1190.

WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES
PUBLIC LAND SURVEY OFFICE
801 88th AVE S.E.
OLYMPIA, WASHINGTON 98501-7019

UPON COMPLETION OF CONSTRUCTION, ALL MONUMENTS DISPLACED, REMOVED, OR DESTROYED SHALL BE REPLACED BY A REGISTERED LAND SURVEYOR, AT THE COST AND AT THE DIRECTION OF THE CONTRACTOR, PURSUANT TO THESE REGULATIONS. THE APPROPRIATE FORMS FOR REPLACEMENT OF SAID MONUMENTATION SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR.

811 Know what's **below.** **Call** before you dig.

APPROVED

BY: _____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE: _____

NOTE: THIS APPROVAL IS VOID AFTER 1 YEAR FROM APPROVAL DATE.
THE CITY WILL NOT BE RESPONSIBLE FOR ERRORS AND/OR OMISSIONS ON THESE PLANS. FIELD CHANGES MAY DICTATE CHANGES TO THESE PLANS AS DETERMINED BY THE ENGINEERING SERVICES MANAGER.

No.	Date	By	Ckd.	Appr.	Revision

Title: COVER SHEET
PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUBBELL — STATE OF WASHINGTON — 38950 — REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal 1"=100' Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Job Number 20630 Sheet C1 of 10

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CONSTRUCTION NOTES

STORMWATER NOTES:

1. ALL WORK IN CITY RIGHT-OF-WAY REQUIRES A PERMIT FROM THE CITY OF PUYALLUP. PRIOR TO ANY WORK COMMENCING, THE GENERAL CONTRACTOR SHALL ARRANGE FOR A PRECONSTRUCTION MEETING AT THE DEVELOPMENT SERVICES CENTER TO BE ATTENDED BY ALL CONTRACTORS THAT WILL PERFORM WORK SHOWN ON THE ENGINEERING PLANS, REPRESENTATIVES FROM ALL APPLICABLE UTILITY COMPANIES, THE PROJECT OWNER AND APPROPRIATE CITY STAFF. CONTACT ENGINEERING SERVICES TO SCHEDULE THE MEETING (253) 841-5568. THE CONTRACTOR IS RESPONSIBLE TO HAVE THEIR OWN APPROVED SET OF PLANS AT THE MEETING.
2. AFTER COMPLETION OF ALL ITEMS SHOWN ON THESE PLANS AND BEFORE ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL OBTAIN A 'PUNCH LIST' PREPARED BY THE CITY'S INSPECTOR DETAILING REMAINING ITEMS OF WORK TO BE COMPLETED. ALL ITEMS OF WORK SHOWN ON THESE PLANS SHALL BE COMPLETED TO THE SATISFACTION OF THE CITY PRIOR TO ACCEPTANCE OF THE WATER SYSTEM AND PROVISION OF SANITARY SEWER SERVICE.
3. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'STANDARD SPECIFICATIONS'), WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER, LATEST EDITION, UNLESS SUPERSEDED OR AMENDED BY THE CITY OF PUYALLUP CITY STANDARDS FOR PUBLIC WORKS ENGINEERING AND CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'CITY STANDARDS').
4. A COPY OF THESE APPROVED PLANS AND APPLICABLE CITY DEVELOPER SPECIFICATIONS AND DETAILS SHALL BE ON SITE DURING CONSTRUCTION.
5. ANY REVISIONS MADE TO THESE PLANS MUST BE REVIEWED AND APPROVED BY THE DEVELOPER'S ENGINEER AND THE ENGINEERING SERVICES STAFF PRIOR TO ANY IMPLEMENTATION IN THE FIELD. THE CITY SHALL NOT BE RESPONSIBLE FOR ANY ERRORS AND/OR OMISSIONS ON THESE PLANS.
6. THE CONTRACTOR SHALL HAVE ALL UTILITIES VERIFIED ON THE GROUND PRIOR TO ANY CONSTRUCTION. CALL (811) AT LEAST TWO WORKING DAYS IN ADVANCE. THE OWNER AND HIS/HER ENGINEER SHALL BE CONTACTED IMMEDIATELY IF A CONFLICT EXISTS.
7. ANY STRUCTURE AND/OR OBSTRUCTION WHICH REQUIRE REMOVAL OR RELOCATION RELATING TO THIS PROJECT, SHALL BE DONE SO AT THE DEVELOPER'S EXPENSE.
8. DURING CONSTRUCTION, ALL EXISTING AND NEWLY INSTALLED DRAINAGE STRUCTURES SHALL BE PROTECTED FROM SEDIMENTS.
9. ALL STORM MANHOLES SHALL CONFORM TO CITY STANDARD DETAIL NO. 02.01.01. FLOW CONTROL MANHOLE/OIL WATER SEPARATOR SHALL CONFORM TO CITY STANDARD DETAIL NO. 02.01.06 AND 02.01.07.
10. MANHOLE RING AND COVER SHALL CONFORM TO CITY STANDARD DETAIL 06.01.02.
11. CATCH BASINS TYPE I SHALL CONFORM TO CITY STANDARD DETAIL NO 02.01.02 AND 02.01.03 AND SHALL BE USED ONLY FOR DEPTHS LESS THAN 5 FEET FROM TOP OF THE GRATE TO THE INVERT OF THE STORM PIPE.
12. CATCH BASINS TYPE II SHALL CONFORM TO CITY STANDARD DETAIL NO. 02.01.04 AND SHALL BE USED FOR DEPTHS GREATER THAN 5 FEET FROM TOP OF THE GRATE TO THE INVERT OF THE STORM PIPE.
13. CAST IRON OR DUCTILE IRON FRAME AND GRATE SHALL CONFORM TO CITY STANDARD DETAIL NO. 02.01.05. GRATE SHALL BE MARKED WITH 'DRAINS TO STREAM'. SOLID CATCH BASIN LIDS (SQUARE UNLESS NOTED AS ROUND) SHALL CONFORM TO WSDOT STANDARD PLAN B-30.20-04 (OLYMPIC FOUNDRY NO. SM60 OR EQUAL). VANED GRATES SHALL CONFORM TO WSDOT STANDARD PLAN B-30.30-03 (OLYMPIC FOUNDRY NO. SM60V OR EQUAL).
14. STORMWATER PIPE SHALL BE ONLY PVC, CONCRETE, DUCTILE IRON, OR DUAL WALLED POLYPROPYLENE PIPE.
    A. THE USE OF ANY OTHER TYPE SHALL BE REVIEWED AND APPROVED BY THE ENGINEERING SERVICES STAFF PRIOR TO INSTALLATION.
    B. PVC PIPE SHALL BE PER ASTM D3034, SDR 35 FOR PIPE SIZE 15-INCH AND SMALLER AND F679 FOR PIPE SIZES 18 TO 27 INCH. MINIMUM COVER ON PVC PIPE SHALL BE 3.0 FEET.
    C. CONCRETE PIPE SHALL CONFORM TO THE WSDOT STANDARD SPECIFICATIONS FOR CONCRETE UNDERDRAIN PIPE. MINIMUM COVER ON CONCRETE PIPE SHALL NOT LESS THAN 3.0 FEET.
    D. DUCTILE IRON PIPE SHALL BE CLASS 50, CONFORMING TO AWWA C151. MINIMUM COVER ON DUCTILE IRON PIPE SHALL BE 1.0 FOOT.
    E. POLYPROPYLENE PIPE (PP) SHALL BE DUAL WALLED, HAVE A SMOOTH INTERIOR AND EXTERIOR CORRUGATIONS AND MEET WSDOT 9-05.24(1). 12-INCH THROUGH 30'-INCH PIPE SHALL MEET OR EXCEED ASTM F2736 AND AASHTO M330, TYPE S, OR TYPE D. 36-INCH THROUGH 60-INCH PIPE SHALL MEET OR EXCEED ASTM F2881 AND AASHTO M330, TYPE S, OR TYPE D. TESTING SHALL BE PER ASTM F1417. MINIMUM COVER OVER POLYPROPYLENE PIPE SHALL BE 3 FEET.
15. TRENCHING, BEDDING, AND BACKFILL FOR PIPE SHALL CONFORM TO CITY STANDARD DETAIL NO. 06.01.01.
16. STORM PIPE SHALL BE A MINIMUM OF 10 FEET AWAY FROM BUILDING FOUNDATIONS AND/OR ROOF LINES.
17. ALL STORM DRAIN MAINS SHALL TESTED AND INSPECTED FOR ACCEPTANCE AS OUTLINED IN SECTION 406 OF THE CITY OF PUYALLUP SANITARY SEWER SYSTEM STANDARDS.
18. ALL TEMPORARY SEDIMENTATION AND EROSION CONTROL MEASURES, AND PROTECTIVE MEASURES FOR CRITICAL AREAS AND SIGNIFICANT TREES SHALL BE INSTALLED PRIOR TO INITIATING ANY CONSTRUCTION ACTIVITIES.

GRADING, EROSION AND SEDIMENT CONTROL NOTES:

1. ALL WORK IN CITY RIGHT-OF-WAY REQUIRES A PERMIT FROM THE CITY OF PUYALLUP. PRIOR TO ANY WORK COMMENCING, THE GENERAL CONTRACTOR SHALL ARRANGE FOR A PRECONSTRUCTION MEETING AT THE DEVELOPMENT SERVICES CENTER TO BE ATTENDED BY ALL CONTRACTORS THAT WILL PERFORM WORK SHOWN ON THE ENGINEERING PLANS, REPRESENTATIVES FROM ALL APPLICABLE UTILITY COMPANIES, THE PROJECT OWNER AND APPROPRIATE CITY STAFF. CONTACT ENGINEERING SERVICES TO SCHEDULE THE MEETING (253) 841-5568. THE CONTRACTOR IS RESPONSIBLE TO HAVE THEIR OWN APPROVED SET OF PLANS AT THE MEETING.
2. AFTER COMPLETION OF ALL ITEMS SHOWN ON THESE PLANS AND BEFORE ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL OBTAIN A 'PUNCH LIST' PREPARED BY THE CITY'S INSPECTOR DETAILING REMAINING ITEMS OF WORK TO BE COMPLETED. ALL ITEMS OF WORK SHOWN ON THESE PLANS SHALL BE COMPLETED TO THE SATISFACTION OF THE CITY PRIOR TO ACCEPTANCE OF THE WATER SYSTEM AND PROVISION OF SANITARY SEWER SERVICE.
3. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'STANDARD SPECIFICATIONS'), WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER, LATEST EDITION, UNLESS SUPERSEDED OR AMENDED BY THE CITY OF PUYALLUP CITY STANDARDS FOR PUBLIC WORKS ENGINEERING AND CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'CITY STANDARDS').
4. A COPY OF THESE APPROVED PLANS AND APPLICABLE CITY DEVELOPER SPECIFICATIONS AND DETAILS SHALL BE ON SITE DURING CONSTRUCTION.
5. ANY REVISIONS MADE TO THESE PLANS MUST BE REVIEWED AND APPROVED BY THE DEVELOPER'S ENGINEER AND THE CITY ENGINEER PRIOR TO ANY IMPLEMENTATION IN THE FIELD. THE CITY SHALL NOT BE RESPONSIBLE FOR ANY ERRORS AND/OR OMISSIONS ON THESE PLANS.
6. THE CONTRACTOR SHALL HAVE ALL UTILITIES VERIFIED ON THE GROUND PRIOR TO ANY CONSTRUCTION. CALL (811) AT LEAST TWO WORKING DAYS HOURS IN ADVANCE. THE OWNER AND HIS/HER ENGINEER SHALL BE CONTACTED IMMEDIATELY IF A CONFLICT EXISTS.
7. ALL LIMITS OF CLEARING AND AREAS OF VEGETATION PRESERVATION AS PRESCRIBED ON THE PLANS SHALL BE CLEARLY FLAGGED IN THE FIELD AND OBSERVED DURING CONSTRUCTION.
8. ALL REQUIRED SEDIMENTATION AND EROSION CONTROL FACILITIES MUST BE CONSTRUCTED AND IN OPERATION PRIOR TO ANY LAND CLEARING AND/OR OTHER CONSTRUCTION TO ENSURE THAT SEDIMENT LADEN WATER DOES NOT ENTER THE NATURAL DRAINAGE SYSTEM. THE CONTRACTOR SHALL SCHEDULE AN INSPECTION OF THE EROSION CONTROL FACILITIES PRIOR TO ANY LAND CLEARING AND/OR OTHER CONSTRUCTION. ALL EROSION AND SEDIMENT FACILITIES SHALL BE MAINTAINED IN A SATISFACTORY CONDITION AS DETERMINED BY THE CITY, UNTIL SUCH TIME THAT CLEARING AND/OR CONSTRUCTION IS COMPLETED AND THE POTENTIAL FOR ONSITE EROSION HAS PASSED. THE IMPLEMENTATION, MAINTENANCE, REPLACEMENT, AND ADDITIONS TO THE EROSION AND SEDIMENTATION CONTROL SYSTEMS SHALL BE THE RESPONSIBILITY OF THE PERMITTEE.
9. THE EROSION AND SEDIMENTATION CONTROL SYSTEM FACILITIES DEPICTED ON THESE PLANS ARE INTENDED TO BE MINIMUM REQUIREMENTS TO MEET ANTICIPATED SITE CONDITIONS. AS CONSTRUCTION PROGRESSES AND UNEXPECTED OR SEASONAL CONDITIONS DICTATE, FACILITIES WILL BE NECESSARY TO ENSURE COMPLETE SILTATION CONTROL ON THE SITE. DURING THE COURSE OF CONSTRUCTION, IT SHALL BE THE OBLIGATION AND RESPONSIBILITY OF THE PERMITTEE TO ADDRESS ANY NEW CONDITIONS THAT MAY BE CREATED BY HIS ACTIVITIES AND TO PROVIDE ADDITIONAL FACILITIES, OVER AND ABOVE THE MINIMUM REQUIREMENTS, AS MAY BE NEEDED TO PROTECT ADJACENT PROPERTIES, SENSITIVE AREAS, NATURAL WATER COURSES, AND/OR STORM DRAINAGE SYSTEMS.
10. APPROVAL OF THESE PLANS IS FOR GRADING, TEMPORARY DRAINAGE, EROSION AND SEDIMENTATION CONTROL ONLY. IT DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT STORM DRAINAGE DESIGN, SIZE OR LOCATION OF PIPES, RESTRICTORS, CHANNELS, OR RETENTION FACILITIES.
11. ANY DISTURBED AREA WHICH HAS BEEN STRIPPED OF VEGETATION AND WHERE NO FURTHER WORK IS ANTICIPATED FOR A PERIOD OF 30 DAYS OR MORE, MUST BE IMMEDIATELY STABILIZED WITH MULCHING, GRASS PLANTING, OR OTHER APPROVED EROSION CONTROL TREATMENT APPLICABLE TO THE TIME OF YEAR IN QUESTION. GRASS SEEDING ALONE WILL BE ACCEPTABLE ONLY DURING THE MONTHS OF APRIL THROUGH SEPTEMBER INCLUSIVE. SEEDING MAY PROCEED OUTSIDE THE SPECIFIED TIME PERIOD WHENEVER IT IS IN THE INTEREST OF THE PERMITTEE BUT MUST BE AUGMENTED WITH MULCHING, NETTING, OR OTHER TREATMENT APPROVED BY THE CITY.
12. IN CASE EROSION OR SEDIMENTATION OCCURS TO ADJACENT PROPERTIES, ALL CONSTRUCTION WORK WITHIN THE DEVELOPMENT THAT WILL FURTHER AGGRAVATE THE SITUATION MUST CEASE, AND THE OWNER/CONTRACTOR WILL IMMEDIATELY COMMENCE RESTORATION METHODS. RESTORATION ACTIVITY WILL CONTINUE UNTIL SUCH TIME AS THE AFFECTED PROPERTY OWNER IS SATISFIED.
13. NO TEMPORARY OR PERMANENT STOCKPILING OF MATERIALS OR EQUIPMENT SHALL OCCUR WITHIN CRITICAL AREAS OR ASSOCIATED BUFFERS, OR THE CRITICAL ROOT ZONE FOR VEGETATION PROPOSED FOR RETENTION.

GENERAL NOTES:

1. ALL WORK IN CITY RIGHT-OF-WAY REQUIRES A PERMIT FROM THE CITY OF PUYALLUP. PRIOR TO ANY WORK COMMENCING, THE GENERAL CONTRACTOR SHALL ARRANGE FOR A PRECONSTRUCTION MEETING AT THE DEVELOPMENT SERVICES CENTER TO BE ATTENDED BY ALL CONTRACTORS THAT WILL PERFORM WORK SHOWN ON THE APPROVED ENGINEERING PLANS, REPRESENTATIVES FROM ALL APPLICABLE UTILITY COMPANIES, THE PROJECT OWNER AND APPROPRIATE CITY STAFF. CONTACT ENGINEERING SERVICES AT (253-841-5568) TO SCHEDULE THE MEETING. THE CONTRACTOR IS RESPONSIBLE TO HAVE THEIR OWN SET OF APPROVED PLANS AT THE MEETING.
2. AFTER COMPLETION OF ALL ITEMS SHOWN ON THESE PLANS AND BEFORE ACCEPTANCE OF THE PROJECT THE CONTRACTOR SHALL OBTAIN A 'PUNCH LIST' PREPARED BY THE CITY'S INSPECTOR DETAILING REMAINING ITEMS OF WORK TO BE COMPLETED. ALL ITEMS OF WORK SHOWN ON THESE PLANS SHALL BE COMPLETED TO THE SATISFACTION OF THE CITY PRIOR TO ACCEPTANCE OF THE WATER SYSTEM AND PROVISION OF SANITARY SEWER SERVICE.
3. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'STANDARD SPECIFICATIONS'), WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER, LATEST EDITION, UNLESS SUPERSEDED OR AMENDED BY THE CITY OF PUYALLUP CITY STANDARDS FOR PUBLIC WORKS ENGINEERING AND CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'CITY STANDARDS').
4. A COPY OF THESE APPROVED PLANS AND APPLICABLE CITY DEVELOPER SPECIFICATIONS AND DETAILS SHALL BE ON SITE DURING CONSTRUCTION.
5. ANY REVISIONS MADE TO THESE PLANS MUST BE REVIEWED AND APPROVED BY THE DEVELOPER'S ENGINEER AND THE CITY PRIOR TO ANY IMPLEMENTATION IN THE FIELD. THE CITY SHALL NOT BE RESPONSIBLE FOR ANY ERRORS AND/OR OMISSIONS ON THESE PLANS.
6. THE CONTRACTOR SHALL HAVE ALL UTILITIES VERIFIED ON THE GROUND PRIOR TO ANY CONSTRUCTION. CALL (811)AT LEAST TWO WORKING DAYS IN ADVANCE. THE OWNER AND HIS/HER ENGINEER SHALL BE CONTACTED IMMEDIATELY IF A CONFLICT EXISTS.
7. ANY STRUCTURE AND/OR OBSTRUCTION THAT REQUIRES REMOVAL OR RELOCATION RELATING TO THIS PROJECT SHALL BE DONE SO AT THE DEVELOPER'S EXPENSE.
8. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE TRUE ELEVATIONS AND LOCATIONS OF HIDDEN UTILITIES. ALL VISIBLE ITEMS SHALL BE THE ENGINEER'S RESPONSIBILITY.
9. THE CONTRACTOR SHALL INSTALL, REPLACE, OR RELOCATE ALL SIGNS, AS SHOWN ON THE PLANS OR AS AFFECTED BY CONSTRUCTION, PER CITY STANDARDS.
10. POWER, STREET LIGHT, CABLE, AND TELEPHONE LINES SHALL BE IN A TRENCH LOCATED WITHIN A 10-FOOT UTILITY EASEMENT ADJACENT TO PUBLIC RIGHT-OF-WAY. RIGHT-OF-WAY CROSSINGS SHALL HAVE A MINIMUM HORIZONTAL SEPARATION FROM OTHER UTILITIES (SEWER, WATER, AND STORM) OF 5 FEET.
11. ALL CONSTRUCTION SURVEYING FOR EXTENSIONS OF PUBLIC FACILITIES SHALL BE DONE UNDER THE DIRECTION OF A WASHINGTON STATE LICENSED LAND SURVEYOR OR A WASHINGTON STATE LICENSED PROFESSIONAL CIVIL ENGINEER.
12. DURING CONSTRUCTION, ALL PUBLIC STREETS ADJACENT TO THIS PROJECT SHALL BE KEPT CLEAN OF ALL MATERIAL DEPOSITS RESULTING FROM ON-SITE CONSTRUCTION, AND EXISTING STRUCTURES SHALL BE PROTECTED AS DIRECTED BY THE CITY.
13. CERTIFIED RECORD DRAWINGS ARE REQUIRED PRIOR TO PROJECT ACCEPTANCE.
14. A NPDES STORMWATER GENERAL PERMIT MAY BE REQUIRED BY THE DEPARTMENT OF ECOLOGY FOR THIS PROJECT. FOR INFORMATION CONTACT THE DEPARTMENT OF ECOLOGY, SOUTHWEST REGION OFFICE AT (360)407-6300.
15. ANY DISTURBANCE OR DAMAGE TO CRITICAL AREAS AND ASSOCIATED BUFFERS, OR SIGNIFICANT TREES DESIGNATED FOR PRESERVATION AND PROTECTION SHALL BE MITIGATED IN ACCORDANCE WITH A MITIGATION PLAN REVIEWED AND APPROVED BY THE CITY'S PLANNING DIVISION. PREPARATION AND IMPLEMENTATION OF THE MITIGATION PLAN SHALL BE AT THE DEVELOPER'S EXPENSE.

ROADWAY NOTES:

1. ALL WORK IN CITY RIGHT-OF-WAY REQUIRES A PERMIT FROM THE CITY OF PUYALLUP. PRIOR TO ANY WORK COMMENCING, THE GENERAL CONTRACTOR SHALL ARRANGE FOR A PRECONSTRUCTION MEETING AT THE DEVELOPMENT SERVICES CENTER TO BE ATTENDED BY ALL CONTRACTORS THAT WILL PERFORM WORK SHOWN ON THE ENGINEERING PLANS, REPRESENTATIVES FROM ALL APPLICABLE UTILITY COMPANIES, THE PROJECT OWNER AND APPROPRIATE CITY STAFF. CONTACT ENGINEERING SERVICES TO SCHEDULE THE MEETING (253) 841-5568. THE CONTRACTOR IS RESPONSIBLE TO HAVE THEIR OWN APPROVED SET OF PLANS AT THE MEETING.
2. AFTER COMPLETION OF ALL ITEMS SHOWN ON THESE PLANS AND BEFORE ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL OBTAIN A 'PUNCH LIST' PREPARED BY THE CITY'S INSPECTOR DETAILING REMAINING ITEMS OF WORK TO BE COMPLETED. ALL ITEMS OF WORK SHOWN ON THESE PLANS SHALL BE COMPLETED TO THE SATISFACTION OF THE CITY PRIOR TO ACCEPTANCE OF THE WATER SYSTEM AND PROVISION OF SANITARY SEWER SERVICE.
3. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'STANDARD SPECIFICATIONS'), WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER, LATEST EDITION, UNLESS SUPERSEDED OR AMENDED BY THE CITY OF PUYALLUP CITY STANDARDS FOR PUBLIC WORKS ENGINEERING AND CONSTRUCTION (HEREINAFTER REFERRED TO AS THE 'CITY STANDARDS').
4. A COPY OF THESE APPROVED PLANS AND APPLICABLE CITY DEVELOPER SPECIFICATIONS AND DETAILS SHALL BE ON SITE DURING CONSTRUCTION.
5. ANY REVISIONS MADE TO THESE PLANS MUST BE REVIEWED AND APPROVED BY THE DEVELOPER'S ENGINEER AND THE ENGINEERING SERVICES STAFF PRIOR TO ANY IMPLEMENTATION IN THE FIELD. THE CITY SHALL NOT BE RESPONSIBLE FOR ANY ERRORS AND/OR OMISSIONS ON THESE PLANS.
6. THE CONTRACTOR SHALL HAVE ALL UTILITIES VERIFIED ON THE GROUND PRIOR TO ANY CONSTRUCTION. CALL (811) AT LEAST TWO WORKING DAYS IN ADVANCE. THE OWNER AND HIS/HER ENGINEER SHALL BE CONTACTED IMMEDIATELY IF A CONFLICT EXISTS.
7. ANY STRUCTURE AND/OR OBSTRUCTION WHICH REQUIRES REMOVAL OR RELOCATION RELATING TO THIS PROJECT, SHALL BE DONE SO AT THE DEVELOPER'S EXPENSE.
8. MONUMENTS SHALL BE INSTALLED AT ALL STREET INTERSECTIONS, AT ANGLE POINTS, AND POINTS OF CURVATURE IN EACH STREET. ALL BOUNDARY MONUMENTS MUST BE INSTALLED ACCORDING TO THE WASHINGTON STATE SUBDIVISION LAWS.
9. CURB AND GUTTER INSTALLATION SHALL CONFORM TO CITY STANDARD DETAIL 01.02.09.
10. SIDEWALKS AND DRIVEWAYS SHALL BE INSTALLED AS LOTS ARE BUILT ON. SIDEWALKS AND DRIVEWAYS SHALL CONFORM TO CITY STANDARD DETAIL 01.02.01, 01.02.02 AND 01.02.12. IF ASPHALT IS DAMAGED DURING REPLACEMENT OF CURB AND GUTTER, THE REPAIR SHALL CONFORM TO CITY STANDARD DETAIL 01.02.10.
11. THE SURROUNDING GROUND (5 FEET BEYOND THE BASE) FOR ALL POWER TRANSFORMERS, TELEPHONE/TV PEDESTALS, AND STREET LIGHT MAIN DISCONNECTS SHALL BE GRADED TO A POSITIVE 2 PERCENT SLOPE FROM TOP OF CURB.
12. SIGNAGE AND TRAFFIC CONTROL DEVICES ARE SAFETY ITEMS AND SHALL BE INSTALLED PRIOR TO ISSUANCE OF ANY CERTIFICATE OF OCCUPANCY OR PLAT APPROVAL. HOWEVER, IN LARGER DEVELOPMENTS, EXACT LOCATIONS OF STOP AND YIELD SIGNS MAY NEED TO BE DETERMINED AFTER FULL BUILDOUT WHEN TRAFFIC PATTERNS HAVE BEEN ESTABLISHED. IN THIS CASE, CONTRACTOR SHALL PROVIDE INDICATED 'CITY-PLACED' SIGNS, SIGNPOSTS, AND BRACKETS TO THE CITY SIGN SPECIALIST (253) 841-5471 FOR LATER INSTALLATION BY THE CITY. ALL SIGNAGE SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
13. PRIOR TO ANY SIGN OR STRIPING INSTALLATION OR REMOVAL THE CONTRACTOR SHALL CONTACT THE CITY SIGN SPECIALIST (253) 841-5471 TO ARRANGE FOR AN ON-SITE MEETING TO DISCUSS PLACEMENT AND UNIFORMITY.
14. NEW OR REVISED STOP SIGNS OR YIELD SIGNS SHALL BE ADVANCE WARNED USING THE PROCEDURE OUTLINED IN THE MUTCD. ADVANCE WARNING SIGNS AND FLAGS SHALL BE MAINTAINED BY INSTALLER FOR 30 DAYS AND THEN REMOVED.

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

NOTE: THIS APPROVAL IS VOID AFTER 1 YEAR FROM APPROVAL DATE.
THE CITY WILL NOT BE RESPONSIBLE FOR ERRORS AND/OR OMISSIONS ON THESE PLANS. FIELD CHANGES MAY DICTATE CHANGES TO THESE PLANS AS DETERMINED BY THE ENGINEERING SERVICES MANAGER.

No.	Date	By	Ckd.	Appr.	Revision

Title: CONSTRUCTION NOTES

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

PUYALLUP, WASHINGTON

JASON GUY HUSBAND — STATE OF WASHINGTON — 38950 — REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal NA Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Job Number 20630

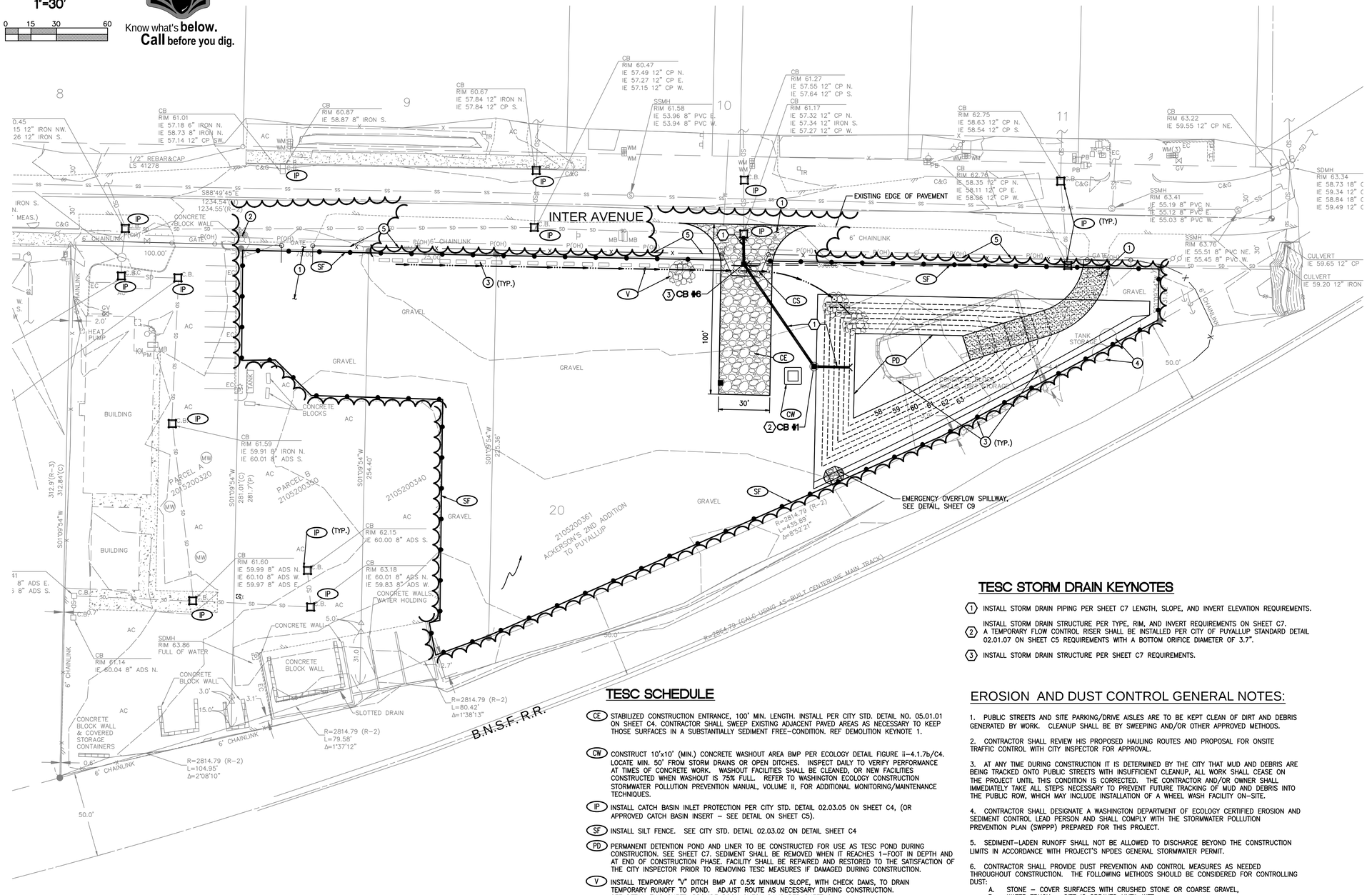
Sheet C2 of 10

EROSION CONTROL PLAN

1"=30'

0 15 30 60

811 Know what's **below.** **Call** before you dig.



LEGEND

- CLEARING LIMITS
- CATCH BASIN INLET PROTECTION
- TEMPORARY SWALE
- SILT FENCE
- OVERLAND FLOW DIRECTION
- TEMPORARY CONSTRUCTION ENTRANCE
- TEMPORARY SEDIMENT POND
- ROCK CHECK DAM
- EXISTING EASEMENT
- EXISTING CURB
- EXISTING SANITARY SEWER
- EXISTING STORM PIPE
- EXISTING WATER
- EXISTING FENCE
- EXISTING GROUND CONTOUR
- EXISTING CATCH BASIN (CB)
- EXISTING STORM MANHOLE (SDMH)
- EXISTING FIRE HYDRANT
- EXISTING SEWER MANHOLE (SSMH)
- DEMO EXISTING CURB
- DEMO EXISTING FENCE
- SAWCUT LINE
- EROSION CONTROL BMP CALLOUT (BMP INITIALS)

TESC SCHEDULE

- (CE) STABILIZED CONSTRUCTION ENTRANCE, 100' MIN. LENGTH. INSTALL PER CITY STD. DETAIL NO. 05.01.01 ON SHEET C4. CONTRACTOR SHALL SWEEP EXISTING ADJACENT PAVED AREAS AS NECESSARY TO KEEP THOSE SURFACES IN A SUBSTANTIALLY SEDIMENT FREE-CONDITION. REF DEMOLITION KEYNOTE 1.
- (CW) CONSTRUCT 10'x10' (MIN.) CONCRETE WASHOUT AREA BMP PER ECOLOGY DETAIL FIGURE ii-4.1.7b/C4. LOCATE MIN. 50' FROM STORM DRAINS OR OPEN DITCHES. INSPECT DAILY TO VERIFY PERFORMANCE AT TIMES OF CONCRETE WORK. WASHOUT FACILITIES SHALL BE CLEANED, OR NEW FACILITIES CONSTRUCTED WHEN WASHOUT IS 75% FULL. REFER TO WASHINGTON ECOLOGY CONSTRUCTION STORMWATER POLLUTION PREVENTION MANUAL, VOLUME II, FOR ADDITIONAL MONITORING/MAINTENANCE TECHNIQUES.
- (IP) INSTALL CATCH BASIN INLET PROTECTION PER CITY STD. DETAIL 02.03.05 ON SHEET C4, (OR APPROVED CATCH BASIN INSERT – SEE DETAIL ON SHEET C5).
- (SF) INSTALL SILT FENCE. SEE CITY STD. DETAIL 02.03.02 ON DETAIL SHEET C4
- (PD) PERMANENT DETENTION POND AND LINER TO BE CONSTRUCTED FOR USE AS TESC POND DURING CONSTRUCTION. SEE SHEET C7. SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1-FOOT IN DEPTH AND AT END OF CONSTRUCTION PHASE. FACILITY SHALL BE REPAIRED AND RESTORED TO THE SATISFACTION OF THE CITY INSPECTOR PRIOR TO REMOVING TESC MEASURES IF DAMAGED DURING CONSTRUCTION.
- (V) INSTALL TEMPORARY "V" DITCH BMP AT 0.5% MINIMUM SLOPE, WITH CHECK DAMS, TO DRAIN TEMPORARY RUNOFF TO POND. ADJUST ROUTE AS NECESSARY DURING CONSTRUCTION. SEE DETAIL THIS SHEET. PROVIDE ROCK CHECK DAMS PER SHEET C4.
- (CS) TEMP ROAD CROSSING SWALE (PER DETAIL SHT C4)

DEMOLITION KEYNOTES

1. REMOVE EXISTING ASPHALT PAVEMENT. WHERE ASPHALT IS SAWCUT, IT SHALL BE TO A CLEAN, VERTICAL, UNYIELDING EDGE. REMOVE PAVEMENT DURING INITIAL CONSTRUCTION, AS NECESSARY TO INSTALL CONSTRUCTION ENTRANCE AND PROPOSED IMPROVEMENTS, REFERENCE SHEET C6 AND C7.
2. REMOVE EXISTING HYDRANT METER AT EXISTING FIRE HYDRANT. COORDINATE WITH INSPECTOR AND CITY OF PUYALLUP WATER UTILITY DEPARTMENT.
3. CONCRETE BLOCKS TO BE REMOVED AND SALVAGED TO OWNER OR DISPOSED OF AT AN APPROVED OFFSITE LOCATION.
4. TANK STORAGE TO BE REMOVED AND SALVAGED TO OWNER OR DISPOSED OF AT AN APPROVED OFFSITE LOCATION.
5. REMOVE EXISTING FENCE WITHIN PUBLIC RIGHT-OF-WAY. SEE SHEET C6 FOR ONSITE FENCING REQUIREMENTS.

TESC STORM DRAIN KEYNOTES

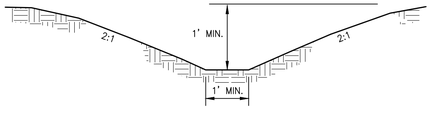
1. INSTALL STORM DRAIN PIPING PER SHEET C7 LENGTH, SLOPE, AND INVERT ELEVATION REQUIREMENTS.
2. INSTALL STORM DRAIN STRUCTURE PER TYPE, RIM, AND INVERT REQUIREMENTS ON SHEET C7. A TEMPORARY FLOW CONTROL RISER SHALL BE INSTALLED PER CITY OF PUYALLUP STANDARD DETAIL 02.01.07 ON SHEET C5 REQUIREMENTS WITH A BOTTOM ORIFICE DIAMETER OF 3.7".
3. INSTALL STORM DRAIN STRUCTURE PER SHEET C7 REQUIREMENTS.

EROSION AND DUST CONTROL GENERAL NOTES:

1. PUBLIC STREETS AND SITE PARKING/DRIVE AISLES ARE TO BE KEPT CLEAN OF DIRT AND DEBRIS GENERATED BY WORK. CLEANUP SHALL BE BY SWEEPING AND/OR OTHER APPROVED METHODS.
2. CONTRACTOR SHALL REVIEW HIS PROPOSED HAULING ROUTES AND PROPOSAL FOR ONSITE TRAFFIC CONTROL WITH CITY INSPECTOR FOR APPROVAL.
3. AT ANY TIME DURING CONSTRUCTION IT IS DETERMINED BY THE CITY THAT MUD AND DEBRIS ARE BEING TRACKED ONTO PUBLIC STREETS WITH INSUFFICIENT CLEANUP, ALL WORK SHALL CEASE ON THE PROJECT UNTIL THIS CONDITION IS CORRECTED. THE CONTRACTOR AND/OR OWNER SHALL IMMEDIATELY TAKE ALL STEPS NECESSARY TO PREVENT FUTURE TRACKING OF MUD AND DEBRIS INTO THE PUBLIC ROW, WHICH MAY INCLUDE INSTALLATION OF A WHEEL WASH FACILITY ON-SITE.
4. CONTRACTOR SHALL DESIGNATE A WASHINGTON DEPARTMENT OF ECOLOGY CERTIFIED EROSION AND SEDIMENT CONTROL LEAD PERSON AND SHALL COMPLY WITH THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARED FOR THIS PROJECT.
5. SEDIMENT-LADEN RUNOFF SHALL NOT BE ALLOWED TO DISCHARGE BEYOND THE CONSTRUCTION LIMITS IN ACCORDANCE WITH PROJECT'S NPDES GENERAL STORMWATER PERMIT.
6. CONTRACTOR SHALL PROVIDE DUST PREVENTION AND CONTROL MEASURES AS NEEDED THROUGHOUT CONSTRUCTION. THE FOLLOWING METHODS SHOULD BE CONSIDERED FOR CONTROLLING DUST:
   - A. STONE – COVER SURFACES WITH CRUSHED STONE OR COARSE GRAVEL,
   - B. WATER TRUCK – SITE IS SPRAYED UNTIL WET,
   - C. SPRINKLERS – SITE IS SPRINKLED UNTIL WET.
   - D. BARRIERS – SOLID BOARD FENCES, HAY BALES BURLAP FENCES, AND SIMILAR MATERIALS CAN BE USED TO CONTROL AIR CURRENTS AND SOIL BLOWING.

DEMOLITION AND EXCAVATION NOTES:

1. CONTRACTOR SHALL ASSURE THAT ALL NECESSARY PERMITS HAVE BEEN OBTAINED AND NECESSARY PRECONSTRUCTION MEETINGS HELD, PRIOR TO COMMENCING WORK.
2. CONTRACTOR SHALL FIELD VERIFY LOCATION, SIZE, AND TYPE OF EXISTING UTILITIES IN WORK AREA PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO ENGINEER IMMEDIATELY.
3. CONTRACTOR SHALL PROTECT AND PRESERVE ALL IMPROVEMENTS ALONG THE PERIMETER OF THE WORK AREA. ANY DAMAGED IMPROVEMENTS SHALL BE REPAIRED/REPLACED AT CONTRACTOR'S EXPENSE.
4. ALL SILT PROTECTION AND EROSION CONTROL MEASURES MUST BE IN PLACE BEFORE SAWCUTTING, CURB AND PAVEMENT REMOVAL, OR STRIPPING OF SITE VEGETATION.
5. ANY/ALL EXISTING WELLS AND/OR SEPTIC SYSTEMS DISCOVERED ON-SITE SHALL BE REMOVED AND/OR ABANDONED PER PIERCE COUNTY HEALTH DEPARTMENT STANDARDS.
6. THE PROJECT SITE IS SUBJECT TO HIGH GROUNDWATER LEVELS. IMPLEMENT DEWATERING PROCEDURES AS NECESSARY.



TEMPORARY "V" DITCH

NOT TO SCALE

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

NOTE: THIS APPROVAL IS VOID AFTER 1 YEAR FROM APPROVAL DATE.
THE CITY WILL NOT BE RESPONSIBLE FOR ERRORS AND/OR OMISSIONS ON THESE PLANS. FIELD CHANGES MAY DICTATE CHANGES TO THESE PLANS AS DETERMINED BY THE ENGINEERING SERVICES MANAGER.

No.	Date	By	Ckd.	Appr.	Revision

Title: EROSION CONTROL PLAN

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUBER — STATE OF WASHINGTON — 38950 — REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal 1"=30' Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 barghausen.com

Job Number 20630

Sheet C3 of 10

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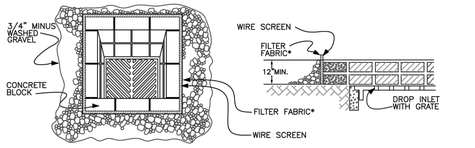
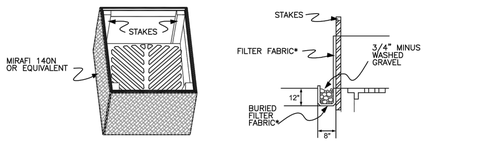
EROSION CONTROL NOTES AND DETAILS

BLOCK AND GRAVEL FILTER



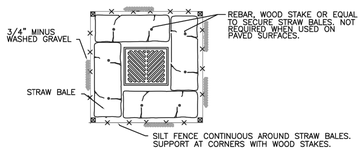
* MIRAFI 140-N OR EQUIVALENT

FILTER FABRIC FENCE



* MIRAFI 140-N OR EQUIVALENT

STRAW BALE BARRIER



CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

STORM DRAIN BARRIERS

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
LINDA LANSING	LINDA LIAN	COLLEEN HARRIS	XXXX	
FILE NAME: F:\DWG\COMMON\STDS\CITY\2009\02_SD\02.03.05		DATE APPROVED: 09/01/1992	DATE REVISED: 06/01/2003	SCALE: NTS

02.03.05

CONDITIONS WHERE PRACTICE APPLIES

1. BLOCK AND GRAVEL FILTER – APPLICABLE FOR AREAS GREATER THAN 5% SLOPE.
2. FILTER FABRIC FENCE – APPLICABLE WHERE THE INLET DRAINS A RELATIVELY SMALL (ONE ACRE OR LESS) AND FLAT AREA (LESS THAN 5% SLOPE).
3. STRAW BALE BARRIER – APPLICABLE WHERE INLET DRAINS A RELATIVELY FLAT DISTURBED AREA (LESS THAN 5% SLOPE) IN WHICH SHEET FLOW (NOT EXCEEDING 0.5 FT/SEC.) OCCURES. BARRIERS OF THIS TYPE SHOULD NOT BE PLACED AROUND INLETS RECEIVING CONCENTRATED FLOWS SUCH AS THOSE ALONG MAJOR STREETS AND HIGHWAYS.

1. BLOCK AND GRAVEL FILTER – INSTALLATION PROCEDURE

A: PLACE WIRE MESH OVER THE DROP INLET SO THAT THE WIRE EXTENDS A MINIMUM OF ONE FOOT BEYOND EACH SIDE OF THE INLET STRUCTURE. USE WIRE SCREEN WITH 1/2-INCH OPENINGS. IF MORE THAN ONE STRIP OF MESH IS NECESSARY, OVERLAP THE STRIPS. PLACE FILTER FABRIC* OVER WIRE MESH.

B: PLACE CONCRETE BLOCKS LENGTHWISE ON THEIR SIDES IN A SINGLE ROW AROUND THE PERIMETER OF THE INLET, SO THAT THE OPEN ENDS FACE OUTWARD, NOT UPWARD. THE ENDS OF ADJACENT BLOCKS SHOULD ABUT. THE HIEGHT OF THE BARRIER CAN BE VARIED, DEPENDING ON DESIGN NEEDS, BY STACKING COMBINATIONS OF BLOCKS THAT ARE 4-INCH, 8-INCH AND 12-INCH WIDE. THE ROW OF BLOCKS SHOULD BE AT LEAST 12-INCHES BUT NO GREATER THAN 24-INCHES HIGH.

C: PLACE WIRE SCREEN OVER THE OVERSIDE VERTICAL FACE (OPEN END) OF THE CONCRETE BLOCKS TO PREVENT STONES FROM BEING WASHED THROUGH THE BLOCKS. USE WIRE SCREEN WITH 1/2-INCH OPENINGS.

D: PILE STONES AGAINST THE WIRE MESH TO THE TOP OF THE BLOCKS. USE 3/4" MINUS WASHED GRAVEL.

2. FILTER FABRIC FENCE – INSTALLATION PROCEDURE

A: PLACE 2-INCH BY 2-INCH WOODEN STAKES AROUND THE PERIMETER OF THE INLET A MAXIMUM OF 3 FEET APART AND DRIVE THEM AT LEAST 8-INCHES INTO THE GROUND. THE STAKES MUST BE AT LEAST 3 FEET LONG.

B: EXCAVATE A TRENCH APPROXIMATELY 8-INCHES WIDE AND 12-INCHES DEEP AROUND THE OUTSIDE PERIMETER OF THE STAKES.

C: STAPLE THE FILTER FABRIC* TO THE WOODEN STAKES SO THAT 32-INCHES OF THE FABRIC EXTENDS AND CAN BE FORMED INTO THE TRENCH, AND USE HEAVY-DUTY WIRE STAPLES AT LEAST 1/2-INCHES LONG.

D: BACKFILL THE TRENCH WITH 3/4-INCH MINUS WASHED GRAVEL ALL THE WAY AROUND.

3. STRAW BALE BARRIER – INSTALLATION PROCEDURE

A: EXCAVATE A 4-INCH DEEP TRENCH AROUND THE INLET. MAKE THE TRENCH AS WIDE AS A STRAW BALE.

B: ORIENT STRAW BALES WITH THE BINDINGS AROUND THE SIDES OF THE BALES RATHER THAN OVER AND UNDER THE BALES.

C: PLACE BALES LENGTHWISE AROUND THE INLET AND PRESS THE ENDS OF ADJACENT BALES SECURELY IN PLACE.

D: DRIVE TWO 2-INCH BY 2-INCH STAKES THROUGH EACH BALE TO ANCHOR THE BALE SECURELY IN PLACE.

E: BACKFILL THE EXCAVATED SOIL AND COMPACT IT AGAINST THE BALE.

F: WEDGE LOOSE STRAW BETWEEN BALES TO PREVENT WATER FROM FLOWING BETWEEN BALES.

* MIRAFI 140-N OR EQUIVALENT

CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

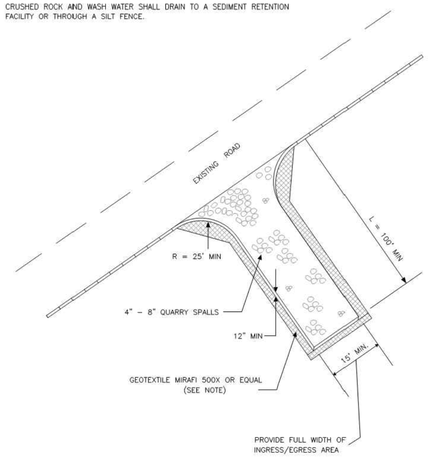
STORM DRAIN BARRIERS NOTES

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
LINDA LANSING	LINDA LIAN	COLLEEN HARRIS	XXXX	
FILE NAME: F:\DWG\COMMON\STDS\CITY\2009\02_SD\02.03.06		DATE APPROVED: 09/01/1992	DATE REVISED: 06/01/2003	SCALE: NTS

02.03.06

NOTE:

1. GEOTEXTILE MIRAFI 500 X OR APPROVED EQUAL SHALL BE PLACED UNDER THE ENTIRETY OF THE TEMPORARY ENTRANCE.
2. ADDITIONAL ROCK SHALL BE ADDED PERIODICALLY TO MAINTAIN PROPER FUNCTION OF THE PAD.
3. IF THE PAD DOES NOT ADEQUATELY REMOVE THE MUD FROM THE VEHICLE'S WHEELS, THE WHEELS SHALL BE HOSED OFF BEFORE THE VEHICLE ENTERS A PAVED STREET. THE WASHING SHALL BE DONE ON AN AREA COVERED WITH CRUSHED ROCK AND WASH WATER SHALL DRAIN TO A SEDIMENT RETENTION FACILITY OR THROUGH A SILT FENCE.

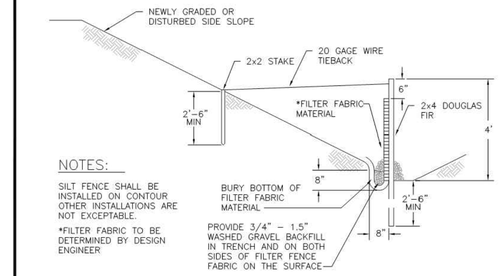


CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

TEMPORARY CONSTRUCTION ENTRANCE

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
JIM EBEN-ES-VOBODA	LINDA LIAN	COLLEEN HARRIS	XXXX	
FILE NAME: F:\DWG\COMMON\STDS\CITY\2009\02_SD\05.01.01		DATE APPROVED: 07/01/2009	DATE REVISED: XX/XX/XX	SCALE: NTS

05.01.01

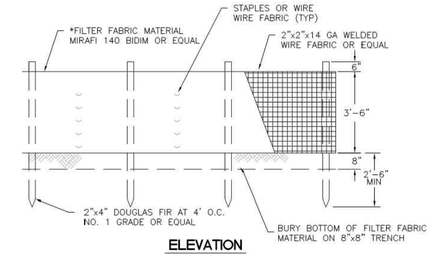


NOTES:

SILT FENCE SHALL BE INSTALLED ON CONTOUR OTHER INSTALLATIONS ARE NOT EXCEPTABLE.

*FILTER FABRIC TO BE DETERMINED BY DESIGN ENGINEER

TYPICAL CROSS SECTION



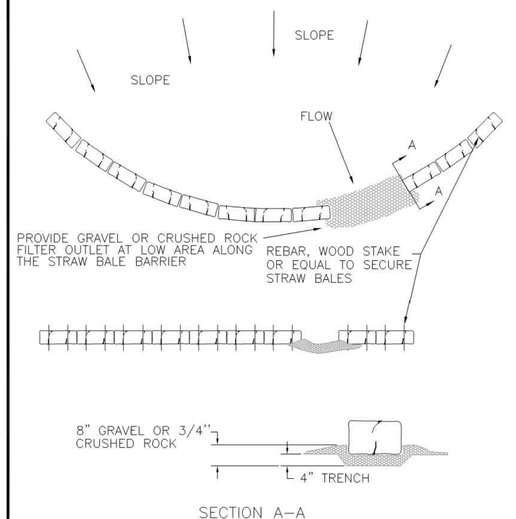
ELEVATION

CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

SILTATION FENCE

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
LINDA LANSING	LINDA LIAN	COLLEEN HARRIS	XXXX	
FILE NAME: F:\DWG\COMMON\STDS\CITY\2009\02_SD\02.03.02		DATE APPROVED: 09/01/1992	DATE REVISED: 06/01/2003	SCALE: NTS

02.03.02



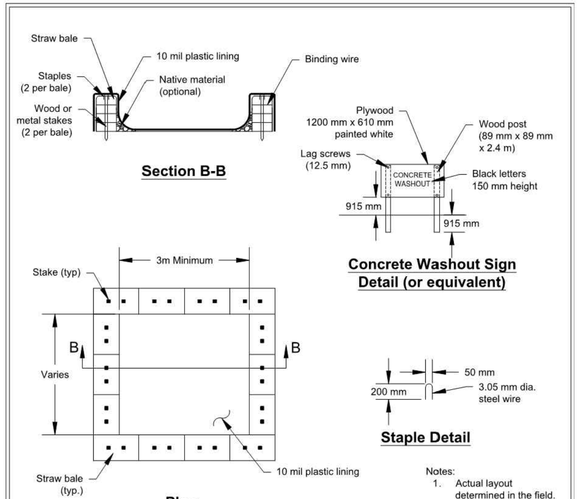
SECTION A-A

CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

BARRIER WITH GRAVEL OUTLET

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
LINDA LANSING	LINDA LIAN	COLLEEN HARRIS	XXXX	
FILE NAME: F:\DWG\COMMON\STDS\CITY\2009\02_SD\02.03.04		DATE APPROVED: 09/01/1992	DATE REVISED: 06/01/2003	SCALE: NTS

02.03.04



Notes:
1. Actual layout determined in the field.
2. The concrete washout sign shall be installed within 10 m of the temporary concrete washout facility.

Type "Above Grade" with Straw Bales

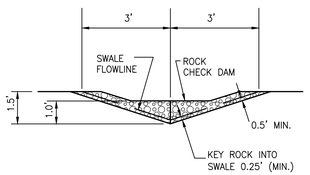
NOT TO SCALE

DEPARTMENT OF ECOLOGY
State of Washington

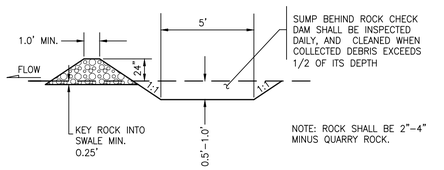
Figure II-4.1.7b
Concrete Washout Area
Revised June 2015

SWALE SLOPE	CHECK DAM SPACING
0% - 5%	150'
5% - 10%	100'
> 10%	50'

← THIS PROJECT



SWALE X-SECTION AT ROCK CHECK DAM



ROCK DAM X-SECTION

ROCK CHECK DAM DETAILS

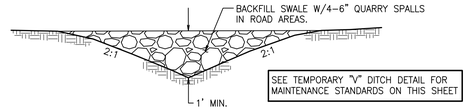
NOT TO SCALE

ALL RIP RAP PADS SHALL BE THE WIDTH OF THE PIPE PLUS 6' WIDE X 8' LONG X 1' DEEP, USING THE GRADATION SPECIFIED BELOW: (UNLESS OTHERWISE SPECIFIED). EXTEND ROCK TO 1' ABOVE CROWN OF OUTLET PIPE.

RIP RAP TO BE QUARRY SPALLS WITH ROCK GRADATION AS FOLLOWS:
- PASSING 8-INCH SQUARE SIEVE: 100%
- PASSING 3-INCH SQUARE SIEVE: 40%-60%
- PASSING 3/4-INCH SQUARE SIEVE: 0-10%

RIP RAP PROTECTION SPECIFICATIONS

NOT TO SCALE



TEMPORARY ROAD X-ING SWALE

NOT TO SCALE

ALL AREAS SUBJECT TO CLEARING AND GRADING THAT HAVE NOT BEEN COVERED BY IMPERVIOUS SURFACE, INCORPORATED INTO A DRAINAGE FACILITY OR ENGINEERED AS STRUCTURAL FILL OR SLOPE SHALL, AT PROJECT COMPLETION, DEMONSTRATE THE FOLLOWING:

1. A TOPSOIL LAYER WITH A MINIMUM ORGANIC MATTER CONTENT OF 10% DRY WEIGHT IN PLANTING BEDS, AND 5% ORGANIC MATTER CONTENT IN TURF AREAS, AND A PH FROM 6.0 TO 8.0 OR MATCHING THE PH OF THE UNDISTURBED SOIL. THE TOPSOIL LAYER SHALL HAVE A MINIMUM DEPTH OF EIGHT INCHES EXCEPT WHERE TREE ROOTS LIMIT THE DEPTH OF INCORPORATION OF AMENDMENTS NEEDED TO MEET THE CRITERIA. SUBSOILS BELOW THE TOPSOIL LAYER SHOULD BE SCARIFIED AT LEAST 4 INCHES WITH SOME INCORPORATION OF THE UPPER MATERIAL TO AVOID STRATIFIED LAYERS, WHERE FEASIBLE.

2. MULCH PLANTING BEDS WITH 2 INCHES OF ORGANIC MATERIAL.
3. USE COMPOST AND OTHER MATERIALS THAT MEET THE FOLLOWING ORGANIC CONTENT REQUIREMENTS:

3.1. THE ORGANIC CONTENT FOR PRE-APPROVED AMENDMENT RATES CAN BE MET ONLY USING COMPOST MEETING THE COMPOST SPECIFICATION FOR BMP T7.30: BIORETENTION, WITH THE EXCEPTION THAT THE COMPOST MAY HAVE UP TO 35% BIOSOLIDS OR MANURE.

THE COMPOST MUST ALSO HAVE AN ORGANIC MATTER CONTENT OF 40% TO 65%, AND A CARBON TO NITROGEN RATIO BELOW 25:1.

THE CARBON TO NITROGEN RATIO MAY BE AS HIGH AS 35:1 FOR PLANTINGS COMPOSED ENTIRELY OF PLANTS NATIVE TO THE PUGET SOUND LOWLANDS REGION.

3.2. THE CALCULATED AMENDMENT RATES MAY BE MET THROUGH USE OF COMPOSTED MATERIAL MEETING (A.) ABOVE; OR OTHER ORGANIC MATERIALS AMENDED TO MEET THE CARBON TO NITROGEN RATIO REQUIREMENTS, AND NOT EXCEEDING THE CONTAMINANT LIMITS IDENTIFIED IN TABLE 220-B, TESTING PARAMETERS, IN WAC 173-350-220.

THE RESULTING SOIL SHOULD BE CONDUCIVE TO THE TYPE OF VEGETATION TO BE ESTABLISHED.

IMPLEMENTATION OPTIONS
THE SOIL QUALITY DESIGN GUIDELINES LISTED ABOVE CAN BE MET BY USING ONE OF THE METHODS LISTED BELOW:
LEAVE UNDISTURBED NATIVE VEGETATION AND SOIL, AND PROTECT FROM COMPACTION DURING CONSTRUCTION.

AMEND EXISTING SITE TOPSOIL OR SUBSOIL EITHER AT DEFAULT "PRE-APPROVED" RATES, OR AT CUSTOM CALCULATED RATES BASED ON TESTS OF THE SOIL AND AMENDMENT.

STOCKPILE EXISTING TOPSOIL DURING GRADING, AND REPLACE IT PRIOR TO PLANTING. STOCKPILED TOPSOIL MUST ALSO BE AMENDED IF NEEDED TO MEET THE ORGANIC MATTER OR DEPTH REQUIREMENTS, EITHER AT A DEFAULT "PRE-APPROVED" RATE OR AT A CUSTOM CALCULATED RATE.

IMPORT TOPSOIL MIX OF SUFFICIENT ORGANIC CONTENT AND DEPTH TO MEET THE REQUIREMENTS.

MORE THAN ONE METHOD MAY BE USED ON DIFFERENT PORTIONS OF THE SAME SITE. SOIL THAT ALREADY MEETS THE DEPTH AND ORGANIC MATTER QUALITY STANDARDS, AND IS NOT COMPACTED, DOES NOT NEED TO BE AMENDED.

BMP T5.13
POST-CONSTRUCTION SOIL QUALITY AND DEPTH

NOT TO SCALE

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

NOTE: THIS APPROVAL IS VOID AFTER 1 YEAR FROM APPROVAL DATE.
THE CITY WILL NOT BE RESPONSIBLE FOR ERRORS AND/OR OMISSIONS ON THESE PLANS. FIELD CHANGES MAY DICTATE CHANGES TO THESE PLANS AS DETERMINED BY THE ENGINEERING SERVICES MANAGER.

No.	Date	By	Ckd.	Appr.	Revision

Title: EROSION CONTROL NOTES AND DETAILS

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUBER — STATE OF WASHINGTON — 38950 — REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal NA Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
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Job Number 20630

Sheet C4 of 10

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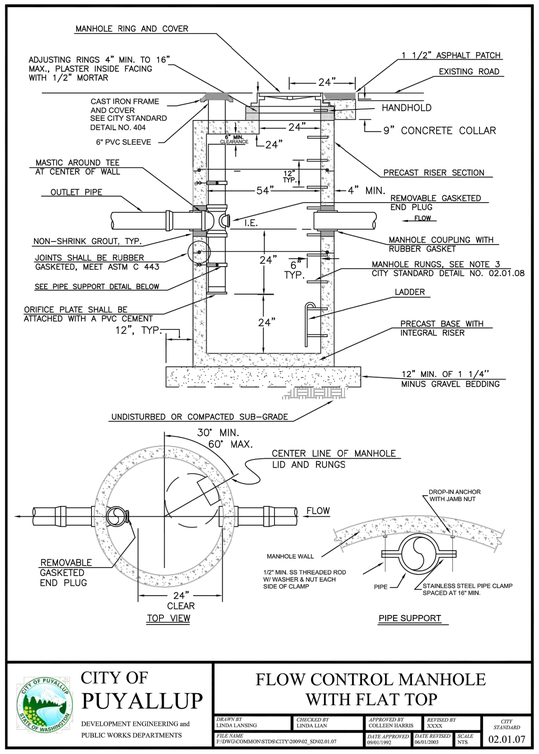
EROSION CONTROL NOTES AND DETAILS



CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

FLOW CONTROL MANHOLE WITH FLAT TOP

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
LINDA LANSING	LINDA LIAN	COLLEEN HARRIS	XXXX	
FILE NAME		DATE APPROVED	DATE REVISED	SCALE
F:\DWG\COMMON\STDS\CITY\200902_SD\02.01.07		09/01/1992	05/01/2003	NTS

02.01.07

MATERIALS OF CONSTRUCTION

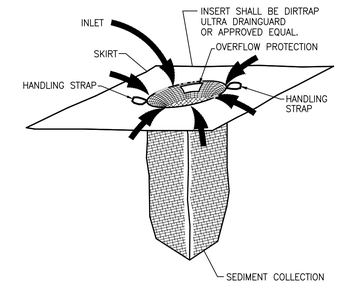
FABRIC:	NEEDLE PUNCHED NON-WOVEN GEOTEXTILE MATERIAL. FABRIC IS IS RESISTANT TO ULTRAVIOLET AND BIOLOGICAL DEGRADATION AND A BROAD RANGE OF CHEMICALS.
APPARENT OPENING SIZE (AOS):	80 US STANDARD SIEVE (0.180 MM)
GRAB TENSILE STRENGTH:	200 LBS
PUNCTURE STRENGTH:	130 LBS
MULLEN BURST:	400 PSI
TRAPEZOIDAL TEAR:	85 LBS
WATER FLOW RATE:	110 GPM/FT2
PERMEABILITY:	0.38 CM/SECOND

DIMENSIONS:

SKIRT:	24"x36"
SOCK FILTER/SEPARATOR:	10" D x 24" L

DISPOSAL REQUIREMENTS:

CONSULT FEDERAL, STATE, AND LOCAL REGULATIONS FOR DISPOSAL OF INSERTS



CATCH BASIN INSERT

NOT TO SCALE

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

NOTE: THIS APPROVAL IS VOID AFTER 1 YEAR FROM APPROVAL DATE.
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No.	Date	By	Ckd.	Appr.	Revision

Title: EROSION CONTROL NOTES AND DETAILS

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUSBAND — STATE OF WASHINGTON — 38950 — REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal NA Vertical N/A

Designed DL
Drawn RDC
Checked DL
Approved JGH
Date 02/09/2022

Barghausen Consulting Engineers, Inc.
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Job Number 20630

Sheet C5 of 10

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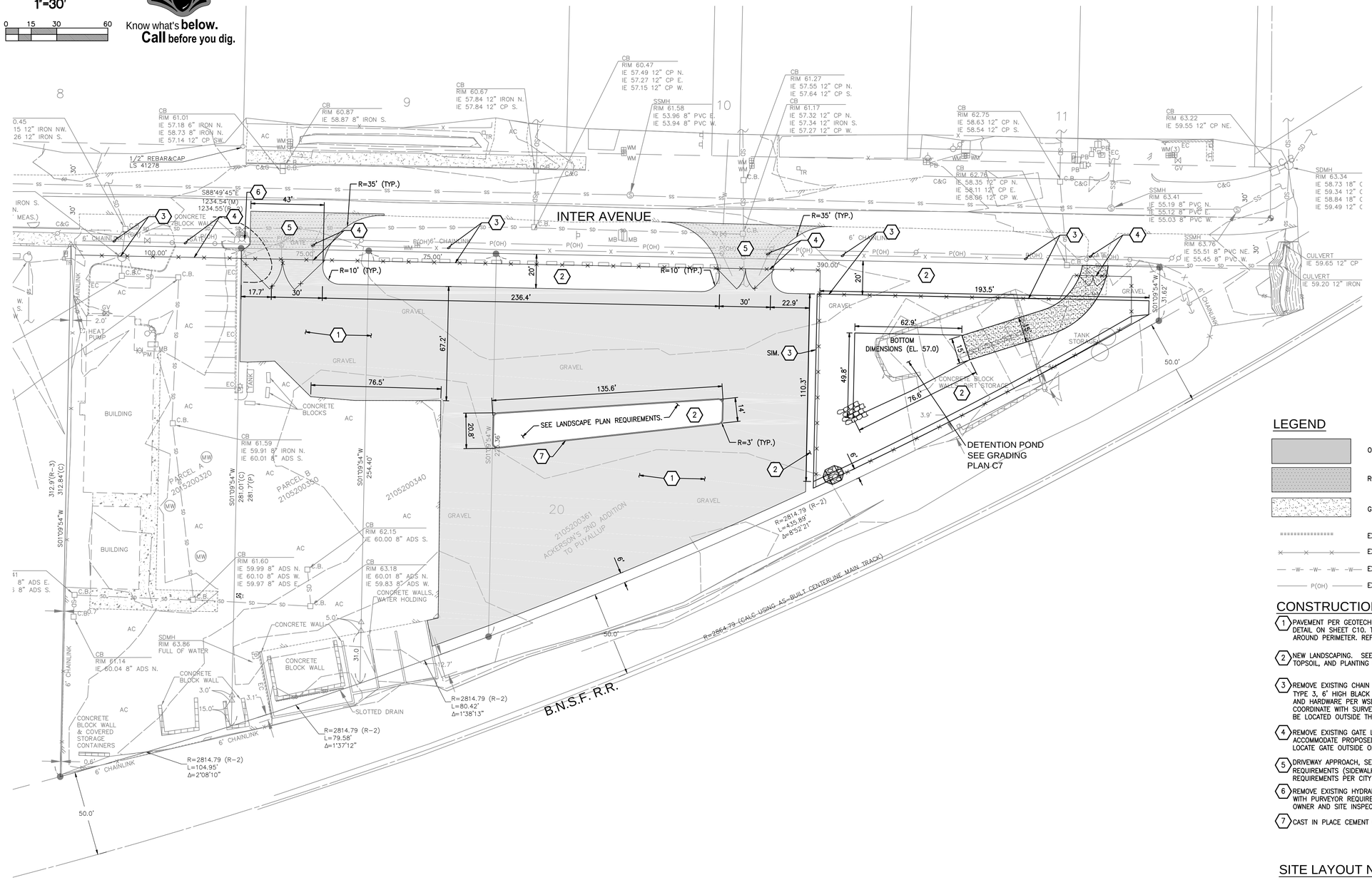
CIVIL SITE PLAN

1"=30'

0 15 30 60

811 Know what's **below.** **Call** before you dig.



LEGEND

- ONSITE ASPHALT PAVEMENT
- ROW ASPHALT PAVEMENT
- GRAVEL
- EXISTING CURB
- EX. CHAIN LINK FENCE
- EX. WATERLINE
- EX. OVERHEAD POWER

CONSTRUCTION CALL OUTS

1. PAVEMENT PER GEOTECHNICAL ENGINEER–RECOMMENDED ASPHALT PAVEMENT SECTION, SEE DETAIL ON SHEET C10. TACK COAT EXISTING PAVEMENT AND MATCH EXISTING ELEVATIONS AROUND PERIMETER. REFER TO GRADING PLAN C7 FOR ADDITIONAL DETAILS.
2. NEW LANDSCAPING. SEE LANDSCAPE PLANS L–1 AND L–2 FOR SOIL PREPARATION, TOPSOIL, AND PLANTING REQUIREMENTS AND DETAILS.
3. REMOVE EXISTING CHAIN LINK FENCE LOCATED WITHIN EXISTING R.O.W. INSTALL TYPE 3, 6' HIGH BLACK VINYL CHAIN LINK FENCE ONSITE WITH BLACK POSTS AND HARDWARE PER WSDOT STD. PLANS L–20.10–03 AND L–30.10–02. COORDINATE WITH SURVEYOR AND OWNER FOR EXACT LIMITS. ALL FENCING MUST BE LOCATED OUTSIDE THE PUBLIC R.O.W.
4. REMOVE EXISTING GATE LOCATED WITHIN EXISTING R.O.W. INSTALL GATE TO ACCOMMODATE PROPOSED DRIVEWAY ENTRY, IN–KIND WITH EXISTING. LOCATE GATE OUTSIDE OF PUBLIC R.O.W.
5. DRIVEWAY APPROACH, SEE CITY STANDARD 01.02.16 ON SHEET C10 FOR DIMENSION REQUIREMENTS (SIDEWALK, CURB AND GUTTER NOT REQUIRED). ROW ASPHALT PAVING REQUIREMENTS PER CITY STANDARD 01.01.04 ON SHEET C10.
6. REMOVE EXISTING HYDRANT METER AND RETURN TO PURVEYOR IN ACCORDANCE WITH PURVEYOR REQUIREMENTS. CONTRACTOR SHALL COORDINATE REMOVAL WITH OWNER AND SITE INSPECTOR.
7. CAST IN PLACE CEMENT CONCRETE TRAFFIC CURB PER WSDOT STANDARD F–10.12–04.

SITE LAYOUT NOTES

1. CONTRACTOR SHALL OBTAIN SERVICES OF A LICENSED LAND SURVEYOR TO PROVIDE HORIZONTAL AND VERTICAL CONTROL FOR ALL NEW WORK. SURVEYOR TO CONTACT BCE, INC. TO OBTAIN ELECTRONIC DRAWING FILES FOR STAKING CONTROL PURPOSES.
2. ALL DIMENSIONS ARE TO FACE OF CURB, UNLESS OTHERWISE NOTED ON PLAN.

SITE AREAS:

TOTAL PROJECT AREA	= 68,550 SF
PERVIOUS AREA, PROVIDED	= 23,585 SF (34.4%)
IMPERVIOUS AREA, PROVIDED	= 44,965 SF (65.6%)

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

NOTE: THIS APPROVAL IS VOID AFTER 1 YEAR FROM APPROVAL DATE.
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No.	Date	By	Ckd.	Appr.	Revision

Title: CIVIL SITE PLAN

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUSBAND STATE OF WASHINGTON 38950 REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal 1"=30' Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

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Job Number 20630

Sheet C6 of 10

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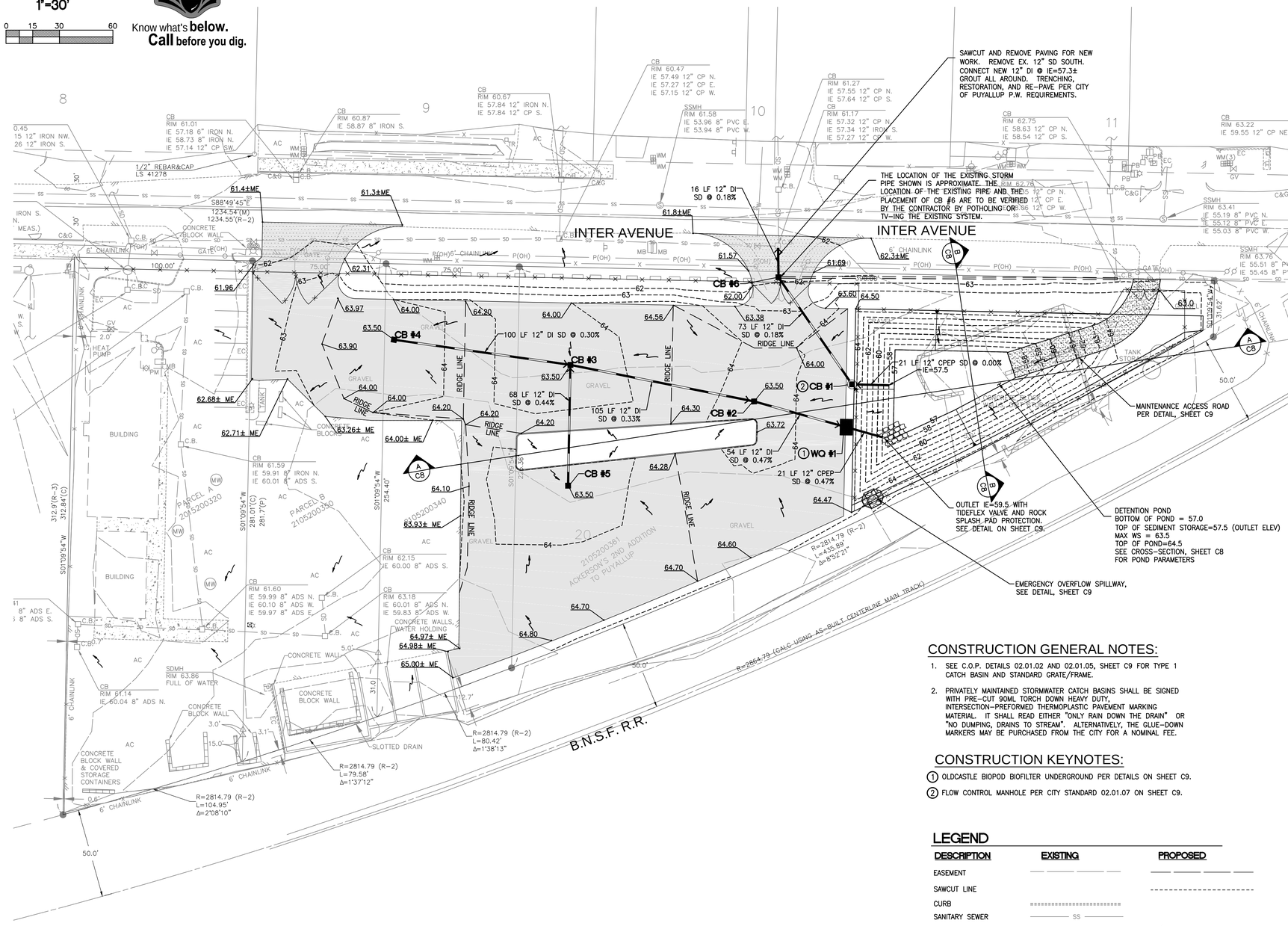
GRADING AND STORM DRAINAGE PLAN

1"=30'

0 15 30 60

811 Know what's **below.** **Call** before you dig.



CONSTRUCTION GENERAL NOTES:

1. SEE C.O.P. DETAILS 02.01.02 AND 02.01.05, SHEET C9 FOR TYPE 1 CATCH BASIN AND STANDARD GRATE/FRAME.
2. PRIVATELY MAINTAINED STORMWATER CATCH BASINS SHALL BE SIGNED WITH PRE-CUT 90ML TORCH DOWN HEAVY DUTY, INTERSECTION-PREFORMED THERMOPLASTIC PAVEMENT MARKING MATERIAL. IT SHALL READ EITHER "ONLY RAIN DOWN THE DRAIN" OR "NO DUMPING, DRAINS TO STREAM". ALTERNATIVELY, THE GLUE-DOWN MARKERS MAY BE PURCHASED FROM THE CITY FOR A NOMINAL FEE.

CONSTRUCTION KEYNOTES:

1. OLDCASTLE BIOPOD BIOFILTER UNDERGROUND PER DETAILS ON SHEET C9.
2. FLOW CONTROL MANHOLE PER CITY STANDARD 02.01.07 ON SHEET C9.

LEGEND

DESCRIPTION	EXISTING	PROPOSED
EASEMENT		
SAWCUT LINE		
CURB		
SANITARY SEWER	SS	
STORM	SD	
WATER	W	
FENCE		
GROUND CONTOUR	55.0	60.0
SPOT ELEVATION		65.0
CATCH BASIN (CB)		
STORM MANHOLE (SDMH)		
FIRE HYDRANT		
ASPHALT PAVEMENT		
OVERLAND FLOW DIRECTION		
MATCH EXISTING ELEVATION		ME

CATCH BASIN TABLE

CB #1, TYPE 2 - 54" RIM = 66.30 IE=57.50 (12" E) IE=57.50 (12" NW)
CB #2, TYPE 1, W/STANDARD GRATE RIM = 63.50 IE=59.85 (12" W) IE=59.85 (12" E)
CB #3, TYPE 1, W/STANDARD GRATE RIM = 63.50 IE=60.20 (12" W) IE=60.20 (12" S) IE=60.20 (12" E)
CB #4, TYPE 1, W/STANDARD GRATE RIM = 63.50 IE=60.50 (12" E)
CB #5, TYPE 1, W/STANDARD GRATE RIM = 63.50 IE=60.50 (12" N)
CB #6, TYPE 1, W/SOLID LOCKING LID RIM = 61.79 IE=57.37 (12" SE) IE=57.30 (12" E) IE=57.37 (12" N)
WQ #1, 6'x8' WATER QUALITY VAULT RIM = 64.44 IE=59.60 (12" W) IE=59.60 (12" E)

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

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No.	Date	By	Ckd.	Appr.	Revision

Title: GRADING AND STORM DRAINAGE PLAN

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUSBAND
STATE OF WASHINGTON
38950
REGISTERED
PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal 1"=30' Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

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Job Number 20630

Sheet C7 of 10

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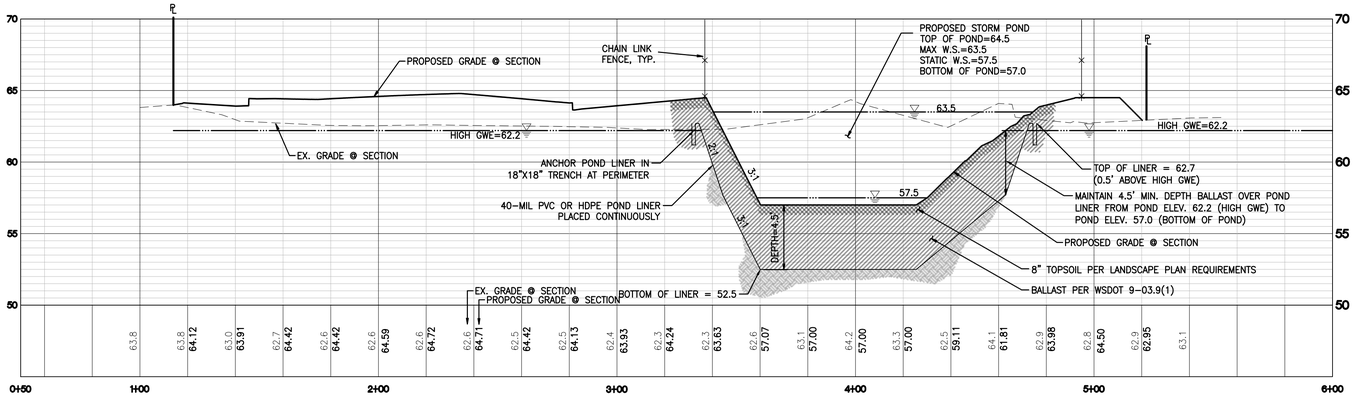
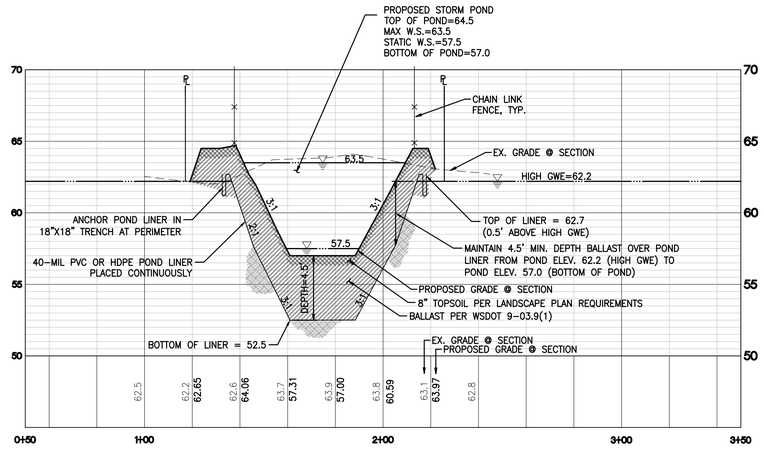
SITE CROSS SECTIONS



SITE SECTIONS A-A

1"=30' HORIZ, 1"=5' VERT



SITE SECTIONS B-B

1"=30' HORIZ, 1"=5' VERT

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

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No.	Date	By	Ckd.	Appr.	Revision

Title: SITE CROSS SECTIONS

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUBER
STATE OF WASHINGTON
38950
REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal NA Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

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Job Number 20630

Sheet C8 of 10

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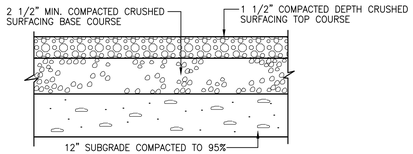
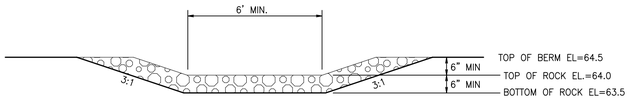
CONSTRUCTION NOTES AND DETAILS



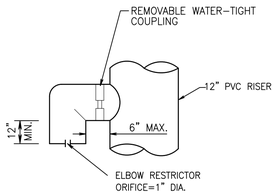
MAINTENANCE ACCESS TYPICAL GRAVEL ROAD SECTION

NOT TO SCALE



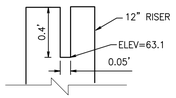
DETENTION POND EMERGENCY OVERFLOW SPILLWAY

NOT TO SCALE



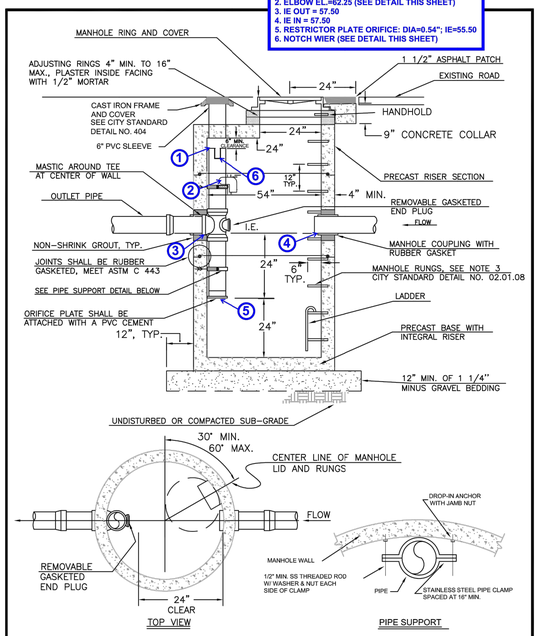
ELBOW DETAIL

N.T.S.

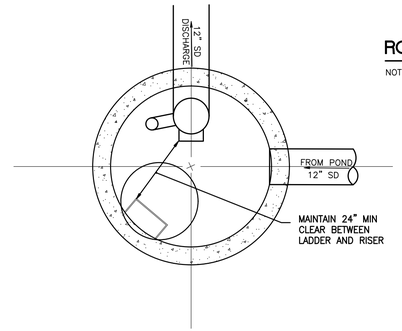


NOTCH DETAIL

N.T.S.

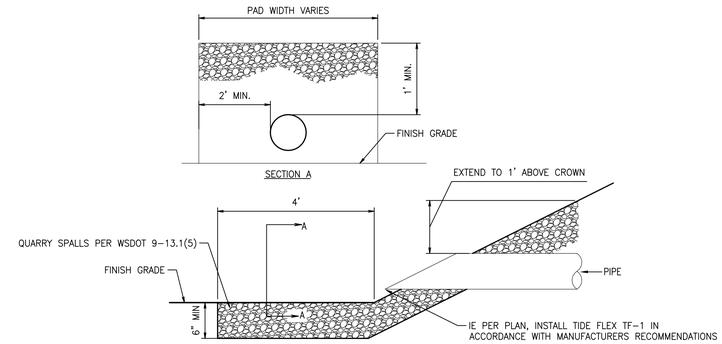


CITY OF PUYALLUP DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS	FLOW CONTROL MANHOLE WITH FLAT TOP				
DRAWN BY: LINDA LANSING	CHECKED BY: LINDA LIAN	APPROVED BY: COLLEEN HARRIS	REVISED BY: XXXX	CITY STANDARD: 02.01.07
FILE NAME: F:\PWGCOMMON\STDS\CITY\20090[2_SD02.01.07	DATE APPROVED: 09/01/1992	DATE REVISED: 06/01/2005	SCALE: NTS	



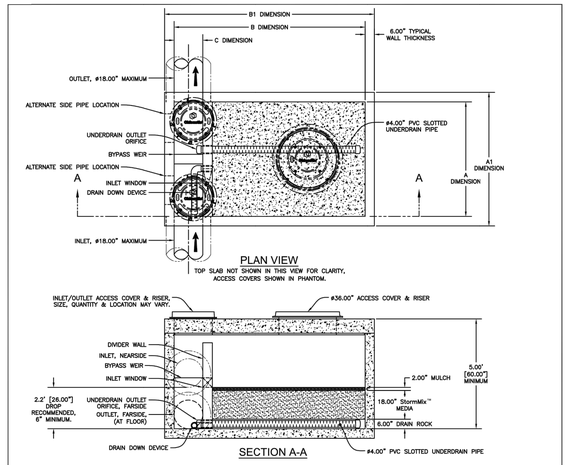
PLAN VIEW

SCALE: 1"=2'



ROCK SPLASH PAD AT PIPE OUTLET

NOT TO SCALE



MODEL	VAULT SIZE[1] (ID)			VAULT FOOTPRINT[1] (OD)		TREATMENT FLOW CAPACITY (GPM/CFS)	
	A DIM	B DIM	C DIM	A1 DIM	B1 DIM	1.6 GPM/SF (WA GULD[2])	1.8 GPM/SF (NJCAT[3])
BPU-46IB	4'	6'	1.5'	5'	7'	25.6 / 0.057	28.8 / 0.064
BPU-48IB	4'	8'	1.5'	5'	9'	38.4 / 0.086	43.2 / 0.096
BPU-412IB	4'	12'	1.5'	5'	13'	64.0 / 0.143	72.0 / 0.160
BPU-66IB	6'	6'	1.5'	7'	7'	38.4 / 0.086	43.2 / 0.096
BPU-68IB	6'	8'	1.5'	7'	9'	57.6 / 0.128	64.8 / 0.144
BPU-612IB	6'	12'	2'	7'	13'	91.2 / 0.203	102.6 / 0.229
BPU-816IB	8'	16'	2'	9'	17'	172.8 / 0.385	194.4 / 0.433

[1] All Dimensions are nominal, ID=Inside Dimension, OD=Outside Dimension.
[2] Treatment flow capacity at 1.6 gpm/sf media surface area based on an WA Ecology GULD Approval for Basic, Enhanced & Phosphorus.
[3] Treatment flow capacity at 1.8 gpm/sf media surface area based on an NJCAT Verification & NJ DEP Certification.

SITE SPECIFIC DATA				
Structure ID				WQ #1
Model Size				6'x8'
Orientation (Left or Right)				
Treatment Flow Rate (cfs)				0.1084 CFS
Peak Flow Rate (cfs)				1.0986 CFS
Rim Elevation				
Pipe Data	Pipe Location (Front or Side)	Pipe Size	Pipe Type	Invert Elevation
Inlet		12"	CPEP	59.60
Outlet		12"	CPEP	59.60
Notes:				

US Patents Pending

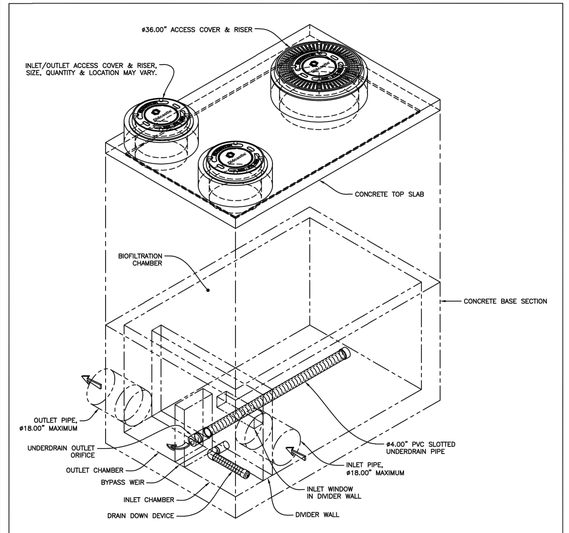
Bioretention/ Biofiltration

BioPod™ Biofilter Underground

Vault with Internal Bypass

Oldcastle Infrastructure™ A CRH COMPANY

DRAWING NO.	REV	ECO	DATE	SHEET
BPU-IB	B	ECO--0161 ARG 5/1/19	MJW 5/6/19	SHEET 2 OF 2



ISOMETRIC VIEW

FILTER MEDIA & DRAIN ROCK NOT SHOWN FOR CLARITY. SCALE: 1X

NOTES:
1. LEFT CONFIGURATION SHOWN, MIRROR RIGHT CONFIGURATION OF INLET AND OUTLET CHAMBER AVAILABLE.
2. CONTACT OLDCASTLE INFRASTRUCTURE FOR ENGINEERING ASSISTANCE AND DETAIL DRAWINGS.
3. CONCRETE COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C890 & C913.

US Patents Pending

Bioretention/ Biofiltration

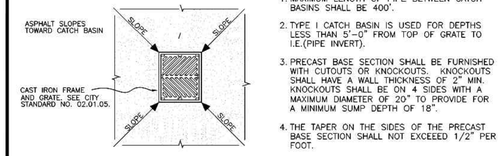
BioPod™ Biofilter Underground

Vault with Internal Bypass

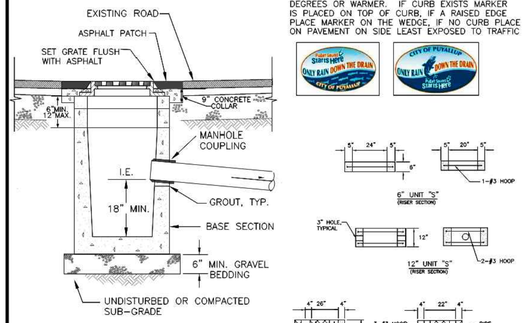
Oldcastle Infrastructure™ A CRH COMPANY

DRAWING NO.	REV	ECO	DATE	SHEET
BPU-IB	B	ECO--0161 ARG 5/1/19	MJW 5/6/19	SHEET 1 OF 2

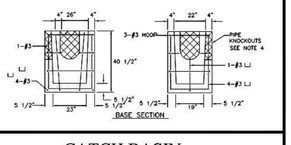
NOTES:
1. MAXIMUM LENGTH OF PIPE BETWEEN CATCH BASINS SHALL BE 400'.
2. TYPE I CATCH BASIN IS USED FOR DEPTHS LESS THAN 5'-0" FROM TOP OF GRATE TO I.E.(PIPE INVERT).
3. PRECAST BASE SECTION SHALL BE FURNISHED WITH CUTOUTS OR KNOCKOUTS. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. KNOCKOUTS SHALL BE ON 4 SIDES WITH A MAXIMUM DIAMETER OF 20" TO PROVIDE FOR A MINIMUM SUMP DEPTH OF 18".
4. THE TAPER ON THE SIDES OF THE PRECAST BASE SECTION SHALL NOT EXCEEDED 1/2" PER FOOT.
5. CATCH BASIN SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C 478 (AASHTO M 199) AND ASTM C 890 UNLESS OTHERWISE NOTED.
6. CATCH BASIN MARKER WILL BE AFFIXED WITH MANUFACTURER'S EPOXY IN DRY WEATHER, 40 DEGREES OR WARMER. IF CURB EXISTS MARKER IS PLACED ON TOP OF CURB, IF A RAISED EDGE PLACE MARKER ON THE WEDGE. IF NO CURB PLACE ON PAVEMENT ON SIDE LEAST EXPOSED TO TRAFFIC



PLAN VIEW

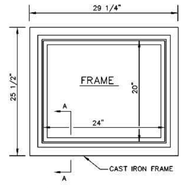


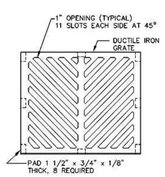
SECTION VIEW

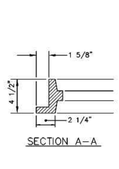


CITY OF PUYALLUP DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS	CATCH BASIN TYPE 1 (AREA DRAIN)				
DRAWN BY: LINDA LANSING	CHECKED BY: LINDA LIAN	APPROVED BY: COLLEEN HARRIS	REVISED BY: XXXX	CITY STANDARD: 02.01.02
FILE NAME: F:\PWGCOMMON\STDS\CITY\20090[2_SD02.01.02	DATE APPROVED: 09/01/1992	DATE REVISED: 06/01/2005	SCALE: NTS	

GRATE



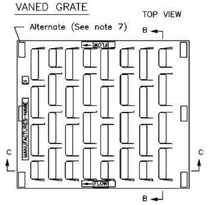


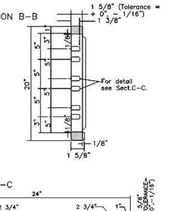


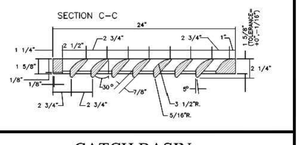
SECTION A-A

NOTES:
1. MATERIAL SHALL CONFORM TO SECTION 9-05.15 "METAL CASTINGS" OF THE "STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION" PUBLISHED BY THE STATE DEPARTMENT OF TRANSPORTATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER.
2. THE NAME OF THE MANUFACTURE AND DIRECTION OF FLOW SHALL BE EMBOSSED ON THE TOP SURFACE OF EACH GRATE. LETTERING TO BE RECESSED 1/16".
3. THE MATERIAL USED FOR THE GRATE SHALL BE DESIGNATED BY EMBASSING EITHER DI (FOR DUCTILE IRON) OR CS (FOR CAST STEEL) NEAR THE NAME OF THE MANUFACTURER.
4. DIMENSIONS SHALL HAVE A +/- 1/16" TOLERANCE, EXCEPT AS NOTED.
5. EDGES SHALL HAVE 1/8" RADIUS.
6. WELDING IS NOT PERMITTED.
7. AS AN ALTERNATE, 8 PADS 1 1/2" X 3/4" X 1/8", INTEGRALLY CAST WITH THE GRATE, MAY BE USED.

VANED GRATE







CITY OF PUYALLUP DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS	CATCH BASIN FRAME AND GRATE/VANED GRATE				
DRAWN BY: LINDA LANSING	CHECKED BY: LINDA LIAN	APPROVED BY: COLLEEN HARRIS	REVISED BY: LINDA LIAN	CITY STANDARD: 02.01.05
FILE NAME: F:\PWGCOMMON\STDS\CITY\20090[2_SD02.01.05	DATE APPROVED: 07/01/2009	DATE REVISED: 09/21/11	SCALE: NTS	

APPROVED

BY:_____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE:_____

NOTE: THIS APPROVAL IS VOID AFTER 1 YEAR FROM APPROVAL DATE.
THE CITY WILL NOT BE RESPONSIBLE FOR ERRORS AND/OR OMISSIONS ON THESE PLANS. FIELD CHANGES MAY DICTATE CHANGES TO THESE PLANS AS DETERMINED BY THE ENGINEERING SERVICES MANAGER.

No.	Date	By	Ckd.	Appr.	Revision

Title: CONSTRUCTION NOTES AND DETAILS

PUYALLUP, WASHINGTON

For: BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

JASON GUY HUSBAND — STATE OF WASHINGTON — 38950 — REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal NA Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/09/20

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Job Number 20630

Sheet C9 of 10

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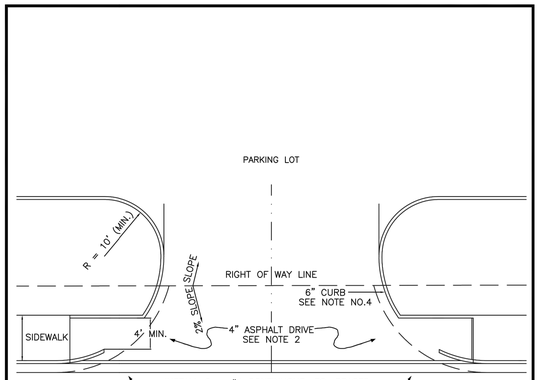
CONSTRUCTION NOTES AND DETAILS



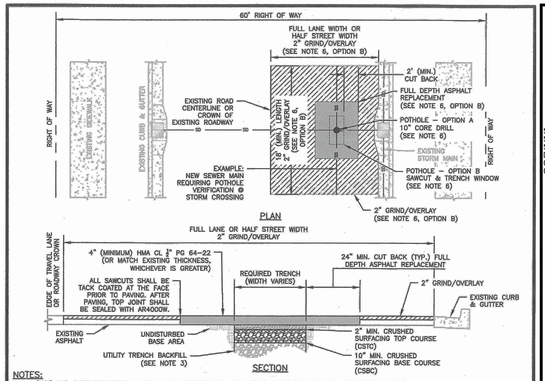
NOTES:

1. TYPICAL COMMERCIAL APPROACHES SHALL BE 30' WIDE AND INCLUDE 35' CURB RADII. IF TRUCKS ARE EXPECTED TO USE THE APPROACH, DRIVEWAY WIDTH, CHANNELIZATION, AND CURB RADII SHALL BE BASED ON AN APPROVED TURNING MOVEMENT ANALYSIS
2. ALL ASPHALT PAVEMENT MUST CONFORM TO CITY STANDARD NO. 01.01.01.
3. APPROACH SHALL BE ASPHALT WITH STANDARD CURB AND GUTTER PLACED ON EACH SIDE OF THE APPROACH.
4. WHEEL CHAIR RAMPS SHALL BE INSTALLED IN ACCORDANCE TO ALL APPLICABLE STANDARDS. DETECTABLE WARNING PATTERNS SHALLBE CONSTRUCTED AT A DRIVEWAY ONLY WHEN IT WILL BE SIGNALIZED. CURB RAMP SLOPE SHALL NOT EXCEED 8.3%, AS MEASURE BY A SMART LEVEL, UNLESS RAMP LENGTH IS EXTENDED TO 15'. SEE DETAIL 01.02.19 FOR ADDITIONAL ADA RAMP INFORMATION.
5. SPACING OF COMMERCIAL APPROACHES ON PRINCIPAL AND MINOR ARTERIALS SHALL BE MINIMUM 300' AND SPACING ON COLLECTORS SHALL BE MINIMUM 150', MEASURED BETWEEN THE CLOSEST EDGES OF EACH DRIVEWAY. THIS REQUIREMENT IS ALSO APPLICABLE TO THE DRIVEWAYS THAT ARE ACROSS THE STREET.
6. SPACING OF COMMERCIAL APPROACHES FROM PRINCIPAL AND MINOR ARTERIALS SHALL BE MINIMUM 300' AND SPACING FROM A COLLECTOR SHALL BE MINIMUM 150', MEASURED FROM NEAREST ROW LINE TO APPROACH PAVEMENT EDGE. THE CITY MAY BE MORE RESTRICTIVE THAN SPECIFIED HEREIN IF DEEMED NECESSARY BASED ON TRAFFIC VOLUMES, CHANNELIZATION AND SIGNALIZATION.
7. THIS COMMERCIAL APPROACH STANDARD SHALL BE USED ON ARTERIALS AND COLLECTORS WITH SPEED LIMITS OF 35 MPH OR GREATER, AND/OR WHEN TRUCK TRAFFIC WILL BE USING THE APPROACH.

CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

STANDARD COMMERCIAL APPROACH

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
JIM ERWIN-SVOBODA	LINDA LIAN	COLLEEN HARRIS	LINDA LIAN	01.02.16
FILE NAME: P:\DWG\COMMON\STDS\CITY\2009\01_ST\R01.02\01.02.16	DATE APPROVED: 07/01/2009	DATE REVISED: 02/19/14	SCALE: 1"=30'	



NOTES:

1. BASE AND SUBBASE MATERIAL SHALL BE COMPACTED TO 95% OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY.
2. ALL DEPTHS INDICATED ARE A MINIMUM COMPACTED DEPTH.
3. INITIAL BACKFILLING SHALL BE PERFORMED ONLY AFTER INSPECTION AND APPROVAL OF THE INSTALLED PIPE OR STRUCTURE. THE TRENCH BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH CITY STANDARD DETAIL NO. 06.01.01.
4. ALL BACKFILL FOR PIPE TRENCHES SHALL BE MECHANICALLY COMPACTED BY A POWER-OPERATED MECHANICAL TAMPER(S) AS SPECIFIED IN WSDOT STANDARD SPEC. 2-03.3 (14)C, COMPACTING EARTH EMBANKMENTS, METHOD C OF THE WSDOT STANDARD SPECIFICATIONS.
5. IF PAVING SURFACES ADJACENT TO THE TRENCH OPENING MAY BE DAMAGED WHERE TRENCHES ARE MADE PARALLEL TO THE STREET, OR WHERE A NUMBER OF CROSS TRENCHES ARE LAID IN CLOSE PROXIMITY TO ONE ANOTHER OR WHERE THE EQUIPMENT USED MAY CAUSE SUCH DAMAGE, THE CITY ENGINEER MAY REQUIRE A RESOTHED CONTRIBUTION FROM THE PERMITTEE FOR RESURFACING IN LIEU OF PATCHING.

   IF THE TOTAL AREA OF THE PROPOSED PATCH OR PROBABLE DAMAGED AREA EXCEEDS 25 PERCENT OF THE TOTAL PAVEMENT SURFACING BETWEEN CURB FACES OR BETWEEN CONCRETE GUTTER EDGES IN ANY BLOCK, SUCH NEGOTIATIONS SHALL BE CARRIED ON AND CONTRIBUTIONS AGREED UPON PRIOR TO ISSUANCE OF A PERMIT. SUCH CONTRIBUTIONS SHALL BE IN ADDITION TO THE STANDARD PERMIT FEE.
6. POTHOLING FOR UTILITIES:

   OPTION A – UP TO A 10" DIAMETER CORE DRILL IS ALLOWED. CORE HOLES MADE DURING UTILITY POTHOLES SHALL BE BACKFILLED WITH CDF TO WITHIN 6" OF FINISHED GRADE. 4" OF HMA SHALL THEN BE PLACED AND COMPACTED, FLUSH WITH EXISTING GRADE.

   OPTION B – FOR POTHOLE WINDOWS LARGER THAN 10" IN DIAMETER OR TRENCHING COMPLETED IN EXISTING ROADWAY, THE CONTRACTOR SHALL MEET CITY STANDARD D5.01.01 FOR PIPE BEDDING AND BACKFILL REQUIREMENTS. PAVEMENT RESTORATION SHALL BE ACCOMPLISHED BY INSTALLING THE TRENCH PATCH, AS SHOWN HEREIN, AND THEN GRINDING/OVERLAYING TO A MINIMUM DEPTH OF 2". THE LIMITS OF THE REQUIRED GRIND/OVERLAY SHALL BE TO THE NEAREST LANE LINE, OR HALF STREET, AND SHALL BE A MINIMUM OF 18 FEET LONG (LONGITUDINALLY ALONG ROADWAY) CENTERED AT LOCATION OF PATCH. NOTE: IF EXISTING ASPHALT THICKNESS IS LESS THAN 3", FULL DEPTH PAVEMENT REPLACEMENT, IN LIEU OF GRIND/OVERLAY, TO MEET A MINIMUM ASPHALT THICKNESS OF 4" WILL BE REQUIRED.

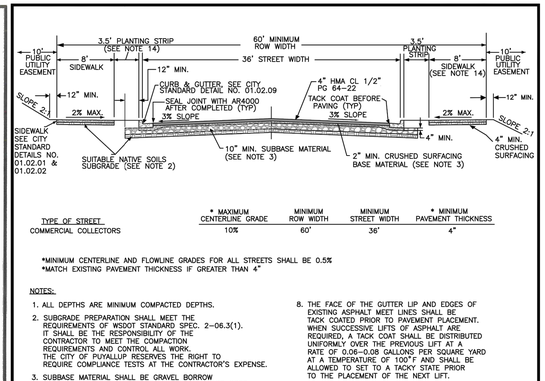
   WHERE LOCATION OF TRENCH OR POTHOLE WINDOW INTERSECTS ROAD CENTERLINE, A MINIMUM GRIND AND OVERLAY OF ONE FULL LANE WIDTH (12') IS REQUIRED CENTERED ON ROADWAY. NO LONGITUDINAL JOINTS WILL BE ALLOWED IN THE WHEEL PATH.
7. ALL MANHOLE FRAMES, VALVE FRAMES AND MONUMENT COVERS SHALL BE INSTALLED AFTER PLACEMENT OF ASPHALT. IF MORE THAN ONE LIFT IS NECESSARY, FRAMES AND LIDS WILL BE ADJUSTED TO FINISH GRADE AT FIRST LIFT AS DIRECTED BY THE CITY.

CITY OF PUYALLUP
OFFICE of THE CITY ENGINEER

APPROVED FOR PUBLICATION
DATE/TIME: 3/15/18

STREET PATCH

CITY STANDARD 01.01.20
(NOT TO SCALE)
FILE NAME: P:\DWG\COMMON\STDS\CITY\2009\01_ST\R01.01\01.01.20.dwg



TYPE OF STREET	* MAXIMUM CENTERLINE GRADE	MINIMUM ROW WIDTH	MINIMUM STREET WIDTH	* MINIMUM PAVEMENT THICKNESS
COMMERCIAL COLLECTORS	10%	60'	36'	4"

*MINIMUM CENTERLINE AND FLOWLINE GRADES FOR ALL STREETS SHALL BE 0.5%
*MATCH EXISTING PAVEMENT THICKNESS IF GREATER THAN 4"

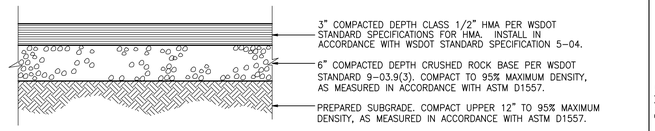
NOTES:

1. ALL DEPTHS ARE MINIMUM COMPACTED DEPTHS.
2. SUBGRADE PREPARATION SHALL MEET THE REQUIREMENTS OF WSDOT STANDARD SPEC. 2-06.3(1). IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MEET THE COMPACTION REQUIREMENTS AND CONTROL ALL WORK. THE CITY OF PUYALLUP RESERVES THE RIGHT TO REQUIRE COMPLIANCE TESTS AT THE CONTRACTOR'S EXPENSE.
3. SUBBASE MATERIAL SHALL BE GRAVEL BORROW MEETING THE REQUIREMENTS OF WSDOT STANDARD SPEC. 9-03.14(1) OR CRUSHED BALLAST MEETING THE REQUIREMENTS OF WSDOT STANDARD SPEC. 9-03.9(1). CRUSHED SURFACING SHALL MEET THE GRADATION REQUIREMENTS OF WSDOT STANDARD SPEC. 9-03.9(3). THE SUBBASE AND BASE MATERIAL SHALL BE INSTALLED IN ACCORDANCE WITH WSDOT STANDARD SPEC. 4-04.
4. SOIL STABILIZATION FABRIC MAY BE REQUIRED BY THE DEVELOPMENT REVIEW ENGINEER TO BE INSTALLED PRIOR TO THE INSTALLATION OF THE BASE MATERIAL. WHEN REQUIRED, THE CONTRACTOR SHALL PLACE A GEOTEXTILE FABRIC OVER THE PREPARED SUBGRADE WITH A 2 FOOT MINIMUM OVERLAP. THE FABRIC SHALL BE INSTALLED PER MANUFACTURER SPECIFICATIONS.
5. ASPHALT CONCRETE PAVEMENT SHALL BE INSTALLED IN ACCORDANCE WITH WSDOT STANDARD SPEC. 5-04. DESIGN ENGINEER SHALL SUBMIT A STATE APPROVED HMA MIX FOR APPROVAL.
6. TEMPERATURE SHALL NOT EXCEED 325°F AT DISCHARGE OF THE PLANT NOR BE LESS THAN 185°F LEAVING THE SPREADER BOX.
7. THE MAXIMUM COMPACTED THICKNESS OF ANY SINGLE LIFT SHALL MEET WSDOT STANDARD SPEC. 5-04.3(9) TO A MINIMUM AVERAGE COMPACTED DRY DENSITY OF 91 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY WSDOT TEST METHOD SPECIFIED IN STANDARD SPEC. 5-04.3(10)B. PERIODIC COMPLIANCE TESTS SHALL BE MADE BY A CERTIFIED TESTING AGENCY AT THE EXPENSE OF THE CONTRACTOR.
8. THE FACE OF THE GUTTER LIP AND EDGES OF EXISTING ASPHALT MEET LINES SHALL BE TACK COATED PRIOR TO PAVEMENT PLACEMENT. WHEN SUCCESSIVE LIFTS OF ASPHALT ARE REQUIRED, A TACK COAT SHALL BE DISTRIBUTED UNIFORMLY OVER THE PREVIOUS LIFT AT A RATE OF 0.06-0.08 GALLONS PER SQUARE YARD AT A TEMPERATURE OF 100°F AND SHALL BE ALLOWED TO SET TO A TACKY STATE PRIOR TO THE PLACEMENT OF THE NEXT LIFT.
9. ALL MEET LINES BETWEEN LIFTS OF ASPHALT SHALL BE UNIFORM AND VERTICAL. THE MEET LINES SHALL BE CLEANED AND TACK COATED.
10. ANY CHANGES TO THE STANDARD PAVEMENT SECTION SHALL REQUIRE APPROVAL BY THE DEVELOPMENT REVIEW ENGINEER. A STRUCTURAL PAVEMENT CROSS SECTION DESIGN WITH CALCULATIONS SHALL BE REQUIRED.
11. ALL MANHOLE FRAMES, VALVE FRAMES AND MONUMENT COVERS SHALL BE INSTALLED AFTER PLACEMENT OF ASPHALT. IF MORE THAN ONE LIFT IS NECESSARY, FRAMES AND LIDS WILL BE ADJUSTED TO FINISH GRADE AT FIRST LIFT AS DIRECTED BY THE CITY.
12. ADDITIONAL BIKE LANES AND/OR ON-STREET PARKING MAY BE REQUIRED PER TRAFFIC ENGINEER.
13. A UTILITY EASEMENT OF 10' SHALL BE PROVIDED ON BOTH SIDES OF THE ROADWAY.
14. WHEN PLANTING STRIP IS 5' IN WIDTH OR LESS, STREET TREE PLANTER BOXES SHALL BE INSERTED AT LOCATIONS AS REQUIRED BY THE CITY (REFER TO CITY STANDARD DETAIL NO. 01.02.04).
15. PLANTING STRIP SHALL BE PLANTED AS DIRECTED BY CITY PLANNING DEPARTMENT.

CITY OF PUYALLUP
DEVELOPMENT ENGINEERING and PUBLIC WORKS DEPARTMENTS

36' PUBLIC ROADWAY COMMERCIAL COLLECTOR CROSS SECTION

DRAWN BY	CHECKED BY	APPROVED BY	REVISED BY	CITY STANDARD
JIM ERWIN-SVOBODA	LINDA LIAN	COLLEEN HARRIS	XXXX	01.01.04
FILE NAME: P:\DWG\COMMON\STDS\CITY\2009\01_ST\R01.01\01.01.04	DATE APPROVED: 07/01/2009	DATE REVISED: XX/XX/XX	SCALE: 1:10	

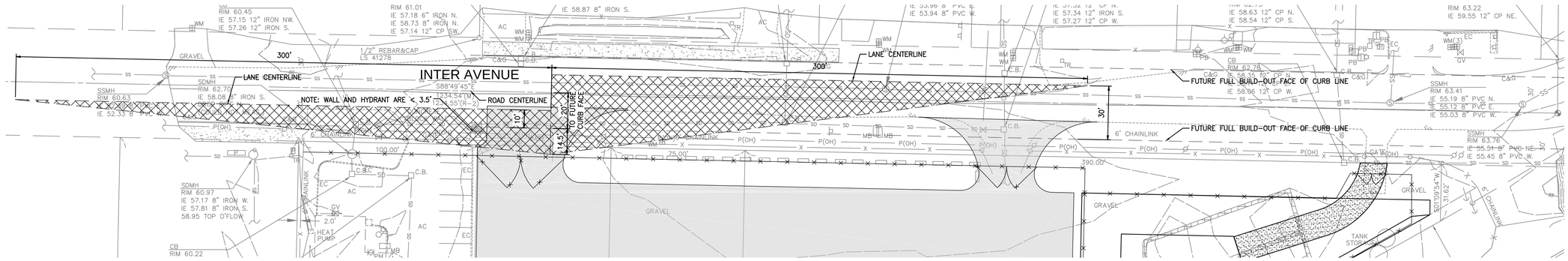


PAVEMENT DESIGN AND INSPECTION NOTE:
ONSITE PAVEMENT DESIGN SECTION IS PER GEOTECHNICAL REPORT PREPARED BY EARTH SOLUTIONS NORTHWEST, LLC UNDER PROJECT NO. ES-6481.01. GEOTECHNICAL ENGINEER SHALL INSPECT AND APPROVE SUBGRADE PRIOR TO PLACEMENT OF CRUSHED ROCK BASE AND PRIOR TO PLACEMENT OF HMA.

ASPHALT PAVEMENT SECTION

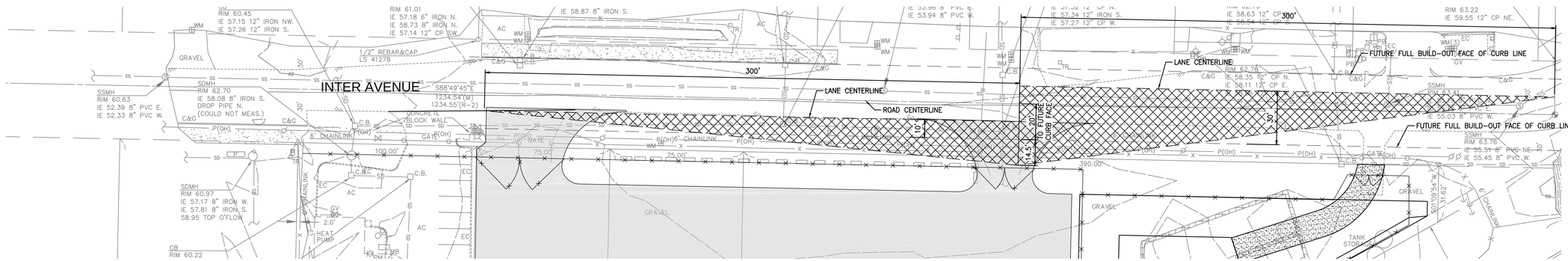
NOT TO SCALE

811 Know what's **below.** **Call** before you dig.



WEST DRIVEWAY SIGHT DISTANCE

1"=30'



EAST DRIVEWAY SIGHT DISTANCE

1"=30'

DRIVEWAY SIGHT DISTANCE
SPEED LIMIT = 25 MPH
ENTERING SITE DISTANCE = 300'
(PER CITY OF PUYALLUP ROADS STANDARDS, TABLE 100-2)

N

0 15' 30' 60'
SCALE: 1"=30'

APPROVED

BY: _____
CITY OF PUYALLUP
ENGINEERING SERVICES

DATE: _____

NOTE: THIS APPROVAL IS VOID AFTER 1 YEAR FROM APPROVAL DATE.
THE CITY WILL NOT BE RESPONSIBLE FOR ERRORS AND/OR OMISSIONS ON THESE PLANS. FIELD CHANGES MAY DICTATE CHANGES TO THESE PLANS AS DETERMINED BY THE ENGINEERING SERVICES MANAGER.

No.	Date	By	Ckd.	Appr.	Revision

Title: CONSTRUCTION NOTES AND DETAILS

PUYALLUP, WASHINGTON

BEST PARKING LOT CLEANING
2412 INTER AVENUE
PUYALLUP, WASHINGTON

For:

JASON GUY HUSER — STATE OF WASHINGTON — 38950 — REGISTERED PROFESSIONAL ENGINEER
02/10/2022

Scale: Horizontal NA Vertical N/A

Designed DL Drawn RDC Checked DL Approved JGH Date 02/05/20

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Job Number 20630 Sheet C10 of 10

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Appendix B
Maintenance Checklists

EXHIBIT 1 MAINTENANCE PROGRAM

1. Maintenance checklist for Catch Basins and Inlets

Frequency	Drainage System Feature	Y	N	NA	Conditions to Check For	Problem	Conditions That Should Exist
M, S	General				Trash or debris in front of the catch basin opening. Is blocking capacity by more than 10%.	Trash, debris and sediment in or on basin	No trash or debris located immediately in front of catch basin opening. Grate is kept clean and allows water to enter.
M					Sediment or debris (in the basin) that exceeds 1/3 depth from the bottom of basin to invert of the lowest pipe into or out of the basin.		No sediment or debris in the catch basin. Catch basin is dug out and clean.
M, S					Trash or debris in any inlet or pipe blocking more than 1/3 of height.		Inlet and outlet pipes free of trash or debris.
M, S					Dead animals or vegetation that could generate odors that would cause complaints or dangerous gases (e.g., methane).		No dead animals or vegetation present within the catch basin.
M, S					Deposits of garbage exceeding 1 cubic foot in volume		No condition present which would attract or support the breeding of insects or rodents.
M					Corner of frame extends more than ¾ inch past curb face into the street (if applicable)	Structural damage to frame and/or top slab.	Frame is even with curb.
M					Top slab has holes larger than 2 square inches or cracks wider than ¼ inch (intent is to make sure all material is running into the basin)		Top slab is free of holes and cracks.
M					Frame is not sitting flush on top slab i.e., separation of more than ¾ inch of the frame from the top slab.		Frame is sitting flush on top slab.
A					Cracks wider than ½ inch and longer than 3 feet, any evidence of soil particles entering catch basin through cracks or maintenance person judges that structure is unsound.	Cracks in basin walls/bottom	Basin replaced or repaired to design standards. Contact a professional engineer for evaluation.
A					Cracks wider than ½ inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.		No cracks more than ¼-inch wide at the joint of inlet/outlet pipe.
A					Basin has settled more than 1 inch or has rotated more than 2 inches out of alignment.	Settlement/ Misalignment	Basin replaced or repaired to design standards. Contact a professional engineer for evaluation.
M, S					Presence of chemicals such as natural gas, oil, or gasoline. Obnoxious color, odor, or sludge noted.	Fire hazard or other pollution	No color, odor, or sludge. Basin is dug out and clean.

EXHIBIT 1

1. Maintenance checklist for Catch Basins and Inlets (continued)

Frequency	Drainage System Feature	Y	N	NA	Conditions to Check For	Problem	Conditions That Should Exist
M, S					Vegetation or roots growing in inlet/outlet pipe joints that are more than six inches tall and less than six inches apart.	Outlet pipe is clogged with vegetation.	No vegetation or root growth present.
M, S					Vegetation growing across and blocking more than 10% of the basin opening.	Vegetation	No vegetation blocking opening to basin.
M, S					Non-flammable chemicals of more than ½ cubic foot per three feet of basin length.	Pollution	No pollution present other than surface film.
M, S	Catch Basin Cover				Cover is missing or only partially in place. Any open catch basin requires maintenance.	Cover not in place	Catch basin cover is closed.
A					Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than ½ inch of thread.	Locking Mechanism Not Working	Mechanism opens with proper tools.
A					One maintenance person cannot remove lid after applying 80 lbs of lift; intent is to keep cover from sealing off access to maintenance.	Cover Difficult to Remove	Cover can be removed by one maintenance person.
A	Ladder				Ladder is unsafe due to missing rungs, misalignment, rust, cracks, or sharp edges.	Ladder Rungs Unsafe	Ladder meets design standards and allows maintenance person safe access.
M, S	Metal Grates (if applicable)				Trash and debris that is blocking more than 20% of grate surface.	Trash and Debris	Grate free of trash and debris.
M, S					Grate missing or broken member(s) of the grate.	Damaged or Missing	Grate is in place and meets design standards.

Key:
A = Annual (March or April preferred)
M = Monthly (see schedule)
S = After major storms.

Comments:

EXHIBIT 1

2. Maintenance Checklist for Conveyance Systems

Frequency	Drainage System Feature	Y	N	NA	Conditions to Check For	Problem	Conditions That Should Exist
M, S	Pipes				Accumulated sediment that exceeds 20% of the diameter of the pipe.	Sediment & debris	Pipe cleaned of all sediment and debris.
M					Vegetation that reduces free movement of water through pipes.	Vegetation	All vegetation removed so water flows freely through pipes.
A					Protective coating is damaged; rust is causing more than 50% deterioration to any part of pipe.	Damaged (rusted, bent, or crushed) Trash & debris Sediment buildup	Pipe repaired or replaced.
M					Any dent that significantly impedes flow (i.e., decreases the cross section area of pipe by more than 20%)		Pipe repaired or replaced.
M					Pipe has major cracks or tears allowing groundwater leakage.		Pipe repaired or replaced.
M, S	Open Ditches				Dumping of yard waste such as grass clippings and branches into basin. Unsightly accumulation of non-degradable materials such as glass, plastic, metal, foam, and coated paper.	Trash & debris	Remove trash and debris and dispose as prescribed by city Waste Management Section.
M					Accumulated sediment that exceeds 20% of the design depth	Sediment buildup	Ditch cleaned of all sediment and debris so that it matches design.
A					Vegetation (e.g., weedy shrubs or saplings) that reduces free movement of water through ditches.	Vegetation	Water flows freely through ditches. Grassy vegetation should be left alone.
M					See "Ponds" Checklist	Erosion damage to slopes	See “Ponds” Checklist.
A					Maintenance person can see native soil beneath the rock lining.	Rock lining out of place or missing (if applicable)	Replace rocks to design standard.
Varies	Catch Basins				See "Catch Basins" Checklist		See “Catch Basins” Checklist.
M, S	Swales				See above for "Ditches"	Trash & debris	See above for “Ditches”.
M					See above for "Ditches"	Sediment Buildup	Vegetation may need to be replanted after cleaning.
M					Grass cover is sparse and weedy or areas are overgrown with woody vegetation.	Vegetation not growing or overgrown.	Aerate soils and reseed and mulch bare areas. Maintain grass height at minimum of 6 inches for best stormwater treatment or a minimum of 2 inches above the design flow depth. Remove woody growths, recontour, and reseed as necessary.
M, S					See Ponds Checklist	Erosion damage to slopes	See Ponds Checklist.
M					Swale has been filled in or blocked by shed, woodpile, shrubbery, etc.	Conversion by homeowner to incompatible use	If possible, speak with homeowner and request that swale be restored. Contact City to report a problem if not rectified voluntarily.
A					Water stands in swale or flow velocity is very slow. Stagnation occurs.	Swale does not drain.	A survey may be needed to check grades. Grades need to be in 1-5% range if possible. If grade is less than 1% underdrains may need to be installed.

Key:
A = Annual (March or April preferred)
M = Monthly (see schedule)
S = After major storms.

Comments:

EXHIBIT 1

3. Maintenance checklist for Ponds.

Frequency	Drainage System Feature	Y	N	NA	Conditions to Check For	Problem	Conditions That Should Exist
M, S	General				Any trash and debris which exceeds 1 cubic foot per 1000 square feet (this is about equal to the amount of trash it would take to fill up one standard size office garbage can). In general, there should be no visual evidence of dumping.	Trash & debris buildup in pond	Trash and debris cleared from site.
M, S					Bar screen over outlet more than 25% covered by debris or missing.	Trash rack plugged or missing	Replace screen. Remove trash and debris and dispose as prescribed by City Waste Management Section.
M					Any poisonous vegetation which may constitute a hazard to the public. Examples of poisonous vegetation include: tansy ragwort, poison oak, stinging nettles, devils club.	Poisonous Vegetation	Remove poisonous vegetation. Do not spray chemicals on vegetation without obtaining guidance from the Cooperative Extension Service and approval from the City.
M, S					Oil, gasoline, or other contaminants of one gallon or more or any amount found that could: 1) cause damage to plant, animal, or marine life; 2) constitute a fire hazard; or 3) be flushed downstream during rain storms. Presence of chemicals such as natural gas, obnoxious color, odor, or sludge noted.	Fire hazard or pollution	Find sources of pollution and eliminate them. Water is free from noticeable color, odor or contamination.
M					For grassy ponds, gross cover is sparse and weedy or is overgrown. For wetland ponds, plants are sparse or invasive species are present. Wetland ponds must be kept wet--water frequently in summer.	Vegetation not growing or is overgrown.	For grassy ponds, selectively thatch, aerate and reseed ponds. Grass cutting unnecessary unless dictated by aesthetics. For wetland ponds, hand-plant nursery-grown wetland plants in bare areas. Pond bottoms should have uniform dense coverage of desired plant species.
M					Any evidence of rodent holes if facility is acting as a dam or berm., or any evidence of water piping through dam or berm via rodent holes.	Rodent holes	Rodents destroyed and dam or berm repaired.
M					Dams resulting in a change or function of the facility	Beaver Dam	Rodents and dam/berm removed.
M					When insects such as wasps and hornets interfere with maintenance activities, or when mosquitoes become a nuisance.	Insects	Insects destroyed or removed from site.
A					Tree growth does not allow maintenance access or interfere with maintenance activity (i.e., slope mowing, silt removal, or equipment movements). If trees are not interfering with access, leave trees alone.	Tree growth	Trees do not hinder maintenance activities. Selectively cultivate trees such as alder for firewood.

EXHIBIT 1

3. Maintenance checklist for Ponds (Continued)

Frequency	Drainage System Feature	Y	N	NA	Conditions To Check For	Problem	Conditions That Should Exist
M	Side Slopes of Pond				Check around inlets and outlets for signs of erosion. Check berms for signs of sliding or settling. Action is needed where eroded damage over 2 inches deep and where there is potential for continued erosion.	Erosion on berms or at entrance/exit.	Find causes of erosion and eliminate them. Then slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
M	Storage Area				Accumulated sediment that exceeds 10% of the designed pond depth. Buried or partially buried outlet structure probably indicates significant sediment deposits.	Sediment buildup in pond.	Sediment cleaned out to designed pond shape and depth; pond reseeded if necessary to control erosion.
A	Pond Dikes				Any part of dike which has settled 4 inches lower than the design elevation.	Settlement	Dike should be built back to the design elevation.
A	Emergency overflow spillway				Only one layer of rock exists above native soil in area 5 square feet or larger, or any exposure of native soil.	Rock Missing	Replace rocks to design standards.

Key:
A = Annual (March or April preferred)
M = Monthly (see schedule)
S = After major storms.

Comments:

EXHIBIT 1

5. Access Roads/Easements

Frequency	Drainage System Feature	Y	N	NA	Conditions to Check For	Problem	Conditions That Should Exist
W	General				Road shall be swept weekly.	Trash and Debris	Trash and debris cleared from site.
W					Debris which could damage vehicle tires (glass or metal)	Blocked Roadway	Roadway free of debris which could damage tires.
M, S					Any obstructions which reduce clearance above road surface to less than 14 feet.		Roadway overhead clear to 14 feet high.
W, S					Any obstructions restricting the access to a 10-to-20 -foot width for a distance of more than 12 feet or any point restricting access to less than a 10-foot width.		Obstruction removed to allow at least a 12 foot access.
M	Road Surface				When any surface defect exceeds 6-inches in depth and 6 square feet in area. In general, any surface defect which hinders or prevents maintenance access.	Settlement, Potholes, Mush, Spots, Ruts	Road surface uniformly smooth with no evidence of settlement, potholes, mush spots or ruts.
					Weeds growing in the road surface that are more than 6 inches tall and less than 6 inches apart within a 400-square foot area.	Vegetation in Road Surface	Road surface free to weeds taller than 2 inches.
M, S	Shoulders and Ditches				Erosion within 1 foot of the roadway more than 8 inches wide and 6 inches deep.	Erosion Damage	Shoulder free of erosion and matching the surrounding road.
M					Weeds and brush exceed 18 inches in height or hinder maintenance access.	Weeds and Brush	Weeds and brush cut to 2 inches in height or cleared in such a way as to allow maintenance access.
SA	Pavement Markings				Pavement marks shall be painted yearly.	Faded Marks	All pavement markings to be obvious.

Key:

SA = Annual (March or April preferred)
M = Monthly (see schedule)
W = Weekly (see schedule)
S = After major storms.

Comments:

EXHIBIT 1

7. Maintenance Checklist for Control Structure/Flow Restrictor (structure that controls rate at which water exits facility)

Frequency	Drainage System Feature	Y	N	NA	Conditions to Check For	Problem	Conditions That Should Exist
M	Structure				Distance between debris buildup and bottom of orifice plate is less than 1 ½ feet	Trash and debris (includes sediment)	All trash and debris removed.
A					Structure is not securely attached to manhole wall and outlet pipe structure should support at least 1,000 pounds of up or down pressure.	Structural damage	Structure securely attached to wall and outlet pipe.
A					Structure is not in upright position (allow up to 10% from plumb).		Structure in correct position.
A					Connections to outlet pipe are not watertight and show signs of rust.		Connections to outlet pipe are watertight; structure repaired or replaced and works as designed.
M					Any holes (other than designed holes) in the structure.		Structure has no holes other than designed holes.
M, S	Cleanout Gate				Cleanout gate is not watertight or is missing.	Damaged or missing	Gate is watertight and works as designed.
A					Gate cannot be moved up and down by one maintenance person.		Gates moves up and down easily and is watertight.
M, S					Chain leading to gate is missing or damaged.		Chain is in place and works as designed.
A					Gate is rusted over 50% of its surface.		Gate is repaired or replaced to meet design standards.
M, S					Any trash, debris, sediment, or vegetation blocking the plate.	Obstructions	Plate is free of all obstructions and works as designed.
M, S	Overflow Pipe				Any trash or debris blocking (or having the potential of blocking) the overflow pipe.	Obstructions	Pipe is free of all obstructions and works as designed.

Key:

A = Annual (March or April preferred)
M = Monthly (see schedule)
S = After major storms.

Comments:

EXHIBIT 1

8. Maintenance Checklist for Energy Dissipaters

Frequency	Drainage System Feature	Y	N	NA	Conditions to Check For	Problem	Conditions That Should Exist
A	Rock Pad				Only one layer of rock exists above native soil in area 5 square feet or larger, or any exposure of native soil.	Missing or moved rock	Replace rocks to design standard.
A	Rock-filled trench for the discharge from pond				Trench is not full of rock.	Missing or moved rock	Add large rock (+30 lb. Each) so that rock is visible above edge of trench.
M	Dispersion Trench				Accumulated sediment that exceeds 20% of the design depth.	Pipe plugged with sediment	Pipe cleaned/flushed.
M					Over ½ of perforations in pipe are plugged with debris and sediment.	Perforations plugged	Clean or replace perforated pipe.
M, S					Visual evidence of water at concentrated points along trench (normal condition is a "sheet flow" of water along trench). Intent is to prevent erosion damage.	Not discharging water properly	Trench must be redesigned or rebuilt to standard. Elevation of lip of trench should be the same (flat) at all points.
M, S					Maintenance person observes water flowing out during any storm less than the design storm or it is causing or appears likely to cause damage.	Water flows out top of "distribution" catch basin	Facility must be rebuilt or redesigned to standards. Pipe is probably plugged or damaged and needs replacement.
M, S					Water in receiving area is causing or has potential of causing landslide.	Receiving area over-saturated.	Stabilize slope with grass or other vegetation, or rock if conditions is severe.

Key:

A = Annual (March or April preferred)
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Comments:

EXHIBIT 1

9. Maintenance Checklist for Fencing/Shrubbery Screen/Other Landscaping

Frequency	Drainage System Feature	Y	N	NA	Conditions To Check For	Problem	Conditions That Should Exist
M	General				Any debris in the fence or screen that permits easy entry to a facility.	Missing or broken parts/dead shrubbery	Fence is mended or shrubs replaced to form a solid barrier to entry.
M, S					Erosion has resulted in an opening under a fence that allows entry by people or pets.	Erosion	Replace soil under fence so that no opening exceeds 4 inches in height.
M					Shrubbery is growing out of control or is infested with weeds.	Unruly vegetation	Shrubbery is trimmed and weeded to provide appealing aesthetics. Do not use chemicals to control weeds.
A	Wire Fences				Posts out of plumb more than 6 inches.	Damaged parts	Posts plumb to within 1 ½ inches of plumb.
A					Top rails bent more than 6 inches.		Top rail free of bends greater than 1 inch
A					Any part of fence (including posts, top rails, and fabric) more than 1 foot out of design alignment.		Fence is aligned and meets design standards.
A					Missing or loose tension wire.		Tension wire in place and holding fabric.
A					Missing or loose barbed wire that is sagging more than 2 ½ inches between posts.		Barbed wire in place with less than ¾-inch sag between posts.
A					Extension arm missing, broken, or bent out of shape more than 1 ½ inches.		Extension arm in place with no bends larger than ¾ inch.
A					Part or parts that have a rusting or scaling condition that has affected structural adequacy.	Deteriorated paint or protective coating.	Structurally adequate posts or parts with a uniform protective coating.
M					Openings in fabric are such that an 8-inch diameter ball could fit through.	Opening in fabric.	No openings in fabric.

Key:

A = Annual (March or April preferred)
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Comments:

EXHIBIT 1

10. Maintenance Checklist for Grounds (Landscaping)

Frequency	Drainage System Feature	Y	N	NA	Conditions To Check For	Problem	Conditions That Should Exist
M	General				Weeds growing in more that 20% of the landscaped area (trees and shrubs only).	Weeds (nonpoisonous)	Weeds present in less than 5% of the landscaped area.
M					Any presence of poison ivy or other poisonous vegetation or insect nests.	Safety hazard	No poisonous vegetation or insect nests present in landscaped area.
M, S					See Ponds Checklist	Trash or litter	See Ponds Checklist
M, S					Noticeable rills are seen in landscaped areas.	Erosion of Ground Surface	Causes of erosion are identified and steps taken to slow down/spread out the water. Eroded areas are filled, contoured, and seeded.
A	Trees and shrubs				Limbs or parts of trees or shrubs that are split or broken which affect more than 25% of the total foliage of the tree or shrub.	Damage	Trim trees/shrubs to restore shape. Replace trees/shrubs with severe damage.
M					Trees or shrubs that have been blown down or knocked over.		Replant tree, inspecting for injury to stem or roots. Replace if severely damaged.
A					Trees or shrubs which are not adequately supported or are leaning over, causing exposure of the roots.		Place stakes and rubber-coated ties around young trees/shrubs for support.

Key:

A = Annual (March or April preferred)
M = Monthly (see schedule)
S = After major storms.

Comments:

Oldcastle Infrastructure™
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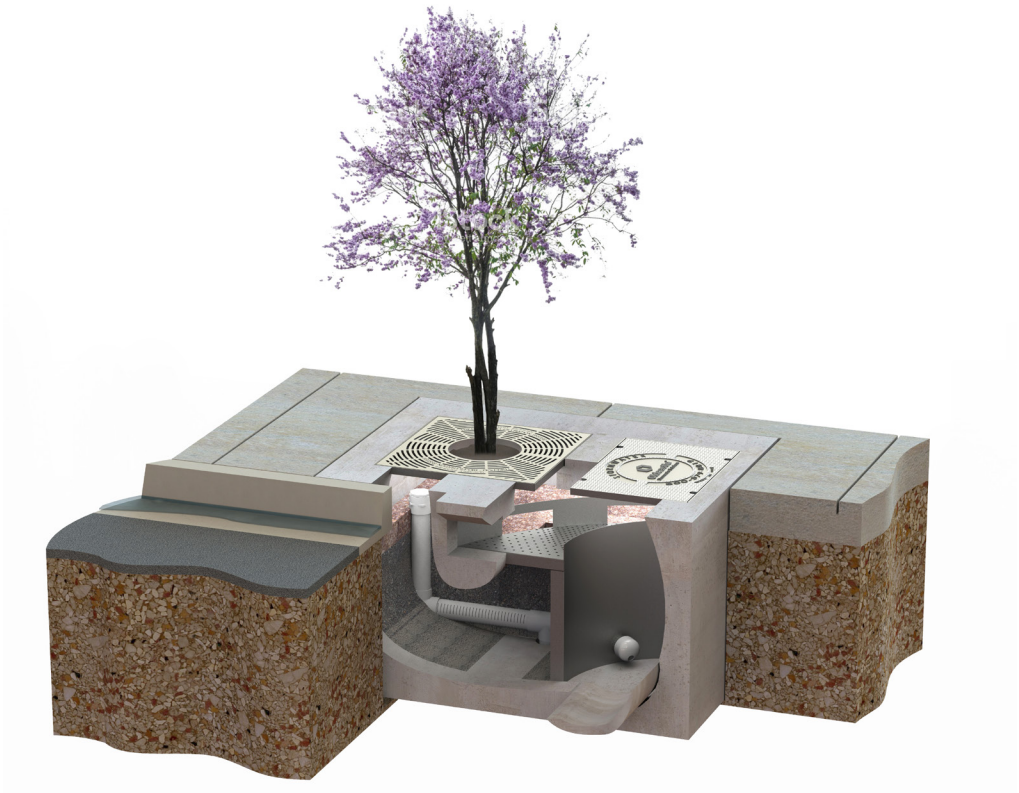
BIOPOD™ SYSTEM

WITH STORMMIX™ MEDIA

Inspection and Maintenance Guide



Water

BioPod™ Biofilter with StormMix™ Biofiltration Media

Description

The BioPod™ Biofilter System (BioPod) is a stormwater biofiltration treatment system used to remove pollutants from stormwater runoff. Impervious surfaces and other urban and suburban landscapes generate a variety of contaminants that can enter stormwater and pollute downstream receiving waters unless treatment is provided. The BioPod system uses proprietary StormMix™ biofiltration media to capture and retain pollutants including total suspended solids (TSS), metals, nutrients, gross solids, trash and debris as well as petroleum hydrocarbons.

Function

The BioPod system uses engineered, high-flow rate filter media to remove stormwater pollutants, allowing for a smaller footprint than conventional bioretention systems. Contained within a compact precast concrete vault, the BioPod system consists of a biofiltration chamber and an optional integrated high-flow bypass with a contoured inlet rack to minimize scour. The biofiltration chamber is filled with horizontal layers of aggregate (which may or may not include an underdrain), biofiltration media and mulch. Stormwater passes vertically down through the mulch and biofiltration media for treatment. The mulch provides pretreatment by retaining most of the solids or sediment. The biofiltration media provides further treatment by retaining finer sediment and dissolved pollutants. The aggregate allows the media bed to drain evenly for discharge through an underdrain pipe or by infiltration.

Configuration

The BioPod system can be configured with either an internal or external bypass. The internal bypass allows both water quality and bypass flows to enter the treatment vault. The water quality flows are directed to the biofiltration chamber while the excess flows are diverted over the bypass weir without entering the biofiltration chamber. Both the treatment and bypass flows are combined in the outlet area prior to discharge from the structure. BioPod units without an internal bypass are designed such that only treatment flows enter the treatment structure. When the system has exceeded its treatment capacity, ponding will force bypass flows to continue down the gutter to the nearest standard catch basin or other external bypass structure.

The BioPod system can be configured as a tree box filter with tree and grated inlet, as a planter box filter with shrubs, grasses and an open top, or as an underground filter with access risers, doors and a subsurface inlet pipe. The optional internal bypass may be incorporated with any of these configurations. In addition, an open bottom configuration may be used to promote infiltration and groundwater recharge. The configuration and size of the BioPod system is designed to meet the requirements of a specific project.

Inspection & Maintenance Overview

State and local regulations require all stormwater management systems to be inspected on a regular basis and maintained as necessary to ensure performance and protect downstream receiving waters. Without maintenance, excessive pollutant buildup can limit system performance by reducing the operating capacity of the system and increasing the potential for scouring of pollutants during periods of high flow.

Some configurations of the BioPod may require periodic irrigation to establish and maintain vegetation. Vegetation will typically become established about two years after planting. Irrigation requirements are ultimately dependent on climate, rainfall and the type of vegetation selected.

Maintenance Frequency

Periodic inspection is essential for consistent system performance and is easily completed. Inspection is typically conducted a minimum of twice per year, but since pollutant transport and deposition varies from site to site, a site-specific maintenance frequency should be established during the first two or three years of operation.

Inspection Equipment

The following equipment is helpful when conducting BioPod inspections:

- Recording device (pen and paper form, voice recorder, iPad, etc.)
- Suitable clothing (appropriate footwear, gloves, hardhat, safety glasses, etc.)
- Traffic control equipment (cones, barricades, signage, flagging, etc.)
- Manhole hook or pry bar
- Flashlight
- Tape measure

Inspection Procedures

BioPod inspections are visual and are conducted without entering the unit. To complete an inspection, safety measures including traffic control should be deployed before the access covers or tree grates are removed. Once the covers have been removed, the following items should be checked and recorded (see form provided on page 6) to determine whether maintenance is required:

- If the BioPod unit is equipped with an internal bypass, inspect the contoured inlet rack and outlet chamber and note whether there are any broken or missing parts. In the unlikely event that internal parts are broken or missing, contact Oldcastle Stormwater at (800) 579-8819 to determine appropriate corrective action.
- Note whether the curb inlet, inlet pipe, or – if the unit is equipped with an internal bypass – the inlet rack is blocked or obstructed.
- If the unit is equipped with an internal bypass, observe, quantify and record the accumulation of trash and debris in the inlet rack. The significance of accumulated trash and debris is a matter of judgment. Often, much of the trash and debris may be removed manually at the time of inspection if a separate maintenance visit is not yet warranted.
- If it has not rained within the past 24 hours, note whether standing water is observed in the biofiltration chamber.
- Finally, observe, quantify and record presence of invasive vegetation and the amount of trash and debris and sediment load in the biofiltration chamber. Erosion of the mulch and biofiltration media bed should also be recorded. Sediment load may be rated light, medium or heavy depending on the conditions. Loading characteristics may be determined as follows:
    - Light sediment load – sediment is difficult to distinguish among the mulch fibers at the top of the mulch layer; the mulch appears almost new.
    - Medium sediment load – sediment accumulation is apparent and may be concentrated in some areas; probing the mulch layer reveals lighter sediment loads under the top 1” of mulch.
    - Heavy sediment load – sediment is readily apparent across the entire top of the mulch layer; individual mulch fibers are difficult to distinguish; probing the mulch layer reveals heavy sediment load under the top 1” of mulch.

Often, much of the invasive vegetation and trash and debris may be removed manually at the time of inspection if a separate maintenance visit is not yet warranted.

Maintenance Indicators

Maintenance should be scheduled if any of the following conditions are identified during inspection:

- The concrete structure is damaged or the tree grate or access cover is damaged or missing.
- The curb inlet or inlet rack is obstructed.
- Standing water is observed in the biofiltration chamber more than 24 hours after a rainfall event (use discretion if the BioPod is located downstream of a storage system that attenuates flow).
- Trash and debris in the inlet rack cannot be easily removed at the time of inspection.
- Trash and debris, invasive vegetation or sediment load in the biofiltration chamber is heavy or excessive erosion has occurred.

Maintenance Equipment

The following equipment is helpful when conducting BioPod maintenance:

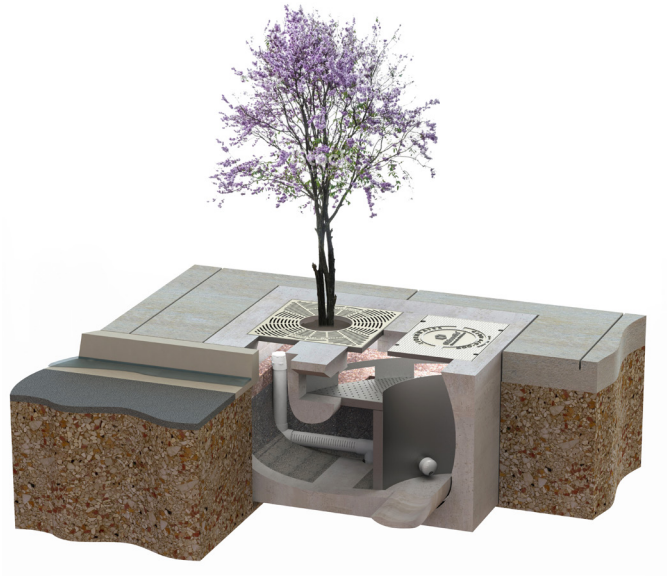
- Suitable clothing (appropriate footwear, gloves, hardhat, safety glasses, etc.)
- Traffic control equipment (cones, barricades, signage, flagging, etc.)
- Manhole hook or pry bar
- Flashlight
- Tape measure
- Rake, hoe, shovel and broom
- Bucket
- Pruners
- Vacuum truck (optional)

Maintenance Procedures

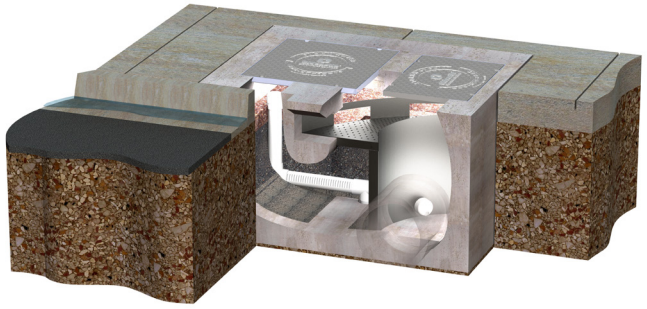
Maintenance should be conducted during dry weather when no flows are entering the system. All maintenance may be conducted without entering the BioPod structure. Once safety measures such as traffic control are deployed, the access covers may be removed and the following activities may be conducted to complete maintenance:

- Remove all trash and debris from the curb inlet and inlet rack manually or by using a vacuum truck as required.
- Remove all trash and debris and invasive vegetation from the biofiltration chamber manually or by using a vacuum truck as required.
- If the sediment load is medium or light but erosion of the biofiltration media bed is evident, redistribute the mulch with a rake or replace missing mulch as appropriate. If erosion persists, rocks may be placed in the eroded area to help dissipate energy and prevent recurring erosion.
- If the sediment load is heavy, remove the mulch layer using a hoe, rake, shovel and bucket, or by using a vacuum truck as required. If the sediment load is particularly heavy, inspect the surface of the biofiltration media once the mulch has been removed. If the media appears clogged with sediment, remove and replace one or two inches of biofiltration media prior to replacing the mulch layer.
- Prune vegetation as appropriate and replace damaged or dead plants as required.
- Replace the tree grate and/or access covers and sweep the area around the BioPod to leave the site clean.
- All material removed from the BioPod during maintenance must be disposed of in accordance with local environmental regulations. In most cases, the material may be handled in the same manner as disposal of material removed from sumped catch basins or manholes.

Natural, shredded hardwood mulch should be used in the BioPod. Timely replacement of the mulch layer according to the maintenance indicators described above should protect the biofiltration media below the mulch layer from clogging due to sediment accumulation. However, whenever the mulch is replaced, the BioPod should be visited 24 hours after the next major storm event to ensure that there is no standing water in the biofiltration chamber. Standing water indicates that the biofiltration media below the mulch layer is clogged and must be replaced. Please contact Oldcastle Infrastructure at (800) 579-8819 to purchase the proprietary StormMix™ biofiltration media.

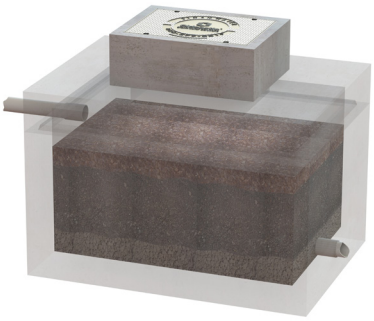


BioPod Tree Module



BioPod Media Module

BioPod Planter Module



BioPod Media Vault

BioPod Inspection & Maintenance Log

BioPod Model_____ **Inspection Date**_____

Location_____

Condition of Internal Components Notes:

☐ Good ☐ Damaged ☐ Missing

Curb Inlet or Inlet Rack Blocked Notes:

☐ Yes ☐ No

Standing Water in Biofiltration Chamber Notes:

☐ Yes ☐ No

Trash and Debris in Inlet Rack Notes:

☐ Yes ☐ No

Trash and Debris in Biofiltration Chamber Notes:

☐ Yes ☐ No

Invasive Vegetation in Biofiltration Chamber Notes:

☐ Yes ☐ No

Sediment in Biofiltration Chamber Notes:

☐ Light ☐ Medium ☐ Heavy

Erosion in Biofiltration Chamber Notes:

☐ Yes ☐ No

Maintenance Requirements

☐ **Yes - Schedule Maintenance** ☐ **No - Schedule Re-Inspection**

BIOPOD™ SYSTEM

WITH STORMMIX™ MEDIA

OUR MARKETS

BUILDING STRUCTURES

COMMUNICATIONS

WATER

ENERGY

TRANSPORTATION

Exhibit J
Downstream Drainage Path Map


Downstream Route
Puyallup River
Legend
5th Ave NE
29th St NE
4th Ave NE
Linden Ln
E Main Ave
18th St SE
15th St SE
Inter Ave
23rd St SE
Shaw Rd E
16th St SE
17th St SE
21st St SE
7th Ave SE
E Pioneer
Google Earth
© 2020 Google
N
1000 ft

Exhibit K
Critical Area Maps

National Flood Hazard Layer FIRMette

FEMA

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 2/13/2020 at 5:59:11 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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INTER AVE
INTER AVE
23RD ST SE
Site
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community