PRELIMINARY STORMWATER SITE PLAN

Founder's Ridge

A PORTION OF SECTIONS 22, 56 AND 27, TOWNSHIP 19 NORTH, RANGE 1 EAST, W.M.
DuPont, Washington

07/14/2021

Prepared for:
Northpoint Development
4825 NW 41st St, Suite 500
Riverside, MO 64150

July 14, 2021
Our Job No. 21127

Stormwater Site Plan

Founders Ridge

Dupont, Washington

Our Job No. 21127

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Attachment D: Geotechnical Memorandum by Terra Associates dated October 6, 2020

8.0 OTHER PERMITS

9.0 OPERATION AND MAINTENANCE MANUAL

Attachment E: Operations and Maintenance Manuals

10.0 BOND QUANTITIES WORKSHEET

Tab 1.0

1.0 PROJECT OVERVIEW

The proposed Founder's Ridge development is located on a parent parcel (Tax Parcel No. 0119272005) totaling approximately 101.16 acres, located around the Lake Fort Lake and south of Sequatchiew Creek in the City of DuPont, Washington. The parcel consists of previously cleared and graded land that is currently covered in small brush.

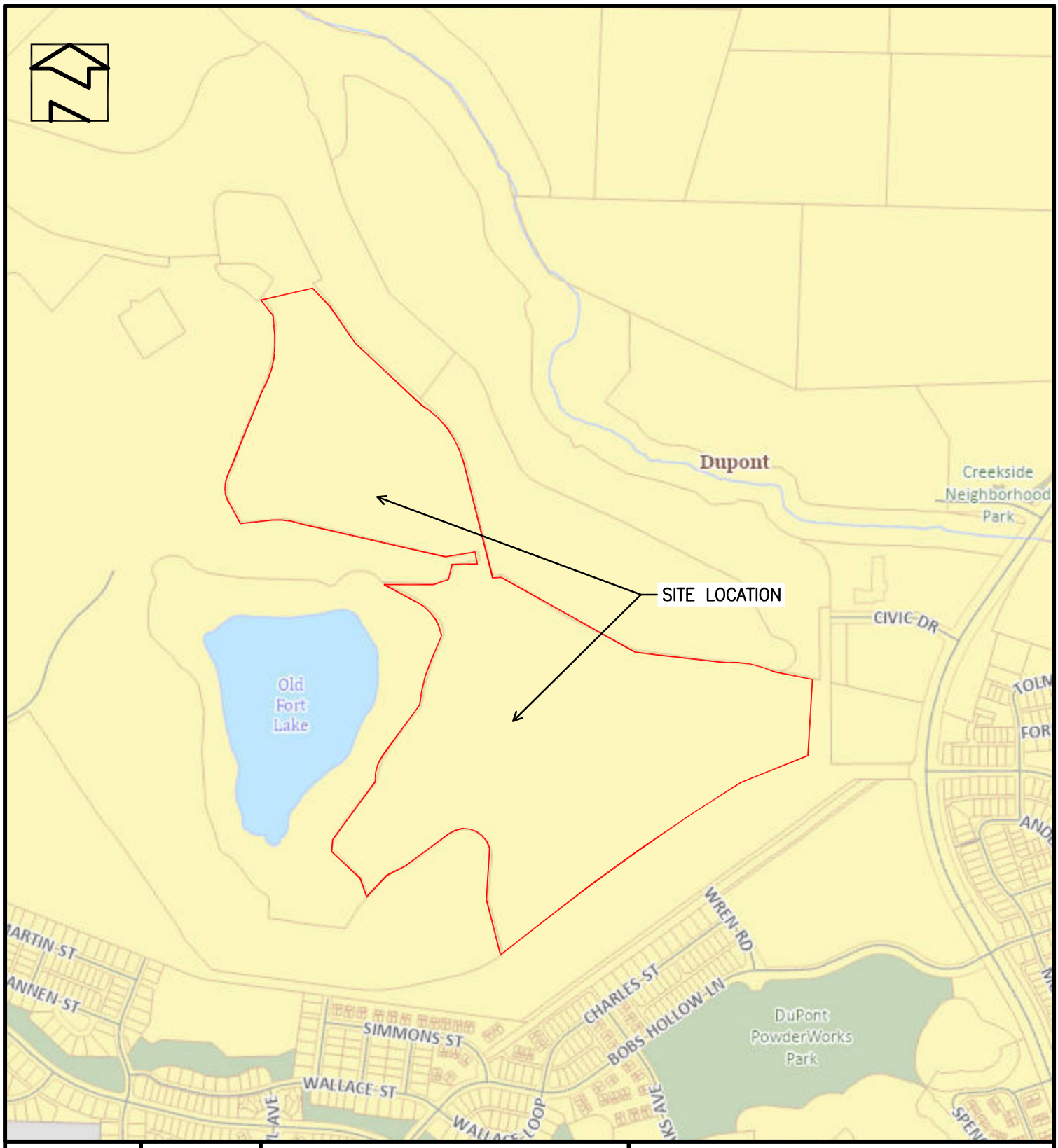
Please see the attached Vicinity Map for the exact location of the project site.

The proposal for this development is to construct industrial buildings with associated site and frontage improvements on the southeastern part of the parent parcel. The industrial improvements total approximately 83 acres of new and replaced impervious surfaces which include both asphalt and concrete paving.

The site is zoned as MUV Mixed use Village 1-8

The project site is subject to the 2012 Department of Ecology Stormwater Management Manual of Wester Washington (SWMMWW) as amended in 2014. Per the SWMMWW, the project site is considered a new development as the parent parcel has less than 35% of existing impervious surfaces. Given this, the project site shall implement Minimum Requirements 1 to 9 to new hard surfaces and converted vegetation areas. See Figure 6 for Flow Chart of New-Development. Furthermore, as part of the stormwater design, infiltration is the proposed method of flow control for this project with basic water quality required for pretreatment prior to infiltration. See Section 5.0 for further discussion.

Figure 1
Vicinity Map



Job Number 21127	Designed SG Drawn SG Checked BE Approved BE Date 03/16/2021	Scale: Horizontal N.T.S. Vertical N/A	For: FOUNDER'S RIDGE
Sheet 1 of 1		BARGHAUSEN CONSULTING ENGINEERS, INC. 18215 72ND AVENUE SOUTH KENT, WA 98032 425.251.6222 BARGHAUSEN.COM	Title: VICINITY MAP

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Figure 2
Assessor Map

Job Number 21127	Designed SG Drawn SG Checked BE Approved BE Date 03/16/2021	Scale: Horizontal N.T.S. Vertical N/A	For: FOUNDER'S RIDGE
Sheet 1 of 1		BARGHAUSEN CONSULTING ENGINEERS, INC. 18215 72ND AVENUE SOUTH KENT, WA 98032 425.251.6222 BARGHAUSEN.COM	Title: ACCESSOR'S MAP

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Figure 3
FEMA Map

Job Number 21127	Designed SG Drawn SG Checked BE Approved BE Date 03/16/2021	Scale: Horizontal N.T.S. Vertical N/A	For: FOUNDER'S RIDGE
Sheet 1 of 1		BARGHAUSEN CONSULTING ENGINEERS, INC. 18215 72ND AVENUE SOUTH KENT, WA 98032 425.251.6222 BARGHAUSEN.COM	Title: FEMA 1

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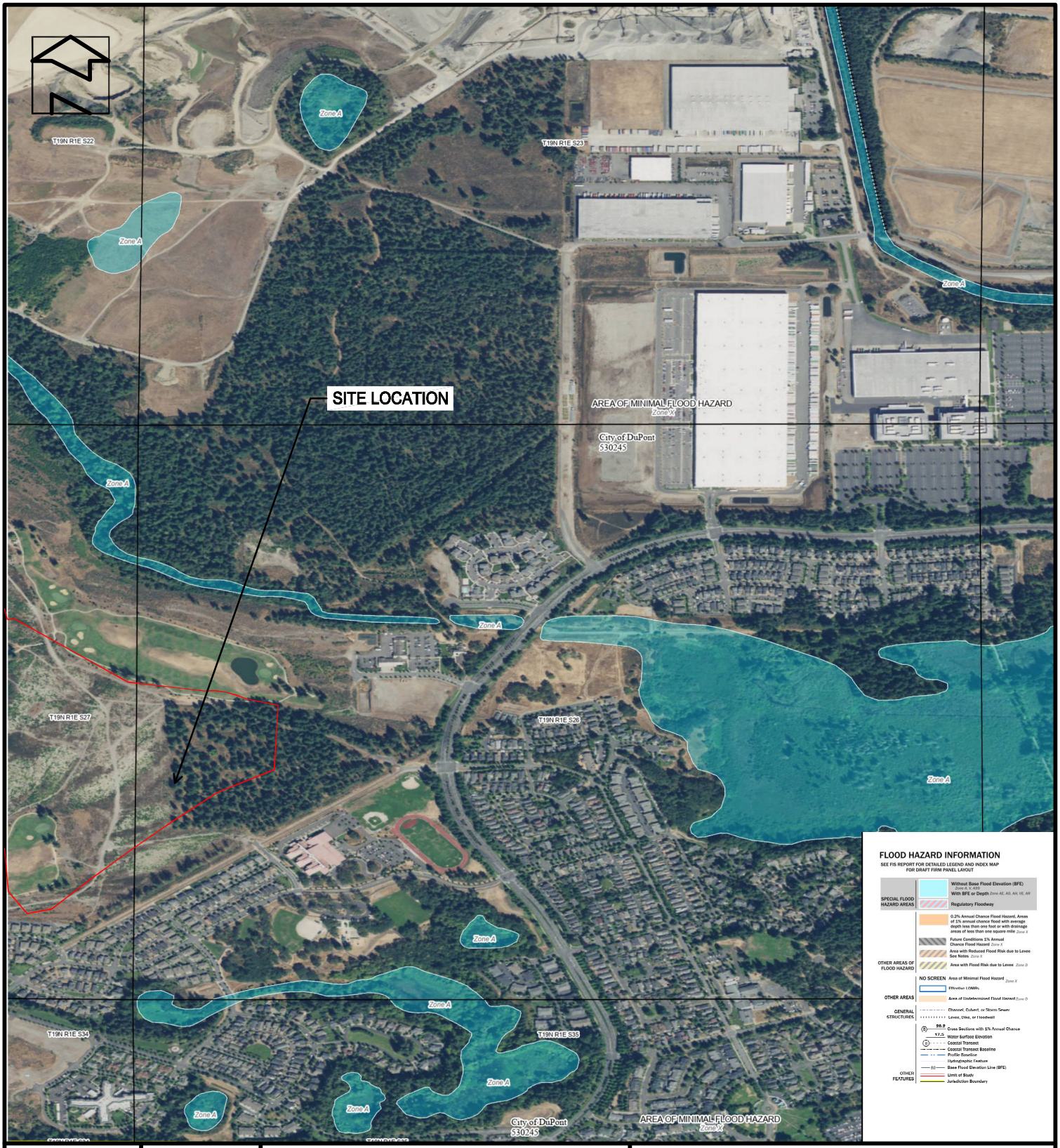

Job Number 21127	Designed SG Drawn SG Checked BE Approved BE Date 03/16/2021	Scale: Horizontal N.T.S. Vertical N/A	For: FOUNDER'S RIDGE
Sheet 1 of 1		BARGHAUSEN CONSULTING ENGINEERS, INC. 18215 72ND AVENUE SOUTH KENT, WA 98032 425.251.6222 BARGHAUSEN.COM	Title: FEMA 2

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Figure 4
Soil Survey Map

REFERENCE: USDA, Natural Resources Conservation Service

LEGEND:	HSG
41A = Spanaway gravelly sandy loam	A

Job Number 21127	Designed SG Drawn SG Checked BE Approved BE Date 03/16/2021	Scale: Horizontal N.T.S. Vertical N/A	For: FOUNDER'S RIDGE
Sheet 1 of 1		BARGHAUSEN CONSULTING ENGINEERS, INC. 18215 72ND AVENUE SOUTH KENT, WA 98032 425.251.6222 BARGHAUSEN.COM	Title: SOIL SURVEY MAP

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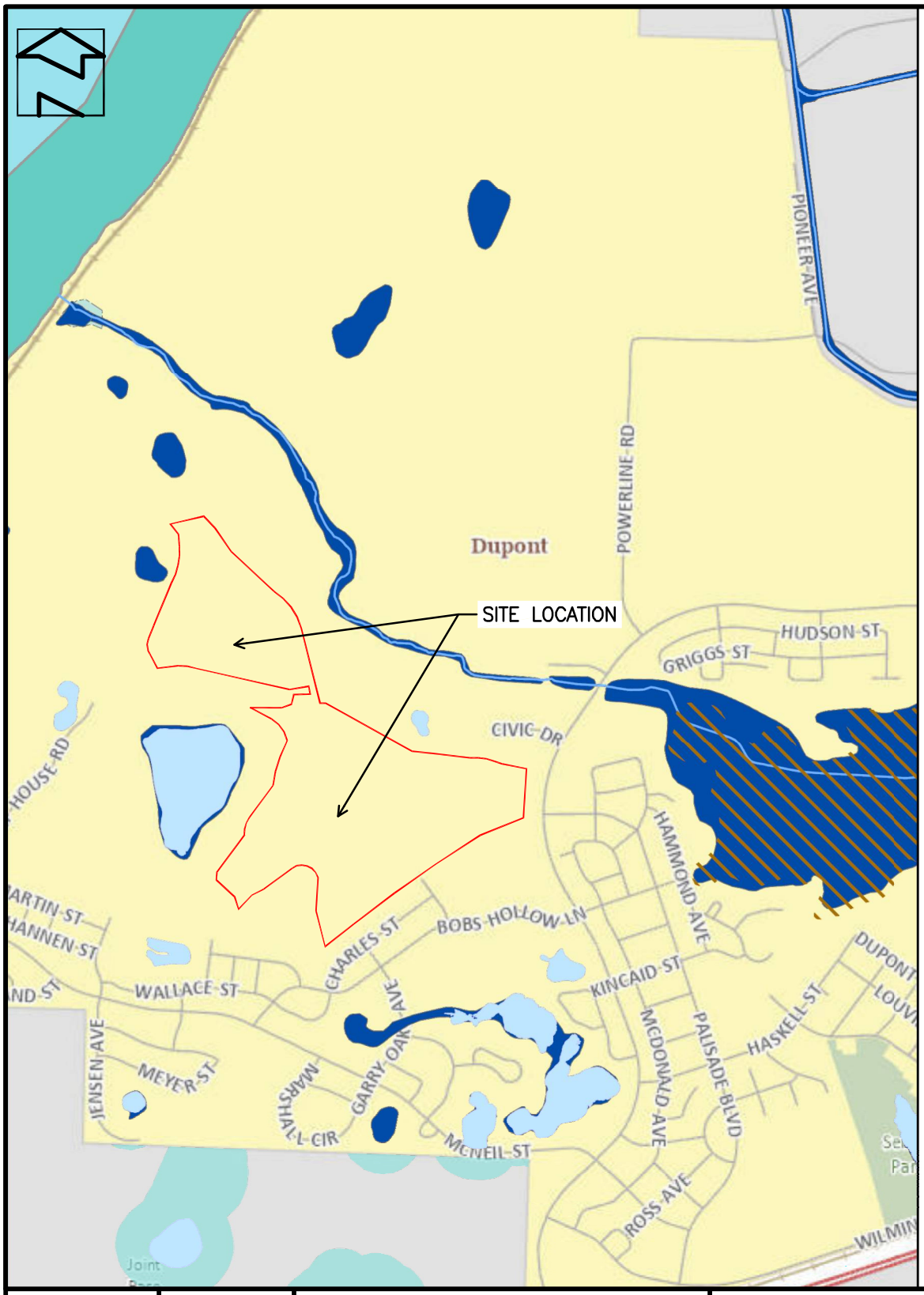
Figure 5
Sensitive Areas Map



Legend

Hydro - Centerlines

- Hydro Centerline
- Pipe
- Hydric Soils
- Hydro Water Bodies

Regulated Floodplain 2017

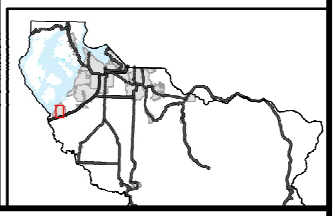
- 1% Annual Chance Flood
- X BEHIND LEVEE
- 0.2 PCT
- X (SHADED)
- Coastal High Hazard Areas
- See King County FIRM
- Potential Wetland Review

Wetlands

- Unconfirmed
- Yes
- No

Wetlands Delineation

- Delineated
- Verified
- Unverified
- Floodways



Job Number 21127	Designed SG Drawn SG Checked BE Approved BE Date 03/16/2021	Scale: Horizontal N.T.S. Vertical N/A	For: FOUNDER'S RIDGE
Sheet 1 of 1		BARGHAUSEN CONSULTING ENGINEERS, INC. 18215 72ND AVENUE SOUTH KENT, WA 98032 425.251.6222 BARGHAUSEN.COM	Title: SENSITIVE AREAS

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Tab 2.0

2.0 ANALYSIS OF THE MINIMUM REQUIREMENTS

Minimum Requirement No. 1 – Preparation of Stormwater Site Plan:

This document fulfills the requirements of a Stormwater Site Plan.

Minimum Requirement No. 2 – Construction Stormwater Pollution Prevention:

The Construction Stormwater Pollution Prevention Plan is included in Section 6.0 of this report.

Minimum Requirement No. 3 – Source Control Prevention:

Source control will be provided on site in the form of regular sweeping of the parking areas, as well as educating the owner about the proper use of fertilizers and pesticides on the landscaping areas. All applicable mandatory operational Source Control BMPs per Volume IV-2.1 such as Formation of a Pollution Prevention Team, Good Housekeeping, Preventive Maintenance, etc. shall be observed and implemented to this proposed project. Moreover, all known available and reasonable Source Control BMPs will be applied to this project in accordance with those applicable manufacturing project per Volume IV-2.1 of the 2012 SWMMWW as amended in 2014.

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

This area consists of silty gravel and silty sand overlaying sand and gravel soils that infiltrate over the entire site. The infiltration rate utilized was 10 inches per hour as allowed by the geotechnical report for long-term infiltration.

Minimum Requirement No. 5 – On-Site Stormwater Management:

This project achieves the Low Impact Development Performance Standard due to full infiltration of runoff from all impervious areas on-site.

Minimum Requirement No. 6 – Runoff Treatment:

Per the 2012 SWMMWW as amended in 2014, the project site is required to comply Basic Treatment standards. All areas requiring runoff treatment will have runoff from those areas routed to a basic water quality facility prior to infiltration. See Section 5.E for further discussion.

Minimum Requirement No. 7 – Flow Control:

Flow control for this development will be provided through the use of infiltration galleries designed to infiltrate 100% of the runoff for historical storm events using the Western Washington Hydrology Model (WWHM) 2012. See Section 5.D for further discussion.

Minimum Requirement No. 8 – Wetland Protection:

There are no wetlands on this project site.

Minimum Requirement No. 9 – Operations and Maintenance:

An Operations and Maintenance Manual will be prepared and included in the final stormwater site plan prepared for this development.

Figure 6
Flowchart for Determining
Minimum Requirements
for New-Developments

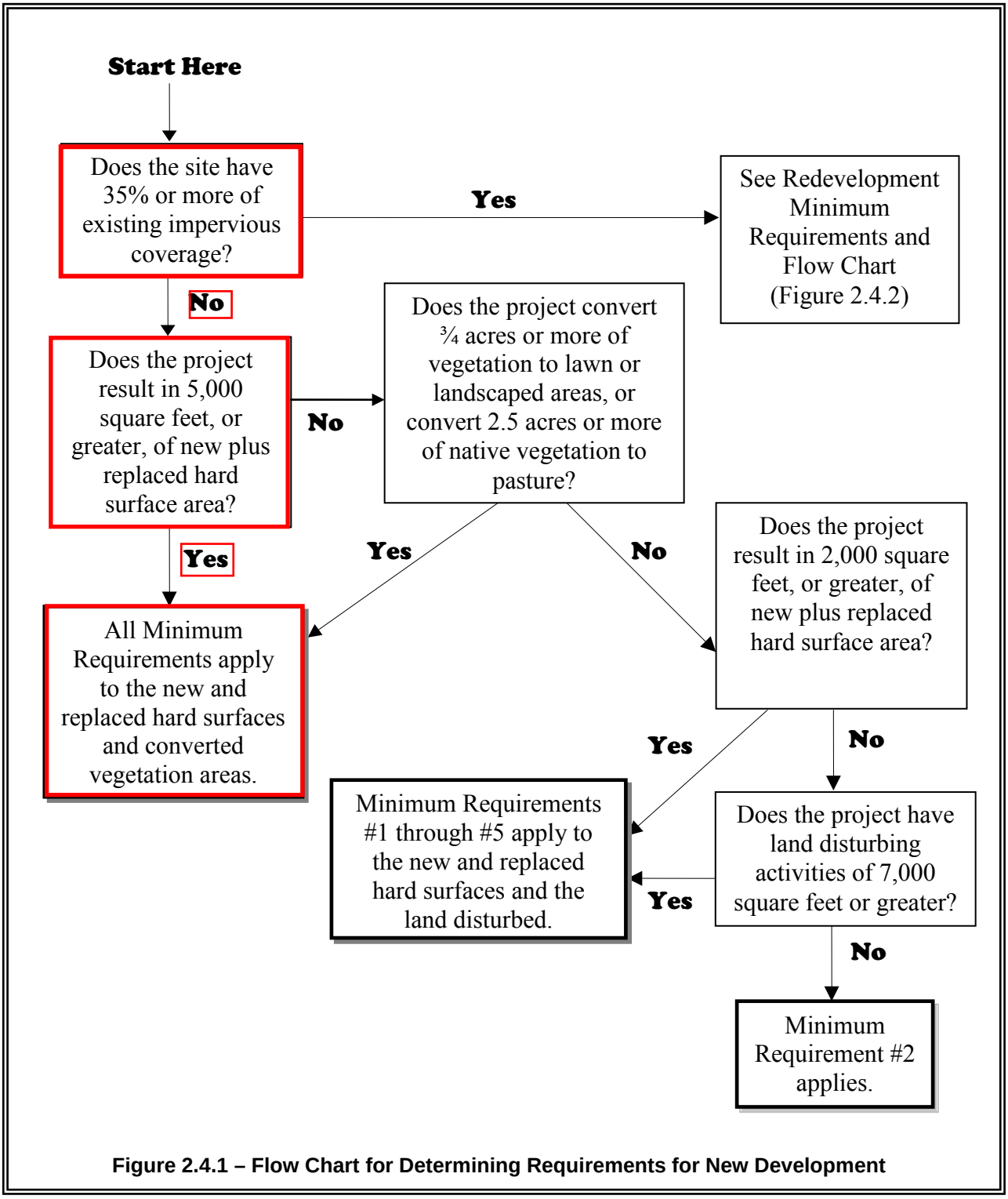


Figure 2.4.1 – Flow Chart for Determining Requirements for New Development

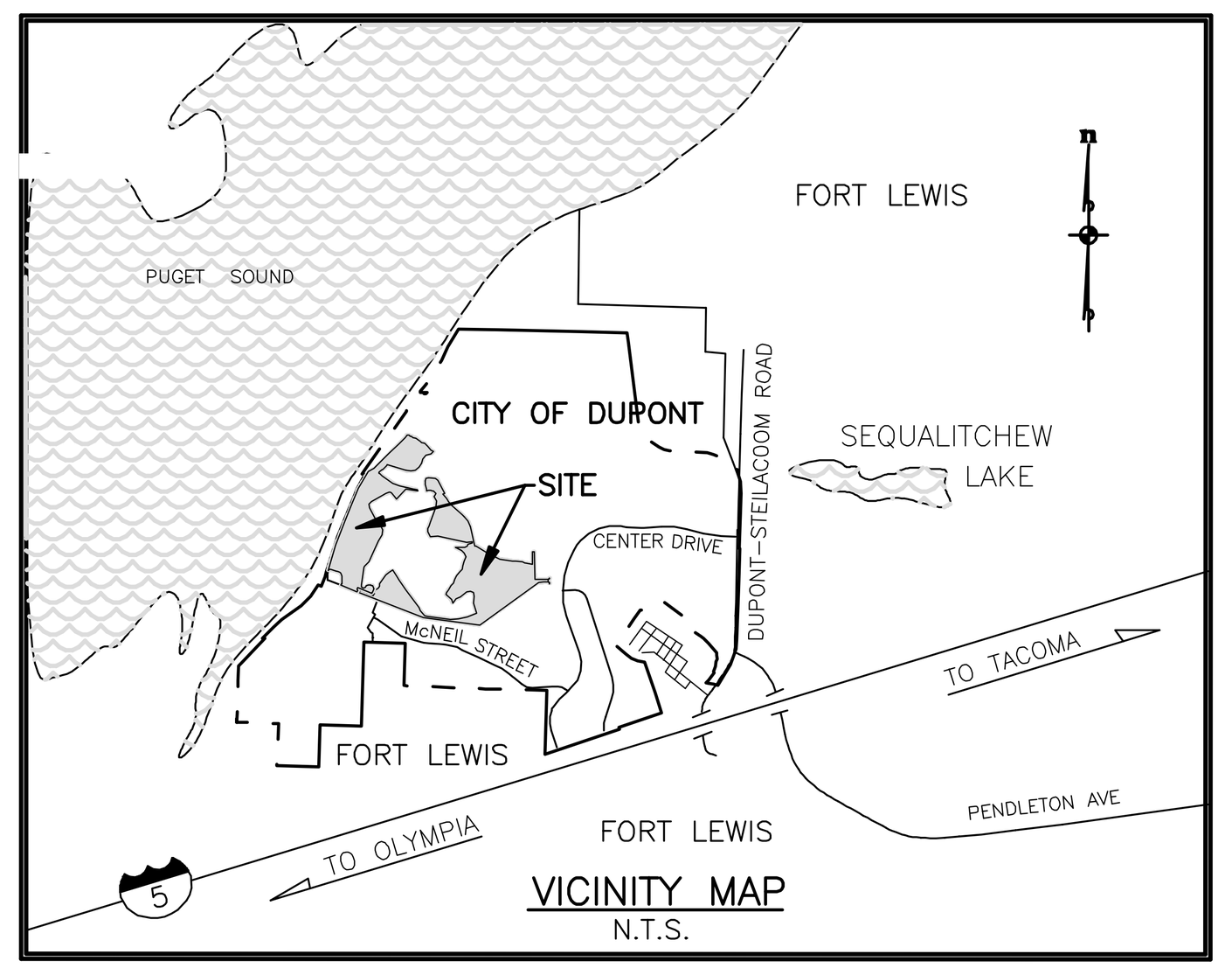
Tab 3.0

3.0 EXISTING CONDITIONS SUMMARY

The existing project site consists of previously cleared and graded land that is currently covered in small brush with no significant trees. The topography of the site ranges from 200 to 230 feet in elevation with the highest being on the southwest portion of the site. The on-site soils are Spanaway gravelly sandy loam type as mapped in the USDA, Soil Conservation Service, Soil survey of Pierce County area, which is an "A" type soil (see Figure 4) and exhibits. The design infiltration rate of the site is 10 inches per hour (see Attachment D for Geotechnical Report). The site is bound on the north by a Sequalitchew Creek, west by Puget sound, on the east by existing Trail, and on the south by ex-residential building.

Figure 7
Existing Conditions Map

A PORTION OF SECTIONS 22, 26 AND 27, TOWNSHIP 19 NORTH, RANGE 1 EAST, W.M.



LEGAL DESCRIPTION

TRACT Y–1 OF RECORD OF SURVEY FOR BOUNDARY LINE ADJUSTMENT RECORDED OCTOBER 31, 2007, UNDER RECORDING NO. 200710315001, RECORDS OF PIERCE COUNTY, WASHINGTON;

EXCEPT THAT PORTION THEREOF CONVEYED TO THE CITY OF DUPONT FOR ROAD PURPOSES BY DEED RECORDED OCTOBER 31, 2007 UNDER RECORDING NO. 200710310594;

AND ALSO EXCEPT THAT PORTION THEREOF DEFINED AS PARCEL TP, AN EXEMPT SEGREGATION OF PROPERTY, AS DEPICTED ON THAT RECORD OF SURVEY RECORDED NOVEMBER 1, 2007 UNDER RECORDING NO. 200711015006;

SITUATE IN THE CITY OF DUPONT, COUNTY OF PIERCE, STATE OF WASHINGTON.

LEGEND

Symbol	Description
☼	LUMINAIRE (PER AERIAL, SEE NOTE 2)
—o—o—o—	FENCE, CHAIN LINK (FIELD LOCATED)
—═—═—	FENCE, SPLIT RAIL (FIELD LOCATED)
(1)	SEE EXCEPTION NUMBER ON SHEET 2 OF 2
◒	ESM SET SURFACE BRASS CAP WITH PUNCH IN CONCRETE IN CONJUNCTION WITH THE PLATS OF "VILLAGE II DIVISION 4" AS RECORDED UNDER RECORDING NUMBER 200109135002 AND OF "HOFFMAN HILL DIVISION 1 (VILLAGE IV)" AS RECORDED UNDER RECORDING NUMBER 200204035002 AND "HOFFMAN HILL DIVISION 1B (VILLAGE IV)" AS RECORDED UNDER RECORDING NUMBER 200312165002 (UNLESS OTHERWISE NOTED)
●	ESM SET REBAR AND CAP STAMPED: "ESM, LLC L.S. 29294/29281" IN CONJUNCTION CITY OF DUPONT BOUNDARY LINE ADJUSTMENT NO. BLA 05–04 AS RECORDED UNDER RECORDING NUMBER 200508245006
⊙	ESM SET REBAR AND CAP STAMPED: "ESM, LLC L.S. 29294/29281" IN CONJUNCTION CITY OF DUPONT BOUNDARY LINE ADJUSTMENT NO. BLA 06–01 AS RECORDED UNDER RECORDING NUMBER 200608225007
◐	ESM SET REBAR AND CAP STAMPED: "ESM, LLC L.S. 29294/29281" AS DEPICTED ON RECORD OF SURVEY RECORDED UNDER RECORDING NO. 200601275001
◎	ESM SET REBAR AND CAP STAMPED: "ESM, LLC L.S. 29294/29281" AS DEPICTED ON RECORD OF SURVEYS RECORDED UNDER RECORDING NOS. 9303110567, 9312220714 AND 200003225002
⊕	ESM SET SURFACE BRASS CAP WITH PUNCH IN CONCRETE STAMPED : "L.S. 29281" SET IN CONJUNCTION WITH CITY OF DUPONT SHORT PLAT NO. 07–01 AS RECORDED UNDER RECORDING NO. 200708155002
◑	ESM SET REBAR AND CAP STAMPED: "ESM, LLC L.S. 29294/29281" AS DEPICTED ON RECORD OF SURVEY RECORDED UNDER RECORDING NO. 200711015006
<>	RADIAL BEARING AT LOT CORNER
Δ	DELTA
R	RADIUS
L	LENGTH
(shaded)	PAVED AREA (PER AERIAL, SEE NOTE 2)
CW	CONCRETE WALK
CONC	CONCRETE AREA
GR	GRAVEL AREA
LS	LANDSCAPE AREA
—][—][—	BOARD FENCE (FB)
AP	ASPHALT PAVEMENT
[P]	POWER VAULT
⊞	WATER METER
[IR]	IRRIGATION CONTROL VALVE
	AIR RELIEF VALVE
[PB]	ELECTRIC CONTROL BOX
	POWER POLE W/ DROP LINE
◫	SIGNAL JUNCTION BOX
(T)	TELEPHONE MANHOLE
⊠	TELEPHONE JUNCTION BOX
◎	CABLE TV RISER
—P—	OVERHEAD POWER LINE
—S—	SANITARY SEWER LINE
—D—	STORM DRAIN LINE
—W—	WATER LINE
—IRR—	IRRIGATION LINE
⋈	WATER VALVE
(S)	SANITARY SEWER MANHOLE
(D)	STORM DRAIN MANHOLE
▥	STORM DRAIN CATCH BASIN

ADJOINING OWNERS WITHIN PLATS

THE OAKS:

LOT 70 – LUIS F. ARZADON

VILLAGE II DIVISION 5:

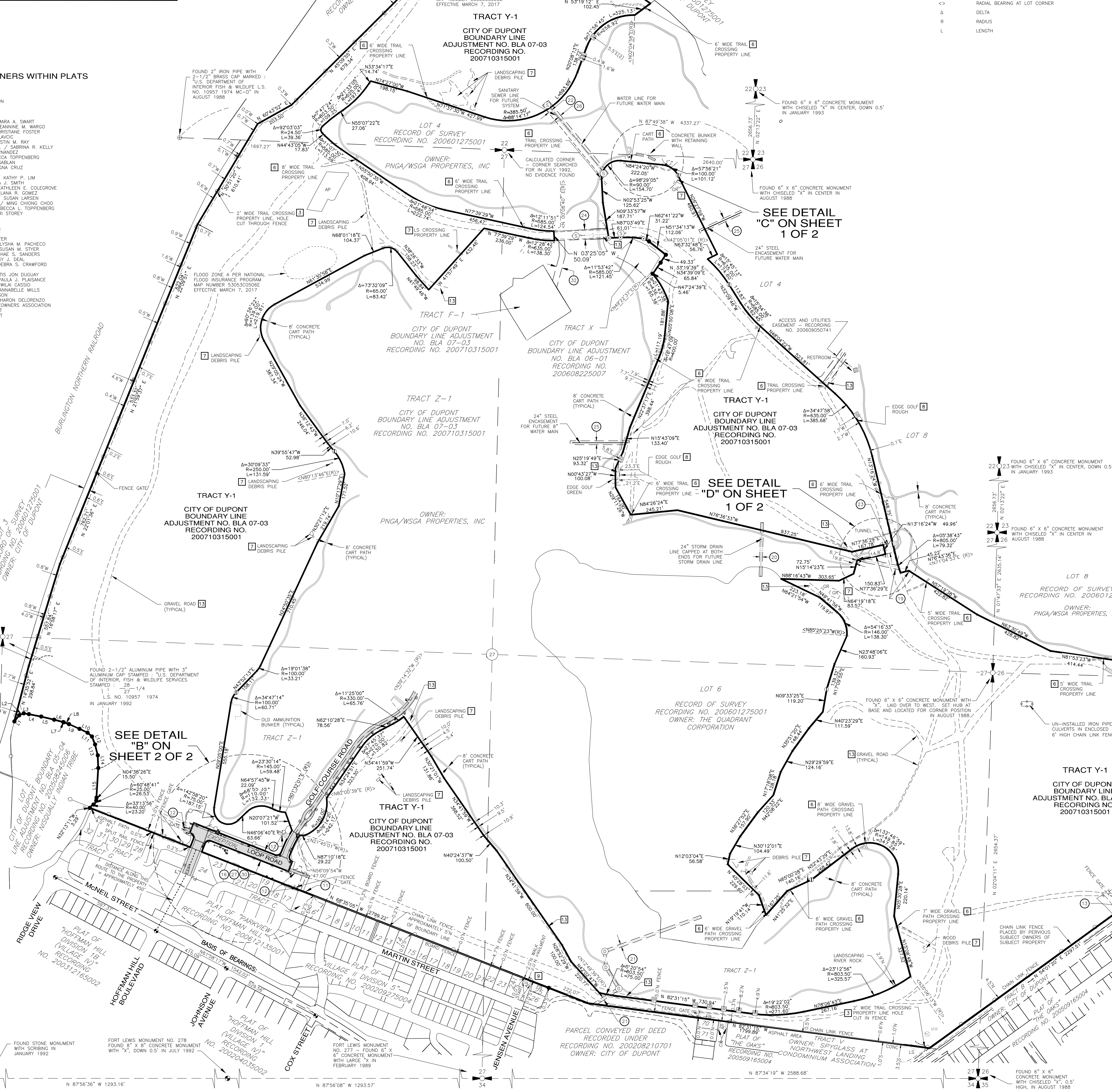
LOT 6 – MARK W. / TAMARA A. SWART
LOT 7 – THOMAS J. / JEANNINE M. WARGO
LOT 8 – BENJAMIN / CHRISTIANE FOSTER
LOT 9 – AUDREY L. MIKLAVCIC
LOT 10 – OWEN G. / KRISTIN M. RAY
LOT 11 – CHRISTOPHER J. / SABRINA R. KELLY
LOT 12 – LAUREN M. HERNANDEZ
LOT 13 – JARED / REBECCA TOPPENBERG
LOT 14 – PETER / MAY SABLAN
LOT 15 – MARTINEZ / WIGNA CRUZ
LOT 16 – VICTORIA KEYS
LOT 17 – AUGUSTUS Z. / KATHY P. LIM
LOT 18 – FRANK / CARLA J. SMITH
LOT 19 – THOMAS P. / KATHLEEN E. COLEGROVE
LOT 20 – ANTHONY R. / LANA R. GOMEZ
LOT 21 – KEVIN BURKE / SUSAN LARSEN
LOT 22 – JAN G. BACON / MING CHIONG CHOO
LOT 23 – JARED M. / REBECCA L. TOPPENBERG
LOT 24 – DAVID C. / YURI STOREY
LOT 25 – PARVIN ABEDI

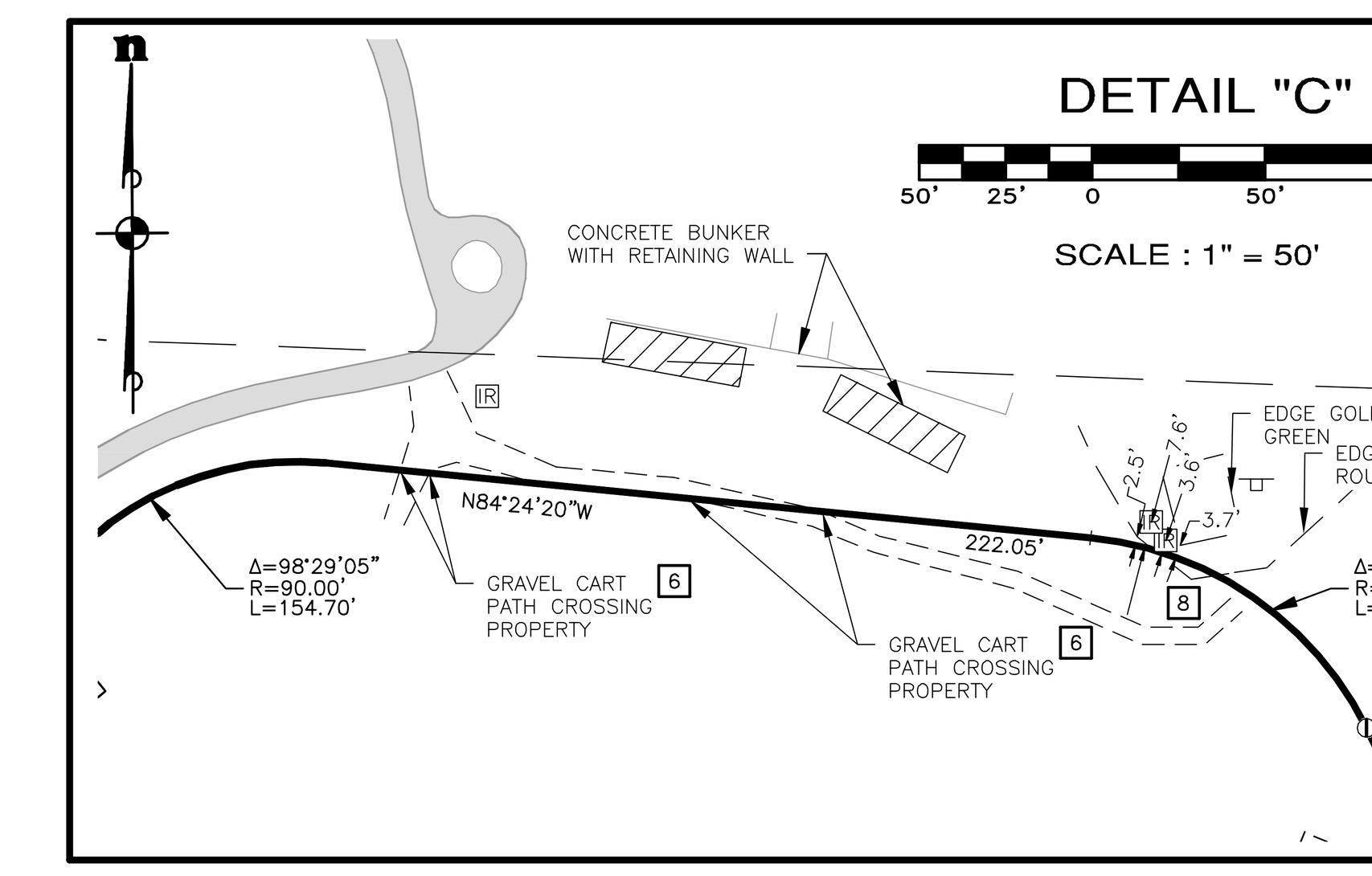
PARKVIEW AT HOFFMAN HILL:

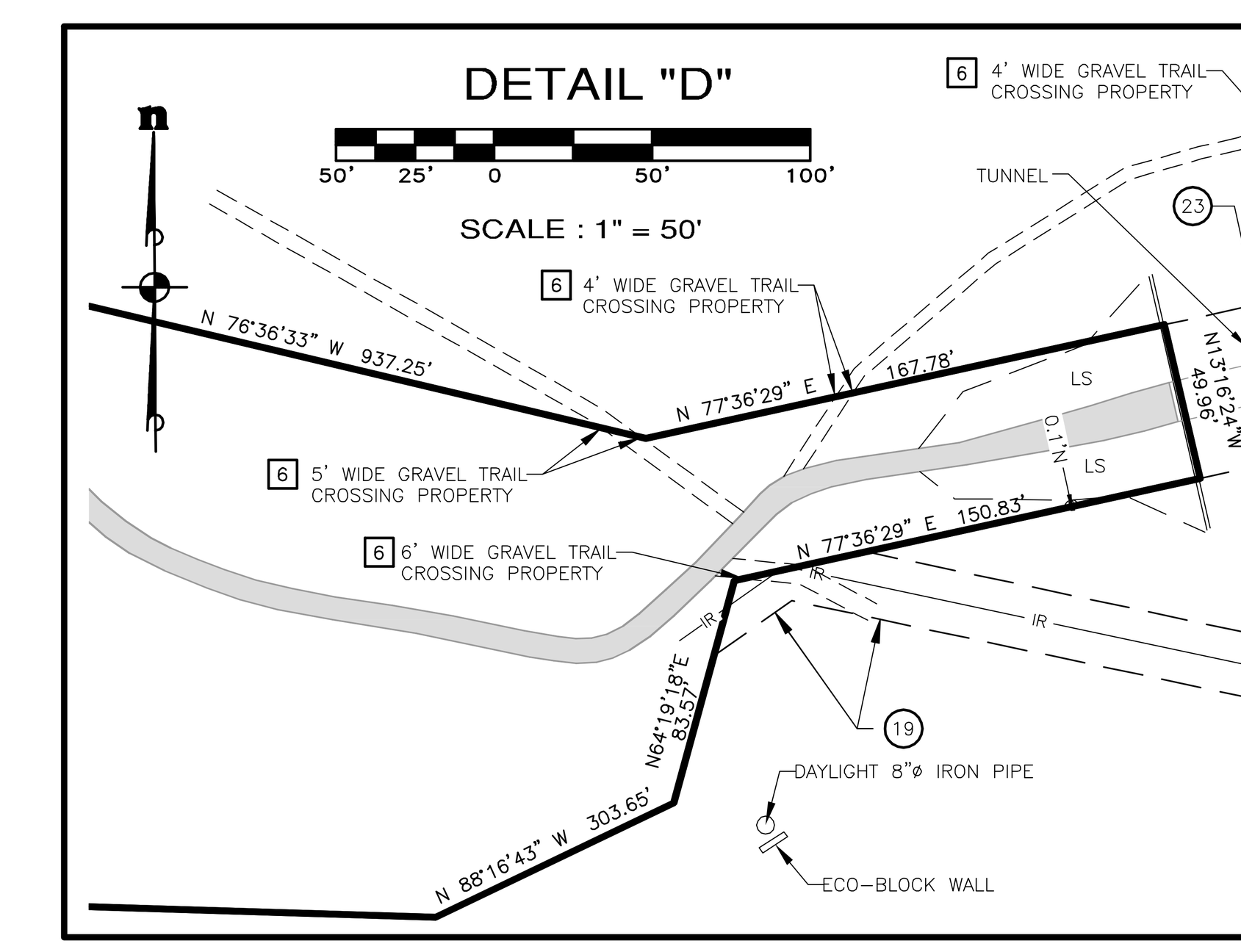
LOT 17 – DARLENE KAMPFER
LOT 18 – CARLOS A. / ALYSHA M. PACHECO
LOT 19 – JEFFREY M. / SUSAN M. STYER
LOT 20 – ROBERT E. / CHAE S. SANDERS
LOT 21 – TERI E. / PEGGY J. DEAL
LOT 22 – ROBERT C. / DEBRA S. CRAWFORD
LOT 23 – MARK SMITH
LOT 24 – THOMAS / CURTIS JON DUGUAY
LOT 28 – ROBERT M. / PAULA J. PLAISANCE
LOT 29 – SCOTT L. / SRIWILAI CASSIO
LOT 30 – TIMOTHY M. / ANNABELLE MILLS
LOT 31 – MI HYUN JOHNSON
LOT 32 – ROBERT A. / SHARON DELORENZO
TRACT C – PARKVIEW HOMEOWNERS ASSOCIATION
TRACT F – CITY OF DUPONT
TRACT G – CITY OF DUPONT

LINE TABLE

LINE	LENGTH	BEARING
L1	40.48	N 38°07'53" E
L2	25.83	N 66°03'43" E
L3	27.29	N 80°53'28" W
L4	65.92	N 78°58'25" W
L5	69.47	N 76°11'44" W
L6	49.34	N 75°24'01" W
L7	2.87	N 68°26'48" W
L8	28.76	N 70°56'46" W
L9	60.54	N 65°42'50" W
L10	46.53	N 64°20'03" W
L11	30.69	N 49°14'55" W
L12	44.53	N 21°20'30" W
L13	58.49	N 13°59'00" W
L14	66.52	N 02°15'32" W
L15	154.97	N 03°27'44" E







DRAWING: \\ESM8\ENGR\ESM-JOBS\2037\001\018\SURVEY PLOTS\ALTA-UPDATE-BT-01.DWG

REVISIONS		
NO.	DESCRIPTION/DATE	BY
1	ORIGINAL SURVEY MAY 2007	FD
2	UPDATE SURVEY NOVEMBER 2007	BRS
3	UPDATE SURVEY DECEMBER 2007	DLR
4	UPDATE SURVEY SEPTEMBER 2018	ESM

PREVIOUS JOB NO.
129–44–005
1449–001–007–0100

ESM CONSULTING ENGINEERS LLC
33915 1st Way South #200
Federal Way, WA 98003
FEDERAL WAY (253) 838–6113
BOTHELL (425) 415–6144
ELLENSBURG (509) 962–2608
www.esmcivil.com
Civil Engineering | Land Surveying | Land Planning
Public Works | Project Management | Landscape Architecture

WASHINGTON

ALBATROSS ESTATES LLC
NORTHWEST LANDING CORPORATE PARK
ALTA/NSPS LAND TITLE SURVEY

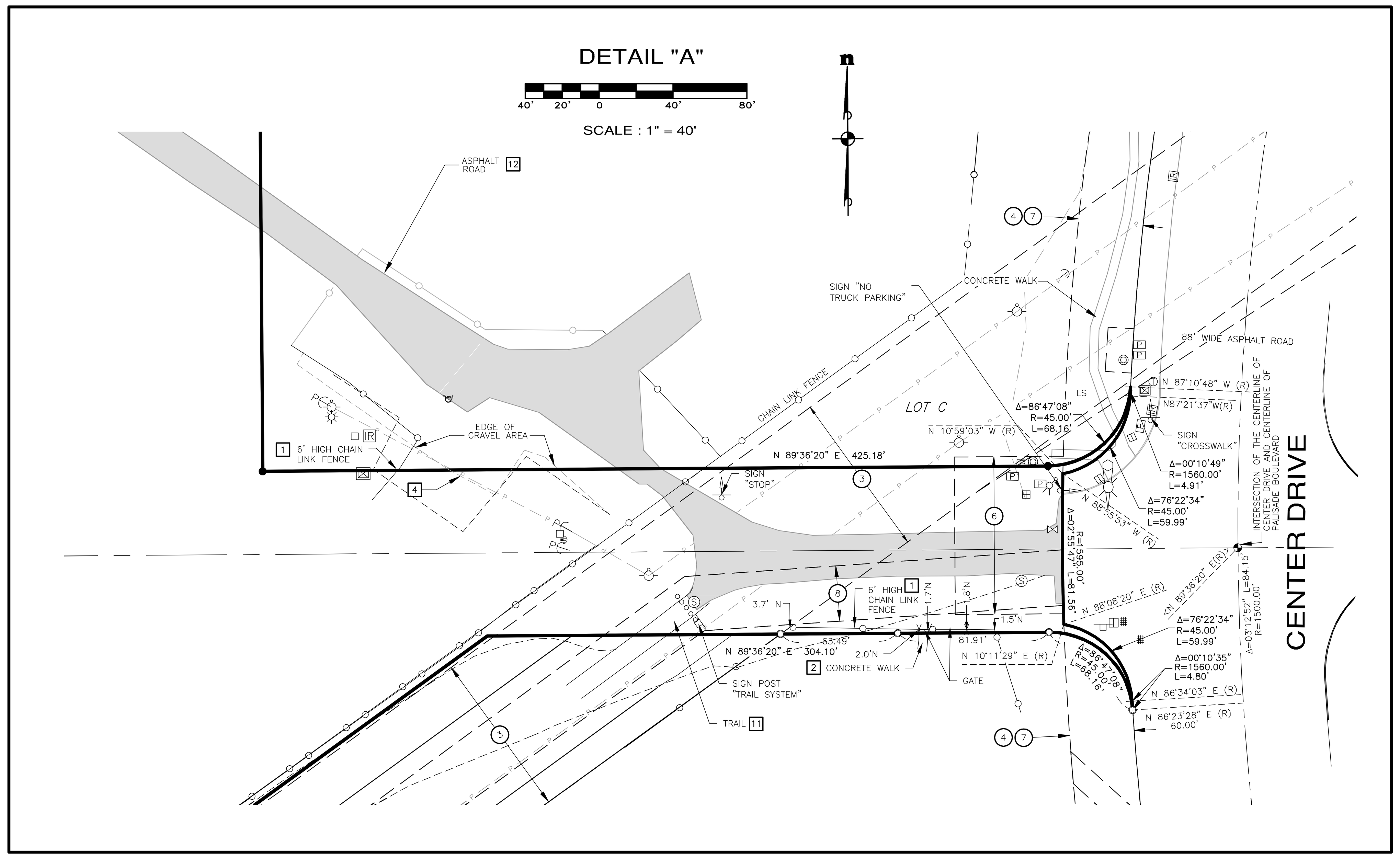
CITY OF DUPONT

JOB: 2037–001–018
DWG. NAME: ALTA–UPDATE–BT–01
DESIGNED BY:
DRAWN BY: FD/CF/RW/BS/DR/RG
CHECKED BY: CAF
DATE: 2018–09–20
PRINT DATE:

A PORTION OF SECTIONS 22, 26 AND 27, TOWNSHIP 19 NORTH, RANGE 1 EAST, W.M.

DETAIL "A"

SCALE : 1" = 40'



DETAIL "B"

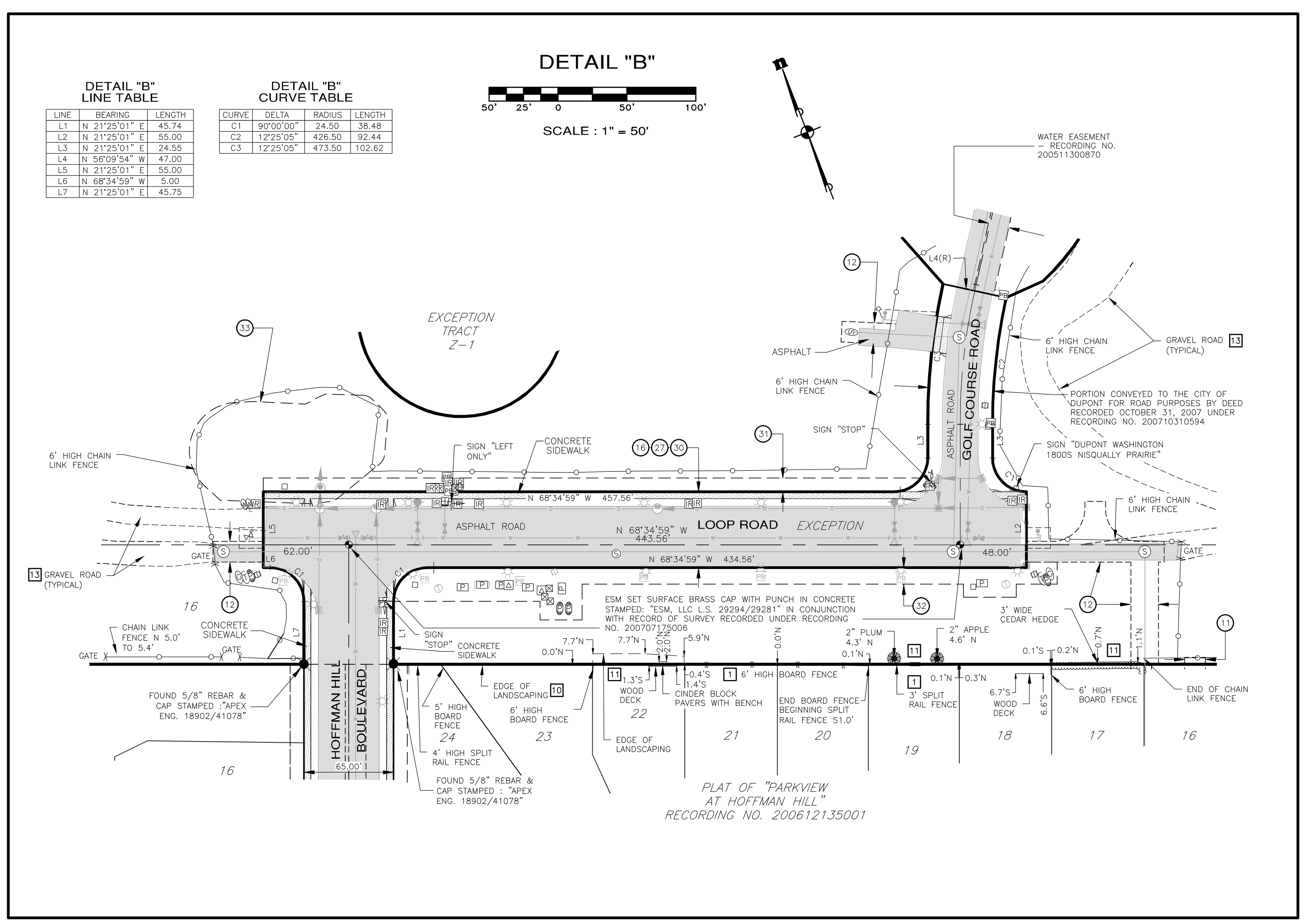
SCALE : 1" = 50'

DETAIL "B" LINE TABLE

LINE	BEARING	LENGTH
L1	N 21°25'01" E	45.74
L2	N 21°25'01" E	55.00
L3	N 21°25'01" E	24.55
L4	N 56°09'54" W	47.00
L5	N 21°25'01" E	55.00
L6	N 68°34'59" W	5.00
L7	N 21°25'01" E	45.75

DETAIL "B" CURVE TABLE

CURVE	DELTA	RADIUS	LENGTH
C1	90°00'00"	24.50	38.48
C2	12°25'05"	426.50	92.44
C3	12°25'05"	473.50	102.62



LEGEND

- LUMINAIRE (PER AERIAL, SEE NOTE 2)
- FENCE, CHAIN LINK (FIELD LOCATED)
- FENCE, SPLIT RAIL (FIELD LOCATED)
- SEE EXCEPTION NUMBER ON THIS SHEET
- ESM SET SURFACE BRASS CAP WITH PUNCH IN CONCRETE IN CONJUNCTION WITH THE PLATS OF "VILLAGE II DIVISION 4" AS RECORDED UNDER RECORDING NUMBER 200109135002 AND OF "HOFFMAN HILL DIVISION 1 (VILLAGE IV)" AS RECORDED UNDER RECORDING NUMBER 200204035002 AND "HOFFMAN HILL DIVISION 1B (VILLAGE IV)" AS RECORDED UNDER RECORDING NUMBER 200312165002 (UNLESS OTHERWISE NOTED)
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- <> RADIAL BEARING AT LOT CORNER
- Δ DELTA
- R RADIUS
- L LENGTH
- PAVED AREA (PER AERIAL, SEE NOTE 2)
- CW CONCRETE WALK
- CONC CONCRETE AREA
- GR GRAVEL AREA
- LS LANDSCAPE AREA
- BOARD FENCE (FB)
- AP ASPHALT PAVEMENT
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- WATER METER
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- POWER POLE W/ DROP LINE
- SIGNAL JUNCTION BOX
- TELEPHONE MANHOLE
- TELEPHONE JUNCTION BOX
- CABLE TV RISER
- P OVERHEAD POWER LINE
- S SANITARY SEWER LINE
- D STORM DRAIN LINE
- W WATER LINE
- IRR IRRIGATION LINE
- WATER VALVE
- SANITARY SEWER MANHOLE
- STORM DRAIN MANHOLE
- STORM DRAIN CATCH BASIN

LAND SURVEYOR'S CERTIFICATE

TO ALBATROSS ESTATES LLC
AND FIRST AMERICAN TITLE INSURANCE COMPANY:

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 2, 3, 4, 6(A), 7(A), 8, 9, 13, 16 AND 17 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON SEPTEMBER 12, 2018.

DATE OF PLAT OR MAP: SEPTEMBER 13, 2018.

BY: ______________________

ZACHARY T. LENNON, P.L.S.
WASHINGTON REGISTRATION NO. 44925
PHONE: (253) 838-6113
FAX: (253) 838-7104

ZACHARY T. LENNON — STATE OF WASHINGTON — 44925 REGISTERED — PROFESSIONAL LAND SURVEYOR

NOTES

1. THE CURRENT PROPERTY ADDRESS IS NOT AVAILABLE AT THIS TIME.
2. LOCATIONS OF BUILDINGS AND STRUCTURES AS GENERALLY DEPICTED HEREON ARE DIGITIZED FROM AN AERIAL PICTURE BY WALKER AND ASSOCIATES ON 04-11-2006. LOCATIONS OF IMPROVEMENTS WITHIN 5 FEET OF THE BOUNDARY HAVE BEEN AS-BUILT AND ARE SHOWN WITH DISTANCES TO THE PROPERTY LINES. TIES TO IMPROVEMENTS ARE SHOWN AT 90° TO THE PROPERTY LINES.
3. NO CORNERS HAVE BEEN SET IN CONJUNCTION WITH THIS SURVEY.
4. SITE AS DEPICTED HEREIN CONTAINS 260.74 ACRES.
5. FLOOD ZONE DESIGNATION = ZONE X, AREAS OF MINIMAL FLOODING, ACCORDING TO FLOOD INSURANCE RATE MAP (FIRM) MAP NUMBERS 53053C0506E, EFFECTIVE DATE MARCH 7, 2017, CITY OF DUPONT, PIERCE COUNTY, WASHINGTON AND 53053C0507E, EFFECTIVE DATE MARCH 7, 2017, CITY OF DUPONT, PIERCE COUNTY, WASHINGTON, AS PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) EXCEPT TWO AREAS NOTED ON SAID MAP NUMBER 53053C0506E AS ZONE A – SEE APPROXIMATE DEPICTION HEREIN. ZONE A IS DEFINED AS "SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD" AND WITH "NO BASE FLOOD ELEVATIONS DETERMINED".
6. THERE IS NO OBSERVABLE EVIDENCE THAT THIS SITE HAS BEEN USED AS A SOLID WASTE DUMP, SUMP OR SANITARY LANDFILL.
7. ZONING : BTP (BUSINESS AND TECHNOLOGY PARK) AS DEFINED BY THE CITY OF DUPONT.
8. THERE ARE NO VISIBLE ENCROACHMENTS OF ADJOINING BUILDINGS OR STRUCTURES EXCEPT AS SHOWN HEREON.
9. THERE ARE NO PERMANENT BUILDINGS LOCATED ON THIS SITE.
10. CONDITIONS AS DEPICTED HEREON ARE BASED UPON SITE CONDITIONS IN SEPTEMBER, 2018.
11. THERE HAVE BEEN NO RECENT CHANGES IN STREET RIGHT OF WAY LINES. THERE IS NO OBSERVABLE EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS.
12. THERE IS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS WITHIN RECENT MONTHS.

POTENTIAL ENCROACHMENTS

1. ADJOINER FENCE IS INTO SUBJECT PROPERTY
2. CONCRETE SIDEWALK CROSSES PROPERTY LINE
3. TRAIL CROSSES PROPERTY LINE
4. UTILITY FALLS OUTSIDE A RECORDED EASEMENT
5. HOLE CUT IN FENCE, APPARENT USE OF A TRAIL THAT CROSSES PROPERTY LINE
6. PATH THAT APPEARS TO BE IN USE BY GOLF COURSE CROSSES PROPERTY LINE
7. PILE OF WASTE LANDSCAPE MATERIAL – TREES, SOD AND/OR GRAVEL
8. GOLF COURSE MAINTAINED LIMITS CROSS PROPERTY LINE
9. ROAD IMPROVEMENTS CROSS PROPERTY LINE
10. LANDSCAPING FROM ADJOINING PROPERTY CROSSES THE PROPERTY LINE
11. TRAIL IN USE BY PUBLIC CROSSES PROPERTY LINE, NOT IN A TRAIL EASEMENT
12. PAVED ACCESS ROAD CROSSES PROPERTY LINE, PORTION IS OUTSIDE OF SUBJECT PROPERTY
13. THERE ARE NUMEROUS GRAVEL/DIRT ROADS ON THE SUBJECT PROPERTY. ONLY THOSE ROADS THAT SHOW RECENT USE HAVE BEEN DEPICTED HEREIN. SOME OF THESE ROADS CROSS PROPERTY LINES AS DEPICTED ON SHEET 1.

EXCEPTIONS TO THE TITLE REPORT

LEGAL DESCRIPTION, EASEMENTS, COVENANTS, CONDITIONS AND RESTRICTIONS ARE FROM FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT FOR TITLE INSURANCE ORDER NO. NCS-787921-LA2 4TH REPORT DATED AUGUST 6, 2018. IN PREPARING THIS SURVEY, ESM HAS NOT CONDUCTED AN INDEPENDENT TITLE SEARCH NOR IS ESM AWARE OF ANY TITLE ISSUES AFFECTING THE PROPERTY OTHER THAN THOSE SHOWN ON THIS SURVEY. ESM HAS WHOLLY RELIED ON THE ABOVE REFERENCED SUBDIVISION GUARANTEE TO PREPARE THIS SURVEY AND THEREFORE QUALIFIES THE SURVEYS ACCURACY AND COMPLETENESS TO THAT EXTENT.

1. NOT REPORTED HEREIN. SEE TITLE REPORT FOR ADDITIONAL INFORMATION.

2. SUBJECT TO GENERAL PROPERTY TAXES FOR TAX ACCOUNT NO. 011927-200-5. EXCEPTION CANNOT BE PLOTTED.

3. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR ELECTRICAL TRANSMISSION AND DISTRIBUTION AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 9004190543. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

4. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR A 35 FOOT LANDSCAPING ALONG CENTER DRIVE AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 9205210946. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

5. SUBJECT TO THAT DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS FOR NORTHWEST LANDING COMMERCIAL PROPERTY AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 9208240297 AND AS AMENDED BY INSTRUMENTS RECORDED UNDER RECORDING NOS. 9501100462, 9503150368, 9601090368, 9601260346, 9603120707, 9609110555, 9612240420, 9710170646, 9803170310, 9807070025, 9912200109, 200011080374, 200012060263, 200209180938, 200512050081 AND 200712210490. EXCEPTION CANNOT BE PLOTTED.

6. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR ELECTRICAL TRANSMISSION AND DISTRIBUTION AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 9511200886. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

7. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR ACCESS AND UTILITY AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 9601090362. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

8. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR SANITARY SEWER LINES AND APPURTENANT SEWER STRUCTURES AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 9909090470. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

9. SUBJECT TO THAT DECLARATION OF RESTRICTIVE COVENANT AND THE COVENANTS, CONDITIONS AND RESTRICTIONS CONTAINED THEREIN AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 9910290750. EXCEPTION CANNOT BE PLOTTED.

10. SUBJECT TO THAT NOTICE REGARDING HISTORIC DISTRICT DESIGNATION AND DECLARATION OF COVENANT AND THE COVENANTS, CONDITIONS AND RESTRICTIONS CONTAINED THEREIN AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200101120143 AND AMENDMENT THERETO AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200606120310. EXCEPTION CANNOT BE PLOTTED.

11. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR SANITARY SEWER LINES AND APPURTENANT SEWER STRUCTURES AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200201150274. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

12. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR SANITARY SEWER LINES AND APPURTENANT SEWER STRUCTURES AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200412130297. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

13. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR SANITARY SEWER LINES AND APPURTENANT SEWER STRUCTURES AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NOS. 200504040337 AND 200504040338. THE LOCATION OF SAID EASEMENT IS LOCATED HEREON.

14. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR ELECTRICAL TRANSMISSION AND DISTRIBUTION PURPOSES AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200505130713. SAID EASEMENT IS NOT DEPICTED HEREON AS THE LOCATION OF SAID EASEMENT CANNOT BE DETERMINED FROM THE INSTRUMENT OF RECORD.

15. SUBJECT TO THOSE COVENANTS, CONDITIONS, RESTRICTIONS, RESERVATIONS, EASEMENTS OR OTHER SERVITUDES, IF ANY, DISCLOSED BY THE BOUNDARY LINE ADJUSTMENT RECORDED UNDER RECORDING NO. 200508245006. NO NEW EASEMENTS WERE CREATED BY BOUNDARY LINE ADJUSTMENT.

16. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR WATER PURPOSES AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200511300872. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

17. SUBJECT TO THOSE MATTERS DISCLOSED BY THAT SURVEY RECORDED UNDER RECORDING NO. 200601275001. EXCEPTION CANNOT BE PLOTTED.

18. SUBJECT TO ALL COVENANTS, CONDITIONS, RESTRICTIONS, RESERVATIONS, EASEMENTS OR OTHER SERVITUDES, IF ANY, DISCLOSED BY THE RECORD OF SURVEY FOR BOUNDARY LINE ADJUSTMENT RECORDED UNDER RECORDING NO. 200608225007. NO NEW EASEMENTS WERE CREATED BY BOUNDARY LINE ADJUSTMENT.

19. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR IRRIGATION AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200609050736. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

20. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR STORM DRAINAGE AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200609050737. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

21. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR STORM DRAINAGE AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200609050738. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

22. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR STORM DRAINAGE AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200609050739. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

23. SUBJECT TO AN EASEMENT AND THE TERMS AND PROVISIONS THEREOF FOR GOLF CART PATH AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200609050740. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

24. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR UTILITIES AND ACCESS AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200609050742. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

25. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR WATER MAINS AND APPURTENANT EQUIPMENT AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200609050743. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

26. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR WATER LINES AND ASSOCIATED IMPROVEMENTS AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200609050744. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

27. SUBJECT TO A TEMPORARY EASEMENT FOR INGRESS AND EGRESS AND THE TERMS AND CONDITIONS THEREOF AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200705311264. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

28. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR TEMPORARY CONSTRUCTION AND PERMANENT ACCESS AND UTILITIES AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200708100582. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

29. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR SANITARY SEWER AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200708160513. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

30. SUBJECT TO AN AGREEMENT FOR RIGHT OF WAY AND LANDSCAPING MAINTENANCE AND THE TERMS AND CONDITIONS THEREOF AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200710310595. THE LOCATION OF SAID RIGHT OF WAY IS DEPICTED HEREON.

31. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR UTILITIES PURPOSES AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200710310596. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

32. SUBJECT TO AN EASEMENT AND THE TERMS AND CONDITIONS THEREOF FOR UTILITIES PURPOSES AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200710310597. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

33. SUBJECT TO A TEMPORARY EASEMENT FOR STORM DRAINAGE FACILITIES AND THE TERMS AND CONDITIONS THEREOF AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200710310598. THE LOCATION OF SAID EASEMENT IS DEPICTED HEREON.

34. SUBJECT TO ALL COVENANTS, CONDITIONS, RESTRICTIONS, RESERVATIONS, EASEMENTS OR OTHER SERVITUDES, IF ANY, DISCLOSED BY THE BOUNDARY LINE ADJUSTMENT RECORDED UNDER RECORDING NO. 200710315001. NO NEW EASEMENTS WERE CREATED BY BOUNDARY LINE ADJUSTMENT.

35. SUBJECT TO A DECLARATION OF RESTRICTIVE COVENANT – COMMERCIAL, RECORDED UNDER RECORDING NO. 200611010855. EXCEPTION CANNOT BE PLOTTED.

36. SUBJECT TO THAT "DECLARATION FOR THE DUPONT BUSINESS AND TECHNOLOGY PARK, A DISTRICT OF THE NORTHWEST LANDING COMMERCIAL PROPERTY" AND THE TERMS AND CONDITIONS THEREOF AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200712210491. EXCEPTION CANNOT BE PLOTTED.

37. SUBJECT TO THAT "COVENANT FOR SHARING OF BUSINESS PARK IMPROVEMENTS" AND THE TERMS AND CONDITIONS THEREOF AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200712210493. EXCEPTION CANNOT BE PLOTTED.

38. SUBJECT TO THAT "DECLARATION OF EASEMENT" AND THE TERMS AND CONDITIONS THEREOF AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200712210492. THE LOCATION OF THE EASEMENT IS DEPICTED HEREIN.

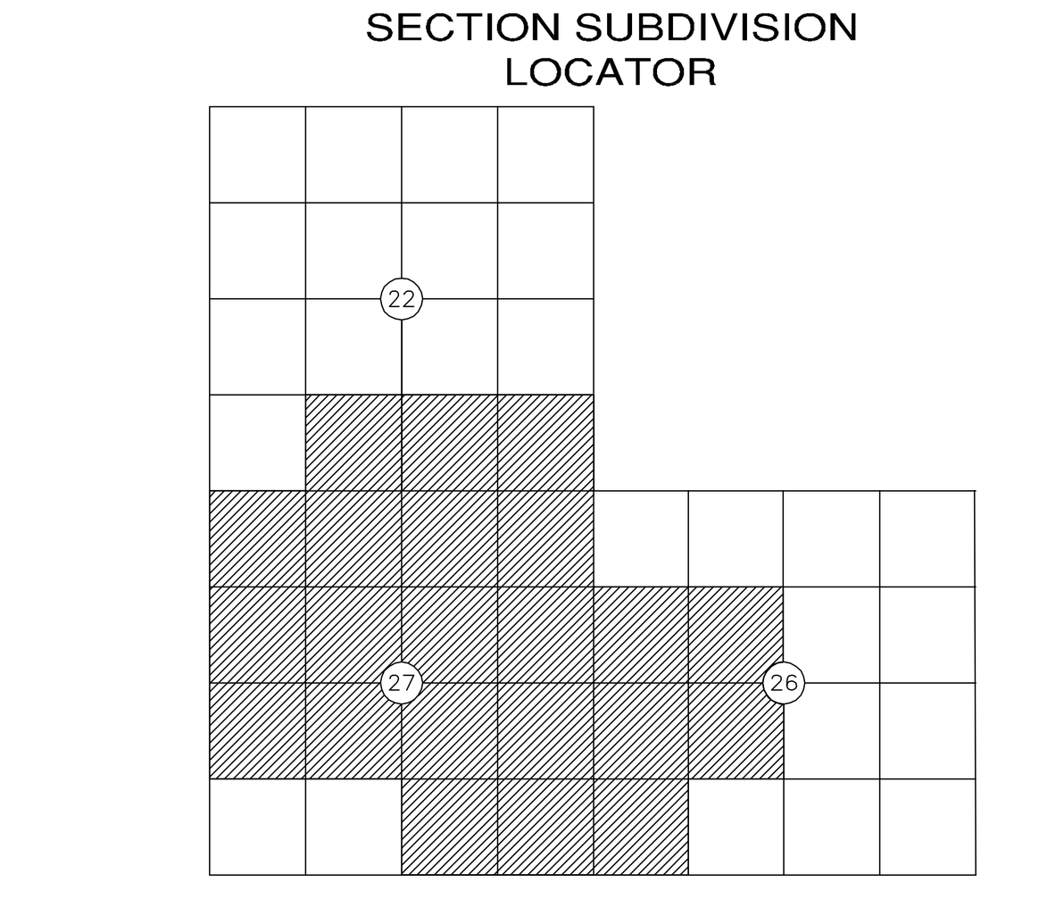
39. SUBJECT TO THAT "DEVELOPMENT COVENANT" AND THE TERMS AND CONDITIONS THEREOF AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200712210495. EXCEPTION CANNOT BE PLOTTED.

40. SUBJECT TO RESERVATIONS REGARDING OIL, GASES, COAL, ORES, MINERALS, FOSSILS, ETC. AND THE RIGHT OF ENTRY FOR OPENING, DEVELOPING AND WORKING THE SAME PER THE TERMS AND CONDITIONS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 200712210488. EXCEPTION CANNOT BE PLOTTED.

41. SUBJECT TO THAT "FIRST PARK NORTHWEST LANDING DEVELOPMENT AGREEMENT" AND THE TERMS AND CONDITIONS THEREOF AS CONTAINED IN INSTRUMENT RECORDED UNDER RECORDING NO. 201002020136. EXCEPTION CANNOT BE PLOTTED.

42 THOROUGH 47. NOT REPORTED HEREIN. SEE TITLE REPORT FOR ADDITIONAL INFORMATION.

SECTION SUBDIVISION LOCATOR



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REVISIONS

NO.	DESCRIPTION/DATE	BY
1	ORIGINAL SURVEY MAY 2007	FD
2	UPDATE SURVEY NOVEMBER 2007	BRS
3	UPDATE SURVEY DECEMBER 2007	DLR
4	UPDATE SURVEY SEPTEMBER 2018	ESM

PREVIOUS JOB NO.
129-44-005
1449-001-007-0100

ESM CONSULTING ENGINEERS LLC
33915 1st Way South #200
Federal Way, WA 98003
www.esmcivil.com
FEDERAL WAY (253) 838-6113
BOTHELL (425) 415-6144
ELLENSBURG (509) 962-2608
Civil Engineering | Land Surveying | Land Planning
Public Works | Project Management | Landscape Architecture

ALBATROSS ESTATES LLC
NORTHWEST LANDING CORPORATE PARK
ALTA/NSPS LAND TITLE SURVEY

CITY OF DUPONT — WASHINGTON

JOB:	2037-001-018
DWG. NAME:	ALTA-UPDATE-BT-02
DESIGNED BY:	
DRAWN BY:	FD/CF/RW/BS/DR/RG
CHECKED BY:	CAF
DATE:	2018-09-20
PRINT DATE:	

Tab 4.0

4.0 OFF-SITE ANALYSIS REPORT

The project site is surrounded by well-developed residential building to the south and southeast, a Sequalitchew creek to the north, and a Puget sound to the west.

There are no offsite upstream stormwater runoff contributions and since infiltration is proposed as the flow control method for the entire project site, and there are very minimal, if any, off-site areas contributing to this site, no further off-site analysis has been prepared for this development.

The site runoff from Founder's Ridge project will be contained on site in infiltration ponds.

Tab 5.0

5.0 PERMANENT STORMWATER CONTROL PLAN

A. **Existing Site Hydrology**: The existing project site consists of land that has been previously cleared and graded that is now covered in small deciduous trees and brush. The on-site soil type is considered Spanaway type soil. This creates a pre-developed condition of no runoff from the site, even in peak storm events. All runoff infiltrates into the ground or evaporates. This will be matched in the developed condition through the use of infiltration.

B. **Developed Site Hydrology**: In developed conditions, all runoff from the on-site improvements will be routed through water quality features prior to infiltration on-site. An infiltration rate of 10 inches per hour was utilized based on the geotechnical recommendations.

C. **Performance Standards and Goals**: The infiltration facilities were sized using the Western Washington Hydrology Model (WWHM), utilizing an infiltration rate of 10 inches per hour and providing 100% infiltration for up to the 100-year storm event for historic rainfall data. Basic water quality is provided.

D. **Flow Control System:** Flow control will be provided by an infiltration pond on-site. The system has been designed based off the geotechnical engineer's preliminary infiltration rate of 10 inches per hour. Based on topography, the site is divided into 5 basins and corresponding ponds (see table 1 for sizes & fig. 9 for development basins). The infiltration ponds are designed to accommodate run-off from the total new and replaced hard surfaces areas.

Table 1: Development basins & associated ponds

Basin Name	Total Contribution Area (AC)	Impervious Area (AC)	Pervious Area (AC)	Discharge to	Pond Size	
					Top Surface Area (AC)	Riser Height (in)
Basin 1	21.21	11.57	9.64	Pond 1	0.78	6
Basin 2	13.6	8.54	5.06	Pond 2	0.48	6
Basin 3	18.2	12.25	5.95	Pond 3	1.41	6
Basin 4	16.57	10.51	6.06	Pond 4	1.66	6
Basin 5	13.6	8.93	4.67	Pond 5	0.86	6

E. **Water Quality System**: Per Chapter V-2 of the 2012 SWMMWW as amended in 2014, Oil Control is not required for this proposal as it does not fall within the definition of a high-use site, given that the general use of the improvements is for industrial use/vehicular parking lot. However, Basic Treatment is deemed appropriate for this project, as the site will use infiltration strictly for flow control but does not discharge to any phosphorus sensitive lake that is within 1/4 mile of the site, nor does it discharge to a fresh water designated for aquatic life use/has an existing aquatic life use that is within 1/4 mile of the site. See Figure 7 for the Treatment Facility Selection Flow Chart.

The installation of appropriate Storm Filter upstream of the infiltration Ponds will be proposed to provide Basic Water Quality treatment for the site. The water quality units will be sized to accommodate run-off from the total area of land disturbed and will use the off-line water quality flowrate as tabulated in the WWHM Report found in Attachment A.

F. **Conveyance System Analysis and Design**: The internal conveyance system for this project will be designed for a 25-year storm event using the Rational Method. See Figure

9 for the Developed Basin Map and Attachment B for conveyance sizing spreadsheet and Isopluvial Map used for calculations.

Figure 8
Treatment Facility Selection
Flow Chart

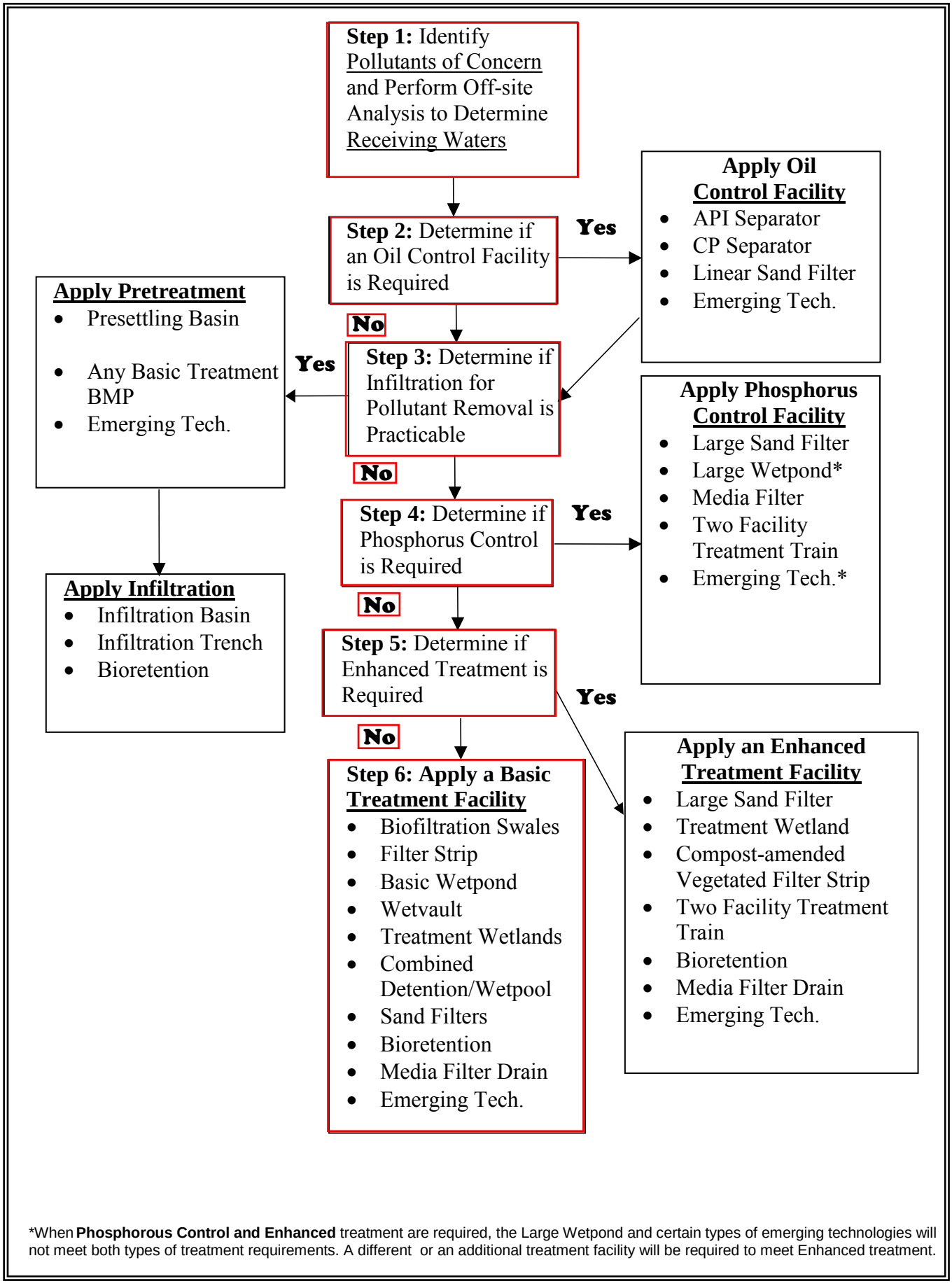
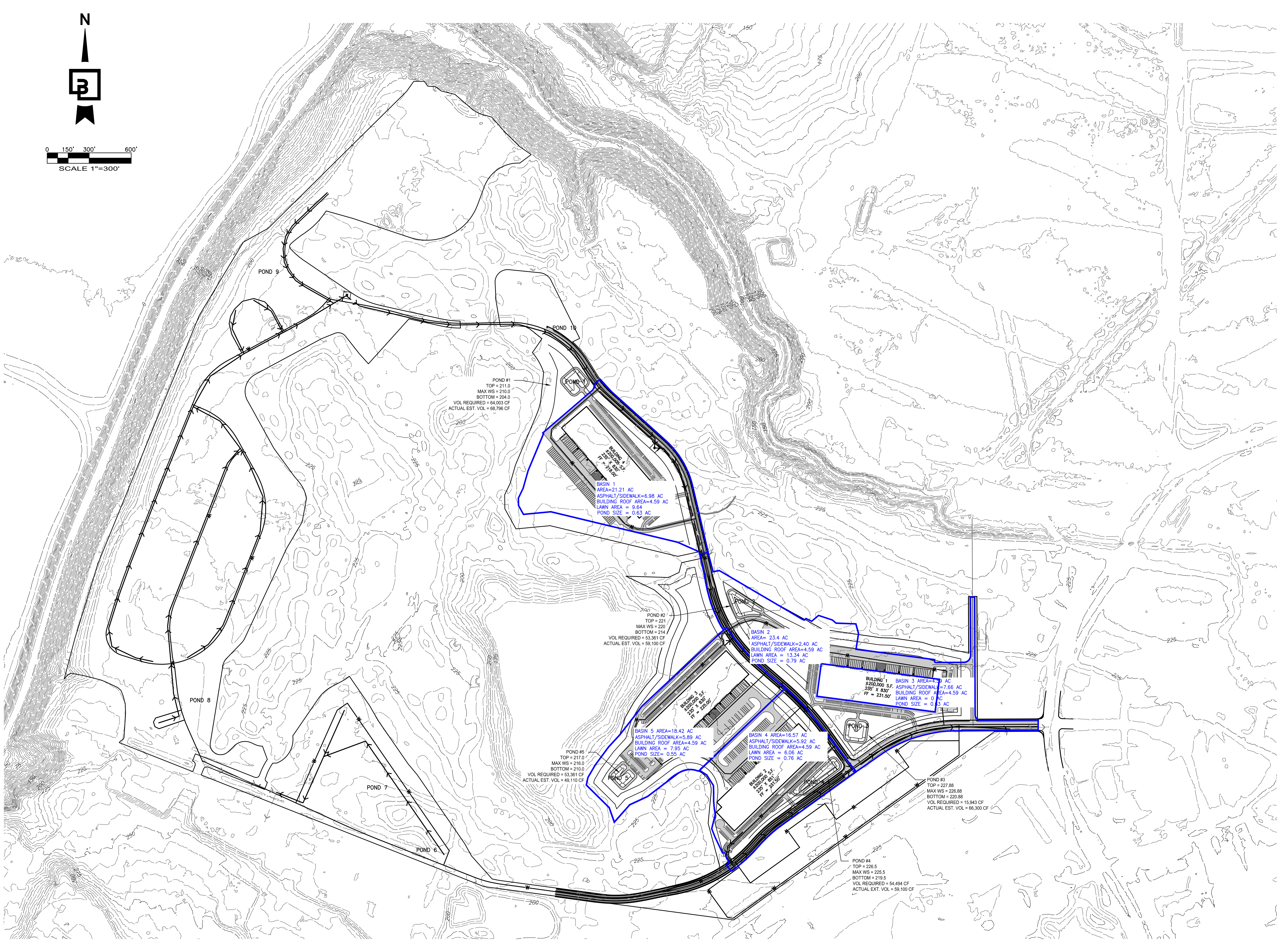


Figure 2.1.1 – Treatment Facility Selection Flow Chart

Figure 9
Developed Basin Map



No.	Date	By	Ckd.	Appr.	Revision

Title:
PRE-DEVELOPMENT DRAINAGE BASIN EXHIBIT
FOR
FIRST PARK NORTHWEST LANDING

For:
ALBATROSS ESTATES LLC
17837 1ST AVE S NORMANDY PARK
98148-1728

Scale:
Horizontal 1"=300'
Vertical -

Designed SAR
Drawn SAR
Checked BE
Approved BE
Date 3/31/21

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

Job Number 21127
Sheet 1 of 1

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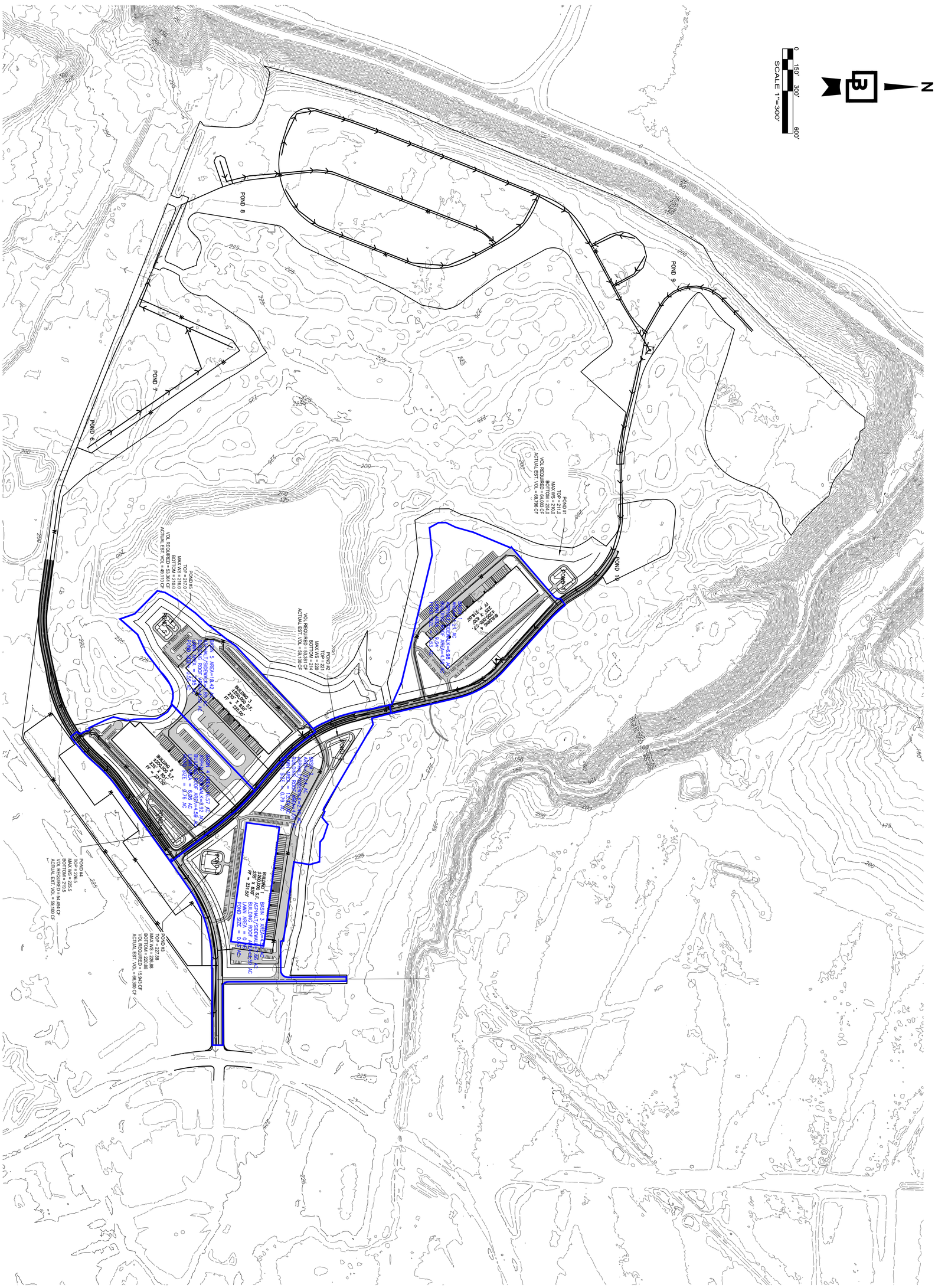

Job Number	Designed	Drawn	Checked	Approved	Date	Scale
21127	SAR	SAR	BE	BE	3/31/21	Horizontal 1"=300' Vertical --

Sheet 1 of 1

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

For:
ALBATROSS ESTATES LLC
17837 1ST AVE S NORMANDY PARK
98148-1728

No.	Date	By	Ckd.	Appr.	Revision

Title:
PRE-DEVELOPMENT DRAINAGE BASIN EXHIBIT

FOR
FIRST PARK NORTHWEST LANDING

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Attachment A
WWHM Calculations

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	default[0]
Site Name:	First Parking NW Landing
Site Address:	First Parking NW Landing
City:	Dupont, WA
Report Date:	4/21/2021
Gage:	
Data Start:	10/01/1901
Data End:	09/30/2059
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2019/09/13
Version:	4.2.17

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year
Low Flow Threshold for POC2:	50 Percent of the 2 Year
High Flow Threshold for POC2:	50 Year
Low Flow Threshold for POC3:	50 Percent of the 2 Year
High Flow Threshold for POC3:	50 Year
Low Flow Threshold for POC4:	50 Percent of the 2 Year
High Flow Threshold for POC4:	50 Year
Low Flow Threshold for POC5:	50 Percent of the 2 Year
High Flow Threshold for POC5:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	21.21
Pervious Total	21.21
Impervious Land Use	acre
Impervious Total	0
Basin Total	21.21

Element Flows To:

Surface	Interflow	Groundwater

Basin 2

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	23.4
Pervious Total	23.4
Impervious Land Use	acre
Impervious Total	0
Basin Total	23.4

Element Flows To:

Surface	Interflow	Groundwater

Basin 3

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	4.59
Pervious Total	4.59
Impervious Land Use	acre
Impervious Total	0
Basin Total	4.59

Element Flows To:

Surface	Interflow	Groundwater

Basin 4

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	16.57
Pervious Total	16.57
Impervious Land Use	acre
Impervious Total	0
Basin Total	16.57

Element Flows To:

Surface	Interflow	Groundwater

Basin 5

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	18.43
Pervious Total	18.43
Impervious Land Use	acre
Impervious Total	0
Basin Total	18.43

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	9.64
Pervious Total	9.64

Impervious Land Use	acre
ROADS FLAT	6.98
ROOF TOPS FLAT	4.59
Impervious Total	11.57
Basin Total	21.21

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Basin 2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	13.34
Pervious Total	13.34

Impervious Land Use	acre
ROADS FLAT	10.06
Impervious Total	10.06
Basin Total	23.4

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 2	Trapezoidal Pond 2	

Basin 3

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROOF TOPS FLAT	4.59
Impervious Total	4.59
Basin Total	4.59

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 3	Trapezoidal Pond 3	

Basin 4

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	6.06
Pervious Total	6.06

Impervious Land Use	acre
ROADS FLAT	5.92
ROOF TOPS FLAT	4.59
Impervious Total	10.51
Basin Total	16.57

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 4	Trapezoidal Pond 4	

Basin 5

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	7.95
Pervious Total	7.95

Impervious Land Use	acre
ROADS FLAT	5.89
ROOF TOPS FLAT	4.59
Impervious Total	10.48
Basin Total	18.43

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 5	Trapezoidal Pond 5	

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	84.00 ft.	
Bottom Width:	84.00 ft.	
Depth:	7 ft.	
Volume at riser head:	1.4701 acre-feet.	
Infiltration On		
Infiltration rate:	10	
Infiltration safety factor:	1	
Wetted surface area On		
Total Volume Infiltrated (ac-ft.):		6295.163
Total Volume Through Riser (ac-ft.):		0
Total Volume Through Facility (ac-ft.):		6295.163
Percent Infiltrated:		100
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
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:	18 in.	
Element Flows To:		
Outlet 1	Outlet 2	

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.162	0.000	0.000	0.000
0.0778	0.163	0.012	0.000	1.651
0.1556	0.165	0.025	0.000	1.669
0.2333	0.167	0.038	0.000	1.688
0.3111	0.169	0.051	0.000	1.706
0.3889	0.171	0.064	0.000	1.725
0.4667	0.173	0.078	0.000	1.744
0.5444	0.174	0.091	0.000	1.762
0.6222	0.176	0.105	0.000	1.781
0.7000	0.178	0.119	0.000	1.800
0.7778	0.180	0.133	0.000	1.819
0.8556	0.182	0.147	0.000	1.839
0.9333	0.184	0.161	0.000	1.858
1.0111	0.186	0.175	0.000	1.877
1.0889	0.188	0.190	0.000	1.897
1.1667	0.190	0.205	0.000	1.916
1.2444	0.192	0.220	0.000	1.936
1.3222	0.194	0.235	0.000	1.956
1.4000	0.196	0.250	0.000	1.976
1.4778	0.198	0.265	0.000	1.996
1.5556	0.200	0.281	0.000	2.016
1.6333	0.202	0.296	0.000	2.036
1.7111	0.204	0.312	0.000	2.057
1.7889	0.206	0.328	0.000	2.077
1.8667	0.208	0.344	0.000	2.097
1.9444	0.210	0.360	0.000	2.118

2.0222	0.212	0.377	0.000	2.139
2.1000	0.214	0.393	0.000	2.160
2.1778	0.216	0.410	0.000	2.181
2.2556	0.218	0.427	0.000	2.202
2.3333	0.220	0.444	0.000	2.223
2.4111	0.222	0.461	0.000	2.244
2.4889	0.224	0.479	0.000	2.265
2.5667	0.226	0.496	0.000	2.287
2.6444	0.229	0.514	0.000	2.308
2.7222	0.231	0.532	0.000	2.330
2.8000	0.233	0.550	0.000	2.352
2.8778	0.235	0.568	0.000	2.373
2.9556	0.237	0.586	0.000	2.395
3.0333	0.239	0.605	0.000	2.417
3.1111	0.242	0.624	0.000	2.439
3.1889	0.244	0.643	0.000	2.462
3.2667	0.246	0.662	0.000	2.484
3.3444	0.248	0.681	0.000	2.506
3.4222	0.250	0.700	0.000	2.529
3.5000	0.253	0.720	0.000	2.552
3.5778	0.255	0.740	0.000	2.574
3.6556	0.257	0.760	0.000	2.597
3.7333	0.259	0.780	0.000	2.620
3.8111	0.262	0.800	0.000	2.643
3.8889	0.264	0.821	0.000	2.666
3.9667	0.266	0.841	0.000	2.690
4.0444	0.269	0.862	0.000	2.713
4.1222	0.271	0.883	0.000	2.736
4.2000	0.273	0.904	0.000	2.760
4.2778	0.276	0.926	0.000	2.784
4.3556	0.278	0.947	0.000	2.807
4.4333	0.280	0.969	0.000	2.831
4.5111	0.283	0.991	0.000	2.855
4.5889	0.285	1.013	0.000	2.879
4.6667	0.288	1.035	0.000	2.903
4.7444	0.290	1.058	0.000	2.928
4.8222	0.292	1.081	0.000	2.952
4.9000	0.295	1.103	0.000	2.976
4.9778	0.297	1.127	0.000	3.001
5.0556	0.300	1.150	0.000	3.026
5.1333	0.302	1.173	0.000	3.050
5.2111	0.305	1.197	0.000	3.075
5.2889	0.307	1.221	0.000	3.100
5.3667	0.310	1.245	0.000	3.125
5.4444	0.312	1.269	0.000	3.150
5.5222	0.315	1.293	0.000	3.176
5.6000	0.317	1.318	0.000	3.201
5.6778	0.320	1.343	0.000	3.226
5.7556	0.322	1.368	0.000	3.252
5.8333	0.325	1.393	0.000	3.278
5.9111	0.327	1.418	0.000	3.303
5.9889	0.330	1.444	0.000	3.329
6.0667	0.332	1.470	0.273	3.355
6.1444	0.335	1.496	0.869	3.381
6.2222	0.338	1.522	1.636	3.407
6.3000	0.340	1.548	2.501	3.434
6.3778	0.343	1.575	3.386	3.460
6.4556	0.345	1.602	4.216	3.486

6.5333	0.348	1.629	4.924	3.513
6.6111	0.351	1.656	5.468	3.540
6.6889	0.353	1.683	5.848	3.566
6.7667	0.356	1.711	6.205	3.593
6.8444	0.359	1.739	6.512	3.620
6.9222	0.361	1.767	6.805	3.647
7.0000	0.364	1.795	7.086	3.675
7.0778	0.367	1.823	7.357	3.702

Trapezoidal Pond 2

Bottom Length:	75.00 ft.	
Bottom Width:	75.00 ft.	
Depth:	7 ft.	
Volume at riser head:	1.2251 acre-feet.	
Infiltration On		
Infiltration rate:	10	
Infiltration safety factor:	1	
Wetted surface area On		
Total Volume Infiltrated (ac-ft.):		6314.641
Total Volume Through Riser (ac-ft.):		0.286
Total Volume Through Facility (ac-ft.):		6314.927
Percent Infiltrated:		100
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
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:	18 in.	
Element Flows To:		
Outlet 1	Outlet 2	

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.129	0.000	0.000	0.000
0.0778	0.130	0.010	0.000	1.318
0.1556	0.132	0.020	0.000	1.334
0.2333	0.134	0.030	0.000	1.351
0.3111	0.135	0.041	0.000	1.367
0.3889	0.137	0.051	0.000	1.384
0.4667	0.139	0.062	0.000	1.401
0.5444	0.140	0.073	0.000	1.418
0.6222	0.142	0.084	0.000	1.434
0.7000	0.144	0.095	0.000	1.452
0.7778	0.145	0.106	0.000	1.469
0.8556	0.147	0.118	0.000	1.486
0.9333	0.149	0.129	0.000	1.503
1.0111	0.150	0.141	0.000	1.521
1.0889	0.152	0.153	0.000	1.538
1.1667	0.154	0.165	0.000	1.556
1.2444	0.156	0.177	0.000	1.574
1.3222	0.157	0.189	0.000	1.592
1.4000	0.159	0.201	0.000	1.610
1.4778	0.161	0.214	0.000	1.628
1.5556	0.163	0.226	0.000	1.646
1.6333	0.165	0.239	0.000	1.664
1.7111	0.166	0.252	0.000	1.683
1.7889	0.168	0.265	0.000	1.701
1.8667	0.170	0.278	0.000	1.720
1.9444	0.172	0.292	0.000	1.738
2.0222	0.174	0.305	0.000	1.757
2.1000	0.176	0.319	0.000	1.776

2.1778	0.178	0.333	0.000	1.795
2.2556	0.179	0.347	0.000	1.814
2.3333	0.181	0.361	0.000	1.833
2.4111	0.183	0.375	0.000	1.852
2.4889	0.185	0.389	0.000	1.872
2.5667	0.187	0.404	0.000	1.891
2.6444	0.189	0.418	0.000	1.911
2.7222	0.191	0.433	0.000	1.931
2.8000	0.193	0.448	0.000	1.950
2.8778	0.195	0.463	0.000	1.970
2.9556	0.197	0.479	0.000	1.990
3.0333	0.199	0.494	0.000	2.010
3.1111	0.201	0.510	0.000	2.030
3.1889	0.203	0.525	0.000	2.051
3.2667	0.205	0.541	0.000	2.071
3.3444	0.207	0.557	0.000	2.092
3.4222	0.209	0.574	0.000	2.112
3.5000	0.211	0.590	0.000	2.133
3.5778	0.213	0.606	0.000	2.154
3.6556	0.215	0.623	0.000	2.175
3.7333	0.217	0.640	0.000	2.196
3.8111	0.219	0.657	0.000	2.217
3.8889	0.222	0.674	0.000	2.238
3.9667	0.224	0.692	0.000	2.259
4.0444	0.226	0.709	0.000	2.281
4.1222	0.228	0.727	0.000	2.302
4.2000	0.230	0.745	0.000	2.324
4.2778	0.232	0.763	0.000	2.345
4.3556	0.234	0.781	0.000	2.367
4.4333	0.237	0.799	0.000	2.389
4.5111	0.239	0.818	0.000	2.411
4.5889	0.241	0.836	0.000	2.433
4.6667	0.243	0.855	0.000	2.455
4.7444	0.245	0.874	0.000	2.478
4.8222	0.248	0.893	0.000	2.500
4.9000	0.250	0.913	0.000	2.523
4.9778	0.252	0.932	0.000	2.545
5.0556	0.254	0.952	0.000	2.568
5.1333	0.257	0.972	0.000	2.591
5.2111	0.259	0.992	0.000	2.614
5.2889	0.261	1.012	0.000	2.637
5.3667	0.263	1.033	0.000	2.660
5.4444	0.266	1.053	0.000	2.683
5.5222	0.268	1.074	0.000	2.706
5.6000	0.270	1.095	0.000	2.730
5.6778	0.273	1.116	0.000	2.753
5.7556	0.275	1.138	0.000	2.777
5.8333	0.277	1.159	0.000	2.800
5.9111	0.280	1.181	0.000	2.824
5.9889	0.282	1.203	0.000	2.848
6.0667	0.284	1.225	0.273	2.872
6.1444	0.287	1.247	0.869	2.896
6.2222	0.289	1.269	1.636	2.921
6.3000	0.292	1.292	2.501	2.945
6.3778	0.294	1.315	3.386	2.969
6.4556	0.297	1.338	4.216	2.994
6.5333	0.299	1.361	4.924	3.018
6.6111	0.301	1.384	5.468	3.043

6.6889	0.304	1.408	5.848	3.068
6.7667	0.306	1.432	6.205	3.093
6.8444	0.309	1.456	6.512	3.118
6.9222	0.311	1.480	6.805	3.143
7.0000	0.314	1.504	7.086	3.168
7.0778	0.316	1.529	7.357	3.194

Trapezoidal Pond 3

Bottom Length:	32.00 ft.
Bottom Width:	32.00 ft.
Depth:	7 ft.
Volume at riser head:	0.3664 acre-feet.
Infiltration On	
Infiltration rate:	10
Infiltration safety factor:	1
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	1847.559
Total Volume Through Riser (ac-ft.):	0.074
Total Volume Through Facility (ac-ft.):	1847.633
Percent Infiltrated:	100
Total Precip Applied to Facility:	0
Total Evap From Facility:	0
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:	18 in.
Element Flows To:	
Outlet 1	Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.023	0.000	0.000	0.000
0.0778	0.024	0.001	0.000	0.244
0.1556	0.024	0.003	0.000	0.251
0.2333	0.025	0.005	0.000	0.258
0.3111	0.026	0.007	0.000	0.265
0.3889	0.027	0.009	0.000	0.272
0.4667	0.027	0.012	0.000	0.280
0.5444	0.028	0.014	0.000	0.287
0.6222	0.029	0.016	0.000	0.295
0.7000	0.030	0.018	0.000	0.303
0.7778	0.030	0.021	0.000	0.311
0.8556	0.031	0.023	0.000	0.319
0.9333	0.032	0.026	0.000	0.327
1.0111	0.033	0.028	0.000	0.335
1.0889	0.034	0.031	0.000	0.343
1.1667	0.034	0.033	0.000	0.352
1.2444	0.035	0.036	0.000	0.360
1.3222	0.036	0.039	0.000	0.369
1.4000	0.037	0.042	0.000	0.377
1.4778	0.038	0.045	0.000	0.386
1.5556	0.039	0.048	0.000	0.395
1.6333	0.040	0.051	0.000	0.404
1.7111	0.041	0.054	0.000	0.413
1.7889	0.041	0.057	0.000	0.422
1.8667	0.042	0.061	0.000	0.432
1.9444	0.043	0.064	0.000	0.441
2.0222	0.044	0.067	0.000	0.450
2.1000	0.045	0.071	0.000	0.460

2.1778	0.046	0.074	0.000	0.470
2.2556	0.047	0.078	0.000	0.479
2.3333	0.048	0.082	0.000	0.489
2.4111	0.049	0.086	0.000	0.499
2.4889	0.050	0.090	0.000	0.509
2.5667	0.051	0.094	0.000	0.520
2.6444	0.052	0.098	0.000	0.530
2.7222	0.053	0.102	0.000	0.540
2.8000	0.054	0.106	0.000	0.551
2.8778	0.055	0.110	0.000	0.561
2.9556	0.056	0.115	0.000	0.572
3.0333	0.057	0.119	0.000	0.583
3.1111	0.058	0.124	0.000	0.594
3.1889	0.060	0.128	0.000	0.605
3.2667	0.061	0.133	0.000	0.616
3.3444	0.062	0.138	0.000	0.627
3.4222	0.063	0.143	0.000	0.638
3.5000	0.064	0.148	0.000	0.650
3.5778	0.065	0.153	0.000	0.661
3.6556	0.066	0.158	0.000	0.673
3.7333	0.067	0.163	0.000	0.685
3.8111	0.069	0.168	0.000	0.696
3.8889	0.070	0.174	0.000	0.708
3.9667	0.071	0.179	0.000	0.720
4.0444	0.072	0.185	0.000	0.732
4.1222	0.073	0.191	0.000	0.745
4.2000	0.075	0.196	0.000	0.757
4.2778	0.076	0.202	0.000	0.769
4.3556	0.077	0.208	0.000	0.782
4.4333	0.078	0.214	0.000	0.794
4.5111	0.080	0.221	0.000	0.807
4.5889	0.081	0.227	0.000	0.820
4.6667	0.082	0.233	0.000	0.833
4.7444	0.083	0.240	0.000	0.846
4.8222	0.085	0.246	0.000	0.859
4.9000	0.086	0.253	0.000	0.872
4.9778	0.087	0.260	0.000	0.886
5.0556	0.089	0.267	0.000	0.899
5.1333	0.090	0.274	0.000	0.912
5.2111	0.091	0.281	0.000	0.926
5.2889	0.093	0.288	0.000	0.940
5.3667	0.094	0.295	0.000	0.954
5.4444	0.096	0.303	0.000	0.968
5.5222	0.097	0.310	0.000	0.982
5.6000	0.098	0.318	0.000	0.996
5.6778	0.100	0.326	0.000	1.010
5.7556	0.101	0.333	0.000	1.024
5.8333	0.103	0.341	0.000	1.039
5.9111	0.104	0.349	0.000	1.053
5.9889	0.105	0.358	0.000	1.068
6.0667	0.107	0.366	0.273	1.083
6.1444	0.108	0.374	0.869	1.097
6.2222	0.110	0.383	1.636	1.112
6.3000	0.111	0.391	2.501	1.127
6.3778	0.113	0.400	3.386	1.142
6.4556	0.114	0.409	4.216	1.158
6.5333	0.116	0.418	4.924	1.173
6.6111	0.117	0.427	5.468	1.188

6.6889	0.119	0.436	5.848	1.204
6.7667	0.121	0.446	6.205	1.220
6.8444	0.122	0.455	6.512	1.235
6.9222	0.124	0.465	6.805	1.251
7.0000	0.125	0.475	7.086	1.267
7.0778	0.127	0.484	7.357	1.283

Trapezoidal Pond 4

Bottom Length:	76.00 ft.	
Bottom Width:	76.00 ft.	
Depth:	7 ft.	
Volume at riser head:	1.2512 acre-feet.	
Infiltration On		
Infiltration rate:	10	
Infiltration safety factor:	1	
Wetted surface area On		
Total Volume Infiltrated (ac-ft.):		5259.861
Total Volume Through Riser (ac-ft.):		0
Total Volume Through Facility (ac-ft.):		5259.861
Percent Infiltrated:		100
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
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:	18 in.	
Element Flows To:		
Outlet 1	Outlet 2	

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.132	0.000	0.000	0.000
0.0778	0.134	0.010	0.000	1.353
0.1556	0.135	0.020	0.000	1.370
0.2333	0.137	0.031	0.000	1.386
0.3111	0.139	0.042	0.000	1.403
0.3889	0.140	0.053	0.000	1.420
0.4667	0.142	0.064	0.000	1.437
0.5444	0.144	0.075	0.000	1.454
0.6222	0.145	0.086	0.000	1.471
0.7000	0.147	0.098	0.000	1.488
0.7778	0.149	0.109	0.000	1.506
0.8556	0.151	0.121	0.000	1.523
0.9333	0.152	0.133	0.000	1.541
1.0111	0.154	0.145	0.000	1.559
1.0889	0.156	0.157	0.000	1.576
1.1667	0.158	0.169	0.000	1.594
1.2444	0.159	0.181	0.000	1.612
1.3222	0.161	0.194	0.000	1.630
1.4000	0.163	0.206	0.000	1.648
1.4778	0.165	0.219	0.000	1.667
1.5556	0.167	0.232	0.000	1.685
1.6333	0.169	0.245	0.000	1.704
1.7111	0.170	0.258	0.000	1.722
1.7889	0.172	0.272	0.000	1.741
1.8667	0.174	0.285	0.000	1.760
1.9444	0.176	0.299	0.000	1.779
2.0222	0.178	0.313	0.000	1.798
2.1000	0.180	0.327	0.000	1.817

2.1778	0.182	0.341	0.000	1.836
2.2556	0.184	0.355	0.000	1.855
2.3333	0.186	0.369	0.000	1.875
2.4111	0.187	0.384	0.000	1.894
2.4889	0.189	0.399	0.000	1.914
2.5667	0.191	0.414	0.000	1.933
2.6444	0.193	0.429	0.000	1.953
2.7222	0.195	0.444	0.000	1.973
2.8000	0.197	0.459	0.000	1.993
2.8778	0.199	0.474	0.000	2.013
2.9556	0.201	0.490	0.000	2.033
3.0333	0.203	0.506	0.000	2.054
3.1111	0.205	0.522	0.000	2.074
3.1889	0.207	0.538	0.000	2.095
3.2667	0.209	0.554	0.000	2.115
3.3444	0.211	0.570	0.000	2.136
3.4222	0.213	0.587	0.000	2.157
3.5000	0.216	0.604	0.000	2.178
3.5778	0.218	0.621	0.000	2.199
3.6556	0.220	0.638	0.000	2.220
3.7333	0.222	0.655	0.000	2.241
3.8111	0.224	0.672	0.000	2.262
3.8889	0.226	0.690	0.000	2.284
3.9667	0.228	0.707	0.000	2.305
4.0444	0.230	0.725	0.000	2.327
4.1222	0.232	0.743	0.000	2.348
4.2000	0.235	0.762	0.000	2.370
4.2778	0.237	0.780	0.000	2.392
4.3556	0.239	0.798	0.000	2.414
4.4333	0.241	0.817	0.000	2.436
4.5111	0.243	0.836	0.000	2.459
4.5889	0.246	0.855	0.000	2.481
4.6667	0.248	0.874	0.000	2.503
4.7444	0.250	0.894	0.000	2.526
4.8222	0.252	0.913	0.000	2.548
4.9000	0.255	0.933	0.000	2.571
4.9778	0.257	0.953	0.000	2.594
5.0556	0.259	0.973	0.000	2.617
5.1333	0.261	0.993	0.000	2.640
5.2111	0.264	1.014	0.000	2.663
5.2889	0.266	1.034	0.000	2.686
5.3667	0.268	1.055	0.000	2.710
5.4444	0.271	1.076	0.000	2.733
5.5222	0.273	1.097	0.000	2.757
5.6000	0.275	1.119	0.000	2.780
5.6778	0.278	1.140	0.000	2.804
5.7556	0.280	1.162	0.000	2.828
5.8333	0.282	1.184	0.000	2.852
5.9111	0.285	1.206	0.000	2.876
5.9889	0.287	1.228	0.000	2.900
6.0667	0.290	1.251	0.273	2.924
6.1444	0.292	1.273	0.869	2.948
6.2222	0.294	1.296	1.636	2.973
6.3000	0.297	1.319	2.501	2.997
6.3778	0.299	1.343	3.386	3.022
6.4556	0.302	1.366	4.216	3.047
6.5333	0.304	1.390	4.924	3.072
6.6111	0.307	1.413	5.468	3.096

6.6889	0.309	1.437	5.848	3.122
6.7667	0.312	1.461	6.205	3.147
6.8444	0.314	1.486	6.512	3.172
6.9222	0.317	1.510	6.805	3.197
7.0000	0.319	1.535	7.086	3.223
7.0778	0.322	1.560	7.357	3.248

Trapezoidal Pond 5

Bottom Length:	75.00 ft.	
Bottom Width:	75.00 ft.	
Depth:	7 ft.	
Volume at riser head:	1.2251 acre-feet.	
Infiltration On		
Infiltration rate:	10	
Infiltration safety factor:	1	
Wetted surface area On		
Total Volume Infiltrated (ac-ft.):		5568.782
Total Volume Through Riser (ac-ft.):		0.048
Total Volume Through Facility (ac-ft.):		5568.831
Percent Infiltrated:		100
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
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:	18 in.	
Element Flows To:		
Outlet 1	Outlet 2	

Pond Hydraulic Table

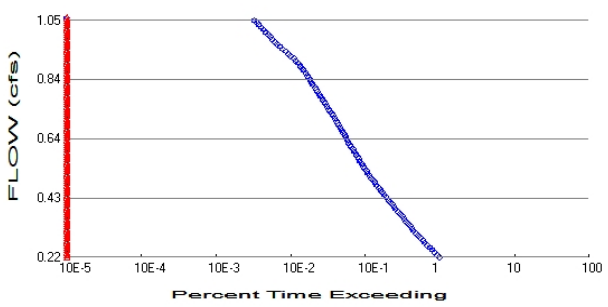
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.129	0.000	0.000	0.000
0.0778	0.130	0.010	0.000	1.318
0.1556	0.132	0.020	0.000	1.334
0.2333	0.134	0.030	0.000	1.351
0.3111	0.135	0.041	0.000	1.367
0.3889	0.137	0.051	0.000	1.384
0.4667	0.139	0.062	0.000	1.401
0.5444	0.140	0.073	0.000	1.418
0.6222	0.142	0.084	0.000	1.434
0.7000	0.144	0.095	0.000	1.452
0.7778	0.145	0.106	0.000	1.469
0.8556	0.147	0.118	0.000	1.486
0.9333	0.149	0.129	0.000	1.503
1.0111	0.150	0.141	0.000	1.521
1.0889	0.152	0.153	0.000	1.538
1.1667	0.154	0.165	0.000	1.556
1.2444	0.156	0.177	0.000	1.574
1.3222	0.157	0.189	0.000	1.592
1.4000	0.159	0.201	0.000	1.610
1.4778	0.161	0.214	0.000	1.628
1.5556	0.163	0.226	0.000	1.646
1.6333	0.165	0.239	0.000	1.664
1.7111	0.166	0.252	0.000	1.683
1.7889	0.168	0.265	0.000	1.701
1.8667	0.170	0.278	0.000	1.720
1.9444	0.172	0.292	0.000	1.738
2.0222	0.174	0.305	0.000	1.757
2.1000	0.176	0.319	0.000	1.776

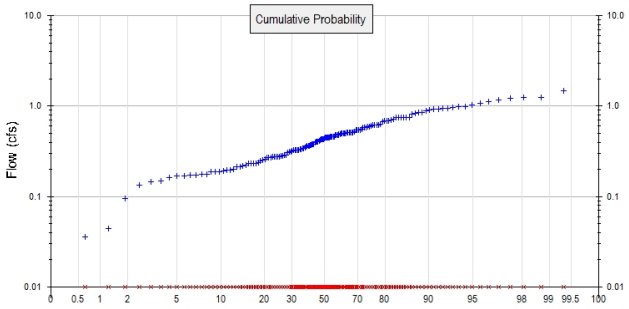
2.1778	0.178	0.333	0.000	1.795
2.2556	0.179	0.347	0.000	1.814
2.3333	0.181	0.361	0.000	1.833
2.4111	0.183	0.375	0.000	1.852
2.4889	0.185	0.389	0.000	1.872
2.5667	0.187	0.404	0.000	1.891
2.6444	0.189	0.418	0.000	1.911
2.7222	0.191	0.433	0.000	1.931
2.8000	0.193	0.448	0.000	1.950
2.8778	0.195	0.463	0.000	1.970
2.9556	0.197	0.479	0.000	1.990
3.0333	0.199	0.494	0.000	2.010
3.1111	0.201	0.510	0.000	2.030
3.1889	0.203	0.525	0.000	2.051
3.2667	0.205	0.541	0.000	2.071
3.3444	0.207	0.557	0.000	2.092
3.4222	0.209	0.574	0.000	2.112
3.5000	0.211	0.590	0.000	2.133
3.5778	0.213	0.606	0.000	2.154
3.6556	0.215	0.623	0.000	2.175
3.7333	0.217	0.640	0.000	2.196
3.8111	0.219	0.657	0.000	2.217
3.8889	0.222	0.674	0.000	2.238
3.9667	0.224	0.692	0.000	2.259
4.0444	0.226	0.709	0.000	2.281
4.1222	0.228	0.727	0.000	2.302
4.2000	0.230	0.745	0.000	2.324
4.2778	0.232	0.763	0.000	2.345
4.3556	0.234	0.781	0.000	2.367
4.4333	0.237	0.799	0.000	2.389
4.5111	0.239	0.818	0.000	2.411
4.5889	0.241	0.836	0.000	2.433
4.6667	0.243	0.855	0.000	2.455
4.7444	0.245	0.874	0.000	2.478
4.8222	0.248	0.893	0.000	2.500
4.9000	0.250	0.913	0.000	2.523
4.9778	0.252	0.932	0.000	2.545
5.0556	0.254	0.952	0.000	2.568
5.1333	0.257	0.972	0.000	2.591
5.2111	0.259	0.992	0.000	2.614
5.2889	0.261	1.012	0.000	2.637
5.3667	0.263	1.033	0.000	2.660
5.4444	0.266	1.053	0.000	2.683
5.5222	0.268	1.074	0.000	2.706
5.6000	0.270	1.095	0.000	2.730
5.6778	0.273	1.116	0.000	2.753
5.7556	0.275	1.138	0.000	2.777
5.8333	0.277	1.159	0.000	2.800
5.9111	0.280	1.181	0.000	2.824
5.9889	0.282	1.203	0.000	2.848
6.0667	0.284	1.225	0.273	2.872
6.1444	0.287	1.247	0.869	2.896
6.2222	0.289	1.269	1.636	2.921
6.3000	0.292	1.292	2.501	2.945
6.3778	0.294	1.315	3.386	2.969
6.4556	0.297	1.338	4.216	2.994
6.5333	0.299	1.361	4.924	3.018
6.6111	0.301	1.384	5.468	3.043

6.6889	0.304	1.408	5.848	3.068
6.7667	0.306	1.432	6.205	3.093
6.8444	0.309	1.456	6.512	3.118
6.9222	0.311	1.480	6.805	3.143
7.0000	0.314	1.504	7.086	3.168
7.0778	0.316	1.529	7.357	3.194

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 21.21
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 9.64
Total Impervious Area: 11.57

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.446954
5 year	0.695329
10 year	0.830286
25 year	0.967648
50 year	1.049292
100 year	1.116428

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1902	0.328	0.000
1903	0.273	0.000
1904	0.446	0.000
1905	0.215	0.000
1906	0.096	0.000
1907	0.686	0.000
1908	0.508	0.000
1909	0.502	0.000
1910	0.693	0.000
1911	0.451	0.000

1912	1.488	0.000
1913	0.713	0.000
1914	0.174	0.000
1915	0.287	0.000
1916	0.446	0.000
1917	0.149	0.000
1918	0.478	0.000
1919	0.353	0.000
1920	0.455	0.000
1921	0.508	0.000
1922	0.510	0.000
1923	0.410	0.000
1924	0.187	0.000
1925	0.232	0.000
1926	0.433	0.000
1927	0.281	0.000
1928	0.346	0.000
1929	0.710	0.000
1930	0.456	0.000
1931	0.422	0.000
1932	0.330	0.000
1933	0.319	0.000
1934	0.936	0.000
1935	0.434	0.000
1936	0.378	0.000
1937	0.603	0.000
1938	0.367	0.000
1939	0.023	0.000
1940	0.407	0.000
1941	0.194	0.000
1942	0.613	0.000
1943	0.316	0.000
1944	0.578	0.000
1945	0.511	0.000
1946	0.276	0.000
1947	0.175	0.000
1948	0.961	0.000
1949	0.824	0.000
1950	0.233	0.000
1951	0.287	0.000
1952	1.254	0.000
1953	1.131	0.000
1954	0.408	0.000
1955	0.334	0.000
1956	0.164	0.000
1957	0.579	0.000
1958	1.210	0.000
1959	0.748	0.000
1960	0.199	0.000
1961	0.752	0.000
1962	0.404	0.000
1963	0.194	0.000
1964	0.213	0.000
1965	0.842	0.000
1966	0.236	0.000
1967	0.361	0.000
1968	0.369	0.000
1969	0.368	0.000

1970	0.576	0.000
1971	0.908	0.000
1972	0.588	0.000
1973	0.750	0.000
1974	0.406	0.000
1975	0.953	0.000
1976	0.504	0.000
1977	0.170	0.000
1978	0.848	0.000
1979	0.233	0.000
1980	0.480	0.000
1981	0.460	0.000
1982	0.188	0.000
1983	0.752	0.000
1984	0.306	0.000
1985	0.499	0.000
1986	0.447	0.000
1987	0.853	0.000
1988	0.541	0.000
1989	0.486	0.000
1990	0.551	0.000
1991	0.431	0.000
1992	0.616	0.000
1993	0.598	0.000
1994	0.896	0.000
1995	0.172	0.000
1996	0.982	0.000
1997	0.377	0.000
1998	0.448	0.000
1999	0.036	0.000
2000	0.341	0.000
2001	0.175	0.000
2002	0.623	0.000
2003	0.543	0.000
2004	0.499	0.000
2005	0.919	0.000
2006	0.278	0.000
2007	0.279	0.000
2008	0.475	0.000
2009	0.326	0.000
2010	0.277	0.000
2011	0.224	0.000
2012	0.325	0.000
2013	0.254	0.000
2014	0.189	0.000
2015	0.362	0.000
2016	0.144	0.000
2017	0.689	0.000
2018	1.252	0.000
2019	1.168	0.000
2020	0.381	0.000
2021	0.620	0.000
2022	0.257	0.000
2023	0.522	0.000
2024	0.981	0.000
2025	0.461	0.000
2026	0.752	0.000
2027	0.270	0.000

2028	0.234	0.000
2029	0.510	0.000
2030	0.945	0.000
2031	0.312	0.000
2032	0.170	0.000
2033	0.273	0.000
2034	0.269	0.000
2035	1.066	0.000
2036	0.554	0.000
2037	0.132	0.000
2038	0.442	0.000
2039	0.044	0.000
2040	0.245	0.000
2041	0.331	0.000
2042	1.037	0.000
2043	0.501	0.000
2044	0.676	0.000
2045	0.460	0.000
2046	0.539	0.000
2047	0.397	0.000
2048	0.514	0.000
2049	0.459	0.000
2050	0.330	0.000
2051	0.479	0.000
2052	0.275	0.000
2053	0.492	0.000
2054	0.626	0.000
2055	0.194	0.000
2056	0.218	0.000
2057	0.338	0.000
2058	0.428	0.000
2059	0.756	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	1.4878	0.0000
2	1.2537	0.0000
3	1.2524	0.0000
4	1.2098	0.0000
5	1.1682	0.0000
6	1.1309	0.0000
7	1.0662	0.0000
8	1.0372	0.0000
9	0.9822	0.0000
10	0.9808	0.0000
11	0.9615	0.0000
12	0.9526	0.0000
13	0.9452	0.0000
14	0.9358	0.0000
15	0.9189	0.0000
16	0.9076	0.0000
17	0.8963	0.0000
18	0.8532	0.0000
19	0.8482	0.0000
20	0.8416	0.0000
21	0.8238	0.0000
22	0.7562	0.0000

23	0.7522	0.0000
24	0.7520	0.0000
25	0.7518	0.0000
26	0.7500	0.0000
27	0.7479	0.0000
28	0.7129	0.0000
29	0.7099	0.0000
30	0.6927	0.0000
31	0.6888	0.0000
32	0.6859	0.0000
33	0.6759	0.0000
34	0.6260	0.0000
35	0.6231	0.0000
36	0.6203	0.0000
37	0.6164	0.0000
38	0.6133	0.0000
39	0.6029	0.0000
40	0.5976	0.0000
41	0.5885	0.0000
42	0.5792	0.0000
43	0.5780	0.0000
44	0.5765	0.0000
45	0.5537	0.0000
46	0.5505	0.0000
47	0.5425	0.0000
48	0.5410	0.0000
49	0.5391	0.0000
50	0.5217	0.0000
51	0.5136	0.0000
52	0.5109	0.0000
53	0.5099	0.0000
54	0.5096	0.0000
55	0.5084	0.0000
56	0.5081	0.0000
57	0.5044	0.0000
58	0.5025	0.0000
59	0.5009	0.0000
60	0.4990	0.0000
61	0.4987	0.0000
62	0.4925	0.0000
63	0.4864	0.0000
64	0.4803	0.0000
65	0.4786	0.0000
66	0.4775	0.0000
67	0.4747	0.0000
68	0.4605	0.0000
69	0.4602	0.0000
70	0.4598	0.0000
71	0.4592	0.0000
72	0.4562	0.0000
73	0.4545	0.0000
74	0.4511	0.0000
75	0.4483	0.0000
76	0.4473	0.0000
77	0.4462	0.0000
78	0.4459	0.0000
79	0.4416	0.0000
80	0.4345	0.0000

81	0.4329	0.0000
82	0.4310	0.0000
83	0.4282	0.0000
84	0.4220	0.0000
85	0.4098	0.0000
86	0.4081	0.0000
87	0.4072	0.0000
88	0.4060	0.0000
89	0.4038	0.0000
90	0.3969	0.0000
91	0.3811	0.0000
92	0.3776	0.0000
93	0.3768	0.0000
94	0.3689	0.0000
95	0.3681	0.0000
96	0.3674	0.0000
97	0.3621	0.0000
98	0.3615	0.0000
99	0.3530	0.0000
100	0.3464	0.0000
101	0.3410	0.0000
102	0.3382	0.0000
103	0.3336	0.0000
104	0.3309	0.0000
105	0.3304	0.0000
106	0.3296	0.0000
107	0.3278	0.0000
108	0.3258	0.0000
109	0.3250	0.0000
110	0.3187	0.0000
111	0.3155	0.0000
112	0.3123	0.0000
113	0.3064	0.0000
114	0.2873	0.0000
115	0.2872	0.0000
116	0.2808	0.0000
117	0.2787	0.0000
118	0.2779	0.0000
119	0.2773	0.0000
120	0.2763	0.0000
121	0.2753	0.0000
122	0.2734	0.0000
123	0.2726	0.0000
124	0.2702	0.0000
125	0.2690	0.0000
126	0.2567	0.0000
127	0.2537	0.0000
128	0.2454	0.0000
129	0.2360	0.0000
130	0.2341	0.0000
131	0.2335	0.0000
132	0.2326	0.0000
133	0.2324	0.0000
134	0.2240	0.0000
135	0.2176	0.0000
136	0.2146	0.0000
137	0.2129	0.0000
138	0.1990	0.0000

139	0.1940	0.0000
140	0.1939	0.0000
141	0.1935	0.0000
142	0.1890	0.0000
143	0.1879	0.0000
144	0.1873	0.0000
145	0.1745	0.0000
146	0.1745	0.0000
147	0.1742	0.0000
148	0.1720	0.0000
149	0.1700	0.0000
150	0.1698	0.0000
151	0.1635	0.0000
152	0.1488	0.0000
153	0.1441	0.0000
154	0.1323	0.0000
155	0.0960	0.0000
156	0.0443	0.0000
157	0.0361	0.0000
158	0.0230	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2235	54525	0	0	Pass
0.2318	50542	0	0	Pass
0.2402	46631	0	0	Pass
0.2485	43484	0	0	Pass
0.2568	40553	0	0	Pass
0.2652	37512	0	0	Pass
0.2735	35063	0	0	Pass
0.2819	32814	0	0	Pass
0.2902	30365	0	0	Pass
0.2986	28393	0	0	Pass
0.3069	26598	0	0	Pass
0.3152	24825	0	0	Pass
0.3236	23390	0	0	Pass
0.3319	22072	0	0	Pass
0.3403	20670	0	0	Pass
0.3486	19507	0	0	Pass
0.3569	18404	0	0	Pass
0.3653	17252	0	0	Pass
0.3736	16232	0	0	Pass
0.3820	15246	0	0	Pass
0.3903	14299	0	0	Pass
0.3986	13496	0	0	Pass
0.4070	12748	0	0	Pass
0.4153	11961	0	0	Pass
0.4237	11296	0	0	Pass
0.4320	10559	0	0	Pass
0.4404	9994	0	0	Pass
0.4487	9418	0	0	Pass
0.4570	8847	0	0	Pass
0.4654	8349	0	0	Pass
0.4737	7895	0	0	Pass
0.4821	7462	0	0	Pass
0.4904	7047	0	0	Pass
0.4987	6643	0	0	Pass
0.5071	6277	0	0	Pass
0.5154	5989	0	0	Pass
0.5238	5728	0	0	Pass
0.5321	5440	0	0	Pass
0.5405	5209	0	0	Pass
0.5488	4968	0	0	Pass
0.5571	4706	0	0	Pass
0.5655	4522	0	0	Pass
0.5738	4350	0	0	Pass
0.5822	4159	0	0	Pass
0.5905	3964	0	0	Pass
0.5988	3782	0	0	Pass
0.6072	3583	0	0	Pass
0.6155	3424	0	0	Pass
0.6239	3277	0	0	Pass
0.6322	3135	0	0	Pass
0.6406	3032	0	0	Pass
0.6489	2938	0	0	Pass
0.6572	2815	0	0	Pass

0.6656	2686	0	0	Pass
0.6739	2564	0	0	Pass
0.6823	2454	0	0	Pass
0.6906	2365	0	0	Pass
0.6989	2267	0	0	Pass
0.7073	2143	0	0	Pass
0.7156	2044	0	0	Pass
0.7240	1960	0	0	Pass
0.7323	1862	0	0	Pass
0.7407	1786	0	0	Pass
0.7490	1702	0	0	Pass
0.7573	1620	0	0	Pass
0.7657	1565	0	0	Pass
0.7740	1482	0	0	Pass
0.7824	1410	0	0	Pass
0.7907	1346	0	0	Pass
0.7990	1270	0	0	Pass
0.8074	1219	0	0	Pass
0.8157	1168	0	0	Pass
0.8241	1103	0	0	Pass
0.8324	1057	0	0	Pass
0.8408	1010	0	0	Pass
0.8491	964	0	0	Pass
0.8574	921	0	0	Pass
0.8658	875	0	0	Pass
0.8741	815	0	0	Pass
0.8825	776	0	0	Pass
0.8908	738	0	0	Pass
0.8991	694	0	0	Pass
0.9075	640	0	0	Pass
0.9158	604	0	0	Pass
0.9242	555	0	0	Pass
0.9325	518	0	0	Pass
0.9409	482	0	0	Pass
0.9492	434	0	0	Pass
0.9575	395	0	0	Pass
0.9659	364	0	0	Pass
0.9742	340	0	0	Pass
0.9826	311	0	0	Pass
0.9909	297	0	0	Pass
0.9992	273	0	0	Pass
1.0076	253	0	0	Pass
1.0159	238	0	0	Pass
1.0243	223	0	0	Pass
1.0326	207	0	0	Pass
1.0410	195	0	0	Pass
1.0493	180	0	0	Pass

Water Quality

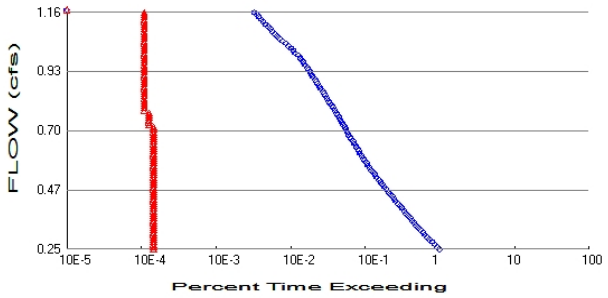
Water Quality BMP Flow and Volume for POC #1

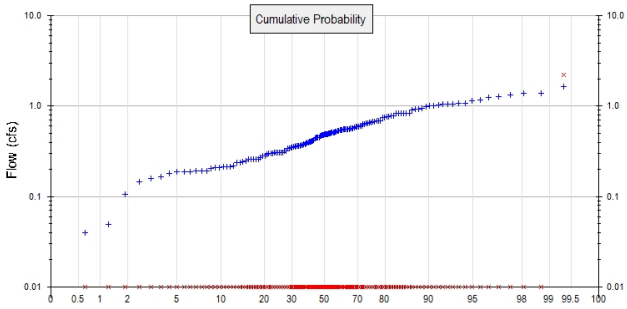
On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

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	☐	5728.60			☐	100.00			
Total Volume Infiltrated		5728.60	0.00	0.00		100.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

POC 2





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #2
Total Pervious Area: 23.4
Total Impervious Area: 0

Mitigated Landuse Totals for POC #2
Total Pervious Area: 13.34
Total Impervious Area: 10.06

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #2

Return Period	**Flow(cfs)**
2 year	0.493103
5 year	0.767124
10 year	0.916016
25 year	1.067561
50 year	1.157635
100 year	1.231703

Flow Frequency Return Periods for Mitigated. POC #2

Return Period	**Flow(cfs)**
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #2

Year	**Predeveloped**	**Mitigated**
1902	0.362	0.000
1903	0.301	0.000
1904	0.492	0.000
1905	0.237	0.000
1906	0.106	0.000
1907	0.757	0.000
1908	0.561	0.000
1909	0.554	0.000
1910	0.764	0.000
1911	0.498	0.000
1912	1.641	0.000

1913	0.787	0.000
1914	0.192	0.000
1915	0.317	0.000
1916	0.492	0.000
1917	0.164	0.000
1918	0.527	0.000
1919	0.389	0.000
1920	0.501	0.000
1921	0.561	0.000
1922	0.563	0.000
1923	0.452	0.000
1924	0.207	0.000
1925	0.256	0.000
1926	0.478	0.000
1927	0.310	0.000
1928	0.382	0.000
1929	0.783	0.000
1930	0.503	0.000
1931	0.466	0.000
1932	0.365	0.000
1933	0.352	0.000
1934	1.032	0.000
1935	0.479	0.000
1936	0.417	0.000
1937	0.665	0.000
1938	0.405	0.000
1939	0.025	0.000
1940	0.449	0.000
1941	0.214	0.000
1942	0.677	0.000
1943	0.348	0.000
1944	0.638	0.000
1945	0.564	0.000
1946	0.305	0.000
1947	0.193	0.000
1948	1.061	0.000
1949	0.909	0.000
1950	0.258	0.000
1951	0.317	0.000
1952	1.383	2.233
1953	1.248	0.000
1954	0.450	0.000
1955	0.368	0.000
1956	0.180	0.000
1957	0.639	0.000
1958	1.335	0.000
1959	0.825	0.000
1960	0.220	0.000
1961	0.830	0.000
1962	0.445	0.000
1963	0.213	0.000
1964	0.235	0.000
1965	0.928	0.000
1966	0.260	0.000
1967	0.399	0.000
1968	0.407	0.000
1969	0.406	0.000
1970	0.636	0.000

1971	1.001	0.000
1972	0.649	0.000
1973	0.827	0.000
1974	0.448	0.000
1975	1.051	0.000
1976	0.556	0.000
1977	0.187	0.000
1978	0.936	0.000
1979	0.257	0.000
1980	0.530	0.000
1981	0.507	0.000
1982	0.207	0.000
1983	0.830	0.000
1984	0.338	0.000
1985	0.550	0.000
1986	0.493	0.000
1987	0.941	0.000
1988	0.597	0.000
1989	0.537	0.000
1990	0.607	0.000
1991	0.476	0.000
1992	0.680	0.000
1993	0.659	0.000
1994	0.989	0.000
1995	0.190	0.000
1996	1.084	0.000
1997	0.416	0.000
1998	0.495	0.000
1999	0.040	0.000
2000	0.376	0.000
2001	0.193	0.000
2002	0.687	0.000
2003	0.599	0.000
2004	0.551	0.000
2005	1.014	0.000
2006	0.307	0.000
2007	0.308	0.000
2008	0.524	0.000
2009	0.359	0.000
2010	0.306	0.000
2011	0.247	0.000
2012	0.359	0.000
2013	0.280	0.000
2014	0.209	0.000
2015	0.400	0.000
2016	0.159	0.000
2017	0.760	0.000
2018	1.382	0.000
2019	1.289	0.000
2020	0.420	0.000
2021	0.684	0.000
2022	0.283	0.000
2023	0.576	0.000
2024	1.082	0.000
2025	0.508	0.000
2026	0.829	0.000
2027	0.298	0.000
2028	0.258	0.000

2029	0.562	0.000
2030	1.043	0.000
2031	0.345	0.000
2032	0.188	0.000
2033	0.302	0.000
2034	0.297	0.000
2035	1.176	0.000
2036	0.611	0.000
2037	0.146	0.000
2038	0.487	0.000
2039	0.049	0.000
2040	0.271	0.000
2041	0.365	0.000
2042	1.144	0.000
2043	0.553	0.000
2044	0.746	0.000
2045	0.508	0.000
2046	0.595	0.000
2047	0.438	0.000
2048	0.567	0.000
2049	0.507	0.000
2050	0.364	0.000
2051	0.528	0.000
2052	0.304	0.000
2053	0.543	0.000
2054	0.691	0.000
2055	0.214	0.000
2056	0.240	0.000
2057	0.373	0.000
2058	0.472	0.000
2059	0.834	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #2

Rank	Predeveloped	Mitigated
1	1.6414	2.2328
2	1.3832	0.0000
3	1.3818	0.0000
4	1.3348	0.0000
5	1.2888	0.0000
6	1.2477	0.0000
7	1.1763	0.0000
8	1.1443	0.0000
9	1.0837	0.0000
10	1.0821	0.0000
11	1.0608	0.0000
12	1.0509	0.0000
13	1.0428	0.0000
14	1.0325	0.0000
15	1.0137	0.0000
16	1.0013	0.0000
17	0.9888	0.0000
18	0.9413	0.0000
19	0.9357	0.0000
20	0.9285	0.0000
21	0.9089	0.0000
22	0.8343	0.0000
23	0.8299	0.0000

24	0.8296	0.0000
25	0.8295	0.0000
26	0.8275	0.0000
27	0.8252	0.0000
28	0.7865	0.0000
29	0.7832	0.0000
30	0.7642	0.0000
31	0.7599	0.0000
32	0.7568	0.0000
33	0.7456	0.0000
34	0.6906	0.0000
35	0.6875	0.0000
36	0.6843	0.0000
37	0.6801	0.0000
38	0.6766	0.0000
39	0.6651	0.0000
40	0.6593	0.0000
41	0.6492	0.0000
42	0.6390	0.0000
43	0.6377	0.0000
44	0.6360	0.0000
45	0.6109	0.0000
46	0.6073	0.0000
47	0.5986	0.0000
48	0.5969	0.0000
49	0.5948	0.0000
50	0.5755	0.0000
51	0.5667	0.0000
52	0.5637	0.0000
53	0.5625	0.0000
54	0.5622	0.0000
55	0.5609	0.0000
56	0.5605	0.0000
57	0.5565	0.0000
58	0.5544	0.0000
59	0.5526	0.0000
60	0.5506	0.0000
61	0.5502	0.0000
62	0.5433	0.0000
63	0.5366	0.0000
64	0.5299	0.0000
65	0.5280	0.0000
66	0.5268	0.0000
67	0.5237	0.0000
68	0.5081	0.0000
69	0.5077	0.0000
70	0.5073	0.0000
71	0.5066	0.0000
72	0.5033	0.0000
73	0.5015	0.0000
74	0.4976	0.0000
75	0.4945	0.0000
76	0.4935	0.0000
77	0.4922	0.0000
78	0.4920	0.0000
79	0.4872	0.0000
80	0.4793	0.0000
81	0.4776	0.0000

82	0.4755	0.0000
83	0.4724	0.0000
84	0.4656	0.0000
85	0.4522	0.0000
86	0.4502	0.0000
87	0.4492	0.0000
88	0.4479	0.0000
89	0.4455	0.0000
90	0.4379	0.0000
91	0.4204	0.0000
92	0.4166	0.0000
93	0.4157	0.0000
94	0.4069	0.0000
95	0.4061	0.0000
96	0.4054	0.0000
97	0.3995	0.0000
98	0.3988	0.0000
99	0.3895	0.0000
100	0.3822	0.0000
101	0.3762	0.0000
102	0.3731	0.0000
103	0.3680	0.0000
104	0.3651	0.0000
105	0.3645	0.0000
106	0.3636	0.0000
107	0.3616	0.0000
108	0.3594	0.0000
109	0.3585	0.0000
110	0.3516	0.0000
111	0.3481	0.0000
112	0.3446	0.0000
113	0.3381	0.0000
114	0.3169	0.0000
115	0.3169	0.0000
116	0.3097	0.0000
117	0.3075	0.0000
118	0.3066	0.0000
119	0.3059	0.0000
120	0.3048	0.0000
121	0.3037	0.0000
122	0.3017	0.0000
123	0.3008	0.0000
124	0.2981	0.0000
125	0.2968	0.0000
126	0.2833	0.0000
127	0.2799	0.0000
128	0.2708	0.0000
129	0.2603	0.0000
130	0.2583	0.0000
131	0.2576	0.0000
132	0.2566	0.0000
133	0.2564	0.0000
134	0.2471	0.0000
135	0.2400	0.0000
136	0.2368	0.0000
137	0.2349	0.0000
138	0.2195	0.0000
139	0.2140	0.0000

140	0.2140	0.0000
141	0.2135	0.0000
142	0.2085	0.0000
143	0.2073	0.0000
144	0.2066	0.0000
145	0.1925	0.0000
146	0.1925	0.0000
147	0.1922	0.0000
148	0.1897	0.0000
149	0.1876	0.0000
150	0.1873	0.0000
151	0.1804	0.0000
152	0.1642	0.0000
153	0.1590	0.0000
154	0.1460	0.0000
155	0.1059	0.0000
156	0.0489	0.0000
157	0.0398	0.0000
158	0.0254	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2466	54536	8	0	Pass
0.2558	50476	8	0	Pass
0.2650	46919	8	0	Pass
0.2742	43368	8	0	Pass
0.2834	40359	8	0	Pass
0.2926	37606	8	0	Pass
0.3018	35113	8	0	Pass
0.3110	32814	8	0	Pass
0.3202	30354	8	0	Pass
0.3294	28354	8	0	Pass
0.3386	26526	8	0	Pass
0.3478	24908	8	0	Pass
0.3570	23457	8	0	Pass
0.3662	21944	8	0	Pass
0.3754	20681	8	0	Pass
0.3846	19501	8	0	Pass
0.3938	18376	8	0	Pass
0.4030	17213	8	0	Pass
0.4122	16177	8	0	Pass
0.4214	15174	8	0	Pass
0.4306	14316	8	0	Pass
0.4398	13507	8	0	Pass
0.4490	12659	8	0	Pass
0.4582	11950	8	0	Pass
0.4674	11274	8	0	Pass
0.4766	10615	8	0	Pass
0.4858	10022	8	0	Pass
0.4950	9374	8	0	Pass
0.5042	8859	8	0	Pass
0.5134	8349	8	0	Pass
0.5226	7889	8	0	Pass
0.5318	7490	8	0	Pass
0.5410	7030	8	0	Pass
0.5502	6620	8	0	Pass
0.5594	6282	8	0	Pass
0.5687	6000	8	0	Pass
0.5779	5728	8	0	Pass
0.5871	5437	8	0	Pass
0.5963	5201	8	0	Pass
0.6055	4953	8	0	Pass
0.6147	4713	8	0	Pass
0.6239	4529	8	0	Pass
0.6331	4335	8	0	Pass
0.6423	4159	8	0	Pass
0.6515	3964	8	0	Pass
0.6607	3776	8	0	Pass
0.6699	3593	8	0	Pass
0.6791	3414	8	0	Pass
0.6883	3267	8	0	Pass
0.6975	3138	8	0	Pass
0.7067	3032	8	0	Pass
0.7159	2938	8	0	Pass
0.7251	2814	7	0	Pass

0.7343	2684	7	0	Pass
0.7435	2560	7	0	Pass
0.7527	2461	7	0	Pass
0.7619	2367	7	0	Pass
0.7711	2256	7	0	Pass
0.7803	2143	6	0	Pass
0.7895	2043	6	0	Pass
0.7987	1955	6	0	Pass
0.8079	1866	6	0	Pass
0.8171	1778	6	0	Pass
0.8263	1695	6	0	Pass
0.8355	1620	6	0	Pass
0.8447	1565	6	0	Pass
0.8539	1489	6	0	Pass
0.8631	1407	6	0	Pass
0.8723	1340	6	0	Pass
0.8815	1275	6	0	Pass
0.8908	1222	6	0	Pass
0.9000	1169	6	0	Pass
0.9092	1103	6	0	Pass
0.9184	1057	6	0	Pass
0.9276	1008	6	0	Pass
0.9368	966	6	0	Pass
0.9460	922	6	0	Pass
0.9552	872	6	0	Pass
0.9644	815	6	0	Pass
0.9736	777	6	0	Pass
0.9828	738	6	0	Pass
0.9920	695	6	0	Pass
1.0012	637	6	0	Pass
1.0104	602	6	0	Pass
1.0196	558	6	1	Pass
1.0288	519	6	1	Pass
1.0380	482	6	1	Pass
1.0472	434	6	1	Pass
1.0564	394	6	1	Pass
1.0656	364	6	1	Pass
1.0748	342	6	1	Pass
1.0840	310	6	1	Pass
1.0932	296	6	2	Pass
1.1024	273	6	2	Pass
1.1116	253	6	2	Pass
1.1208	237	6	2	Pass
1.1300	223	6	2	Pass
1.1392	206	6	2	Pass
1.1484	195	6	3	Pass
1.1576	180	6	3	Pass

Water Quality

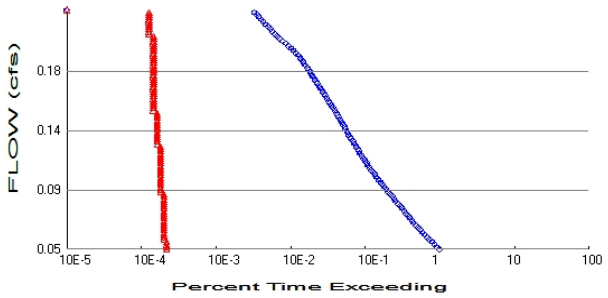
Water Quality BMP Flow and Volume for POC #2

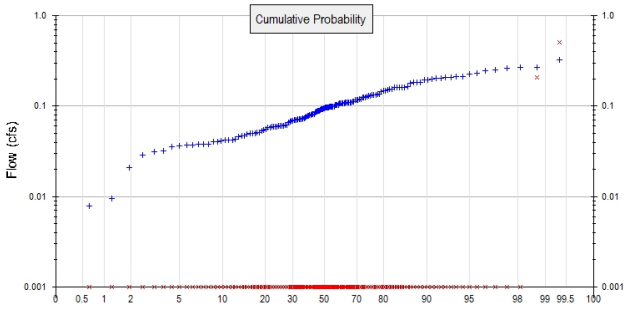
On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

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 2 POC	☐	5746.58			☐	100.00			
Total Volume Infiltrated		5746.58	0.00	0.00		100.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

POC 3





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #3
Total Pervious Area: 4.59
Total Impervious Area: 0

Mitigated Landuse Totals for POC #3
Total Pervious Area: 0
Total Impervious Area: 4.59

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #3

Return Period	**Flow(cfs)**
2 year	0.096724
5 year	0.150474
10 year	0.17968
25 year	0.209406
50 year	0.227075
100 year	0.241603

Flow Frequency Return Periods for Mitigated. POC #3

Return Period	**Flow(cfs)**
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #3

Year	**Predeveloped**	**Mitigated**
1902	0.071	0.000
1903	0.059	0.000
1904	0.097	0.000
1905	0.046	0.000
1906	0.021	0.000
1907	0.148	0.000
1908	0.110	0.000
1909	0.109	0.000
1910	0.150	0.000
1911	0.098	0.000
1912	0.322	0.000

1913	0.154	0.000
1914	0.038	0.000
1915	0.062	0.000
1916	0.097	0.000
1917	0.032	0.000
1918	0.103	0.000
1919	0.076	0.000
1920	0.098	0.000
1921	0.110	0.000
1922	0.110	0.000
1923	0.089	0.000
1924	0.041	0.000
1925	0.050	0.000
1926	0.094	0.000
1927	0.061	0.000
1928	0.075	0.000
1929	0.154	0.000
1930	0.099	0.000
1931	0.091	0.000
1932	0.071	0.000
1933	0.069	0.000
1934	0.203	0.000
1935	0.094	0.000
1936	0.082	0.000
1937	0.130	0.000
1938	0.080	0.000
1939	0.005	0.000
1940	0.088	0.000
1941	0.042	0.000
1942	0.133	0.000
1943	0.068	0.000
1944	0.125	0.000
1945	0.111	0.000
1946	0.060	0.000
1947	0.038	0.000
1948	0.208	0.000
1949	0.178	0.000
1950	0.051	0.000
1951	0.062	0.000
1952	0.271	0.508
1953	0.245	0.209
1954	0.088	0.000
1955	0.072	0.000
1956	0.035	0.000
1957	0.125	0.000
1958	0.262	0.000
1959	0.162	0.000
1960	0.043	0.000
1961	0.163	0.000
1962	0.087	0.000
1963	0.042	0.000
1964	0.046	0.000
1965	0.182	0.000
1966	0.051	0.000
1967	0.078	0.000
1968	0.080	0.000
1969	0.080	0.000
1970	0.125	0.000

1971	0.196	0.000
1972	0.127	0.000
1973	0.162	0.000
1974	0.088	0.000
1975	0.206	0.000
1976	0.109	0.000
1977	0.037	0.000
1978	0.184	0.000
1979	0.050	0.000
1980	0.104	0.000
1981	0.100	0.000
1982	0.041	0.000
1983	0.163	0.000
1984	0.066	0.000
1985	0.108	0.000
1986	0.097	0.000
1987	0.185	0.000
1988	0.117	0.000
1989	0.105	0.000
1990	0.119	0.000
1991	0.093	0.000
1992	0.133	0.000
1993	0.129	0.000
1994	0.194	0.000
1995	0.037	0.000
1996	0.213	0.000
1997	0.082	0.000
1998	0.097	0.000
1999	0.008	0.000
2000	0.074	0.000
2001	0.038	0.000
2002	0.135	0.000
2003	0.117	0.000
2004	0.108	0.000
2005	0.199	0.000
2006	0.060	0.000
2007	0.060	0.000
2008	0.103	0.000
2009	0.071	0.000
2010	0.060	0.000
2011	0.048	0.000
2012	0.070	0.000
2013	0.055	0.000
2014	0.041	0.000
2015	0.078	0.000
2016	0.031	0.000
2017	0.149	0.000
2018	0.271	0.000
2019	0.253	0.000
2020	0.082	0.000
2021	0.134	0.000
2022	0.056	0.000
2023	0.113	0.000
2024	0.212	0.000
2025	0.100	0.000
2026	0.163	0.000
2027	0.058	0.000
2028	0.051	0.000

2029	0.110	0.000
2030	0.205	0.000
2031	0.068	0.000
2032	0.037	0.000
2033	0.059	0.000
2034	0.058	0.000
2035	0.231	0.000
2036	0.120	0.000
2037	0.029	0.000
2038	0.096	0.000
2039	0.010	0.000
2040	0.053	0.000
2041	0.072	0.000
2042	0.224	0.000
2043	0.108	0.000
2044	0.146	0.000
2045	0.100	0.000
2046	0.117	0.000
2047	0.086	0.000
2048	0.111	0.000
2049	0.099	0.000
2050	0.071	0.000
2051	0.104	0.000
2052	0.060	0.000
2053	0.107	0.000
2054	0.135	0.000
2055	0.042	0.000
2056	0.047	0.000
2057	0.073	0.000
2058	0.093	0.000
2059	0.164	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #3

Rank	Predeveloped	Mitigated
1	0.3220	0.5078
2	0.2713	0.2091
3	0.2710	0.0000
4	0.2618	0.0000
5	0.2528	0.0000
6	0.2447	0.0000
7	0.2307	0.0000
8	0.2245	0.0000
9	0.2126	0.0000
10	0.2123	0.0000
11	0.2081	0.0000
12	0.2061	0.0000
13	0.2045	0.0000
14	0.2025	0.0000
15	0.1988	0.0000
16	0.1964	0.0000
17	0.1940	0.0000
18	0.1846	0.0000
19	0.1835	0.0000
20	0.1821	0.0000
21	0.1783	0.0000
22	0.1636	0.0000
23	0.1628	0.0000

24	0.1627	0.0000
25	0.1627	0.0000
26	0.1623	0.0000
27	0.1619	0.0000
28	0.1543	0.0000
29	0.1536	0.0000
30	0.1499	0.0000
31	0.1491	0.0000
32	0.1484	0.0000
33	0.1463	0.0000
34	0.1355	0.0000
35	0.1349	0.0000
36	0.1342	0.0000
37	0.1334	0.0000
38	0.1327	0.0000
39	0.1305	0.0000
40	0.1293	0.0000
41	0.1274	0.0000
42	0.1253	0.0000
43	0.1251	0.0000
44	0.1248	0.0000
45	0.1198	0.0000
46	0.1191	0.0000
47	0.1174	0.0000
48	0.1171	0.0000
49	0.1167	0.0000
50	0.1129	0.0000
51	0.1112	0.0000
52	0.1106	0.0000
53	0.1103	0.0000
54	0.1103	0.0000
55	0.1100	0.0000
56	0.1099	0.0000
57	0.1092	0.0000
58	0.1087	0.0000
59	0.1084	0.0000
60	0.1080	0.0000
61	0.1079	0.0000
62	0.1066	0.0000
63	0.1053	0.0000
64	0.1039	0.0000
65	0.1036	0.0000
66	0.1033	0.0000
67	0.1027	0.0000
68	0.0997	0.0000
69	0.0996	0.0000
70	0.0995	0.0000
71	0.0994	0.0000
72	0.0987	0.0000
73	0.0984	0.0000
74	0.0976	0.0000
75	0.0970	0.0000
76	0.0968	0.0000
77	0.0966	0.0000
78	0.0965	0.0000
79	0.0956	0.0000
80	0.0940	0.0000
81	0.0937	0.0000

82	0.0933	0.0000
83	0.0927	0.0000
84	0.0913	0.0000
85	0.0887	0.0000
86	0.0883	0.0000
87	0.0881	0.0000
88	0.0879	0.0000
89	0.0874	0.0000
90	0.0859	0.0000
91	0.0825	0.0000
92	0.0817	0.0000
93	0.0815	0.0000
94	0.0798	0.0000
95	0.0797	0.0000
96	0.0795	0.0000
97	0.0784	0.0000
98	0.0782	0.0000
99	0.0764	0.0000
100	0.0750	0.0000
101	0.0738	0.0000
102	0.0732	0.0000
103	0.0722	0.0000
104	0.0716	0.0000
105	0.0715	0.0000
106	0.0713	0.0000
107	0.0709	0.0000
108	0.0705	0.0000
109	0.0703	0.0000
110	0.0690	0.0000
111	0.0683	0.0000
112	0.0676	0.0000
113	0.0663	0.0000
114	0.0622	0.0000
115	0.0622	0.0000
116	0.0608	0.0000
117	0.0603	0.0000
118	0.0601	0.0000
119	0.0600	0.0000
120	0.0598	0.0000
121	0.0596	0.0000
122	0.0592	0.0000
123	0.0590	0.0000
124	0.0585	0.0000
125	0.0582	0.0000
126	0.0556	0.0000
127	0.0549	0.0000
128	0.0531	0.0000
129	0.0511	0.0000
130	0.0507	0.0000
131	0.0505	0.0000
132	0.0503	0.0000
133	0.0503	0.0000
134	0.0485	0.0000
135	0.0471	0.0000
136	0.0464	0.0000
137	0.0461	0.0000
138	0.0431	0.0000
139	0.0420	0.0000

140	0.0420	0.0000
141	0.0419	0.0000
142	0.0409	0.0000
143	0.0407	0.0000
144	0.0405	0.0000
145	0.0378	0.0000
146	0.0378	0.0000
147	0.0377	0.0000
148	0.0372	0.0000
149	0.0368	0.0000
150	0.0367	0.0000
151	0.0354	0.0000
152	0.0322	0.0000
153	0.0312	0.0000
154	0.0286	0.0000
155	0.0208	0.0000
156	0.0096	0.0000
157	0.0078	0.0000
158	0.0050	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0484	54282	12	0	Pass
0.0502	50171	12	0	Pass
0.0520	46570	12	0	Pass
0.0538	43318	12	0	Pass
0.0556	40260	11	0	Pass
0.0574	37456	11	0	Pass
0.0592	34913	11	0	Pass
0.0610	32564	11	0	Pass
0.0628	30321	11	0	Pass
0.0646	28265	11	0	Pass
0.0664	26432	11	0	Pass
0.0682	24792	11	0	Pass
0.0700	23285	11	0	Pass
0.0718	21928	11	0	Pass
0.0736	20637	11	0	Pass
0.0754	19423	11	0	Pass
0.0772	18282	11	0	Pass
0.0791	17213	11	0	Pass
0.0809	16155	11	0	Pass
0.0827	15141	11	0	Pass
0.0845	14266	11	0	Pass
0.0863	13446	11	0	Pass
0.0881	12665	11	0	Pass
0.0899	11933	11	0	Pass
0.0917	11235	10	0	Pass
0.0935	10559	10	0	Pass
0.0953	9972	10	0	Pass
0.0971	9374	10	0	Pass
0.0989	8847	10	0	Pass
0.1007	8332	10	0	Pass
0.1025	7861	10	0	Pass
0.1043	7462	10	0	Pass
0.1061	7036	10	0	Pass
0.1079	6620	10	0	Pass
0.1097	6277	10	0	Pass
0.1115	5983	10	0	Pass
0.1133	5712	10	0	Pass
0.1152	5446	10	0	Pass
0.1170	5202	10	0	Pass
0.1188	4950	10	0	Pass
0.1206	4708	10	0	Pass
0.1224	4519	10	0	Pass
0.1242	4343	10	0	Pass
0.1260	4160	10	0	Pass
0.1278	3964	9	0	Pass
0.1296	3773	9	0	Pass
0.1314	3576	9	0	Pass
0.1332	3411	9	0	Pass
0.1350	3260	9	0	Pass
0.1368	3134	9	0	Pass
0.1386	3027	9	0	Pass
0.1404	2928	9	0	Pass
0.1422	2815	9	0	Pass

0.1440	2684	9	0	Pass
0.1458	2556	9	0	Pass
0.1476	2454	9	0	Pass
0.1495	2363	9	0	Pass
0.1513	2257	9	0	Pass
0.1531	2143	8	0	Pass
0.1549	2042	8	0	Pass
0.1567	1952	8	0	Pass
0.1585	1862	8	0	Pass
0.1603	1781	8	0	Pass
0.1621	1696	8	0	Pass
0.1639	1620	8	0	Pass
0.1657	1564	8	0	Pass
0.1675	1482	8	0	Pass
0.1693	1407	8	0	Pass
0.1711	1338	8	0	Pass
0.1729	1270	8	0	Pass
0.1747	1218	8	0	Pass
0.1765	1163	8	0	Pass
0.1783	1103	8	0	Pass
0.1801	1055	8	0	Pass
0.1819	1006	8	0	Pass
0.1838	964	8	0	Pass
0.1856	920	8	0	Pass
0.1874	873	8	0	Pass
0.1892	815	8	0	Pass
0.1910	776	8	1	Pass
0.1928	738	8	1	Pass
0.1946	695	8	1	Pass
0.1964	640	8	1	Pass
0.1982	602	8	1	Pass
0.2000	558	8	1	Pass
0.2018	517	8	1	Pass
0.2036	477	8	1	Pass
0.2054	434	8	1	Pass
0.2072	394	8	2	Pass
0.2090	363	8	2	Pass
0.2108	339	7	2	Pass
0.2126	310	7	2	Pass
0.2144	296	7	2	Pass
0.2162	273	7	2	Pass
0.2180	252	7	2	Pass
0.2199	237	7	2	Pass
0.2217	223	7	3	Pass
0.2235	206	7	3	Pass
0.2253	195	7	3	Pass
0.2271	180	7	3	Pass

Water Quality

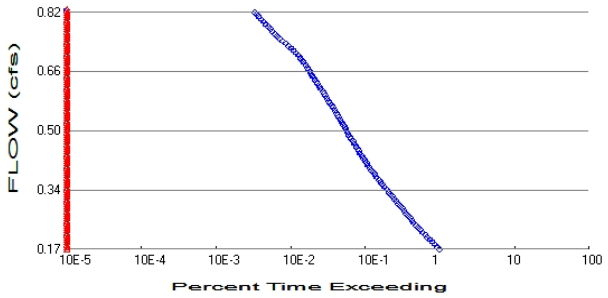
Water Quality BMP Flow and Volume for POC #3

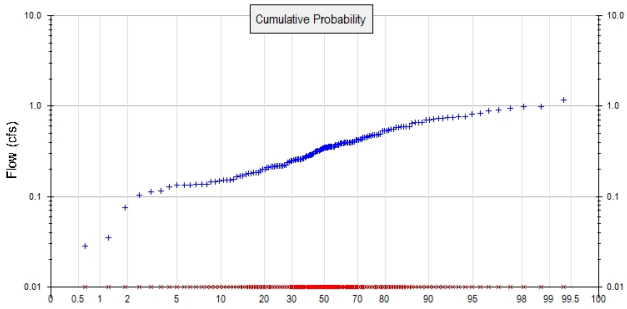
On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

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 3 POC	☐	1681.35			☐	100.00			
Total Volume Infiltrated		1681.35	0.00	0.00		100.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

POC 4





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #4
Total Pervious Area: 16.57
Total Impervious Area: 0

Mitigated Landuse Totals for POC #4
Total Pervious Area: 6.06
Total Impervious Area: 10.51

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #4

Return Period	**Flow(cfs)**
2 year	0.349176
5 year	0.543216
10 year	0.648649
25 year	0.755961
50 year	0.819744
100 year	0.872193

Flow Frequency Return Periods for Mitigated. POC #4

Return Period	**Flow(cfs)**
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #4

Year	**Predeveloped**	**Mitigated**
1902	0.256	0.000
1903	0.213	0.000
1904	0.348	0.000
1905	0.168	0.000
1906	0.075	0.000
1907	0.536	0.000
1908	0.397	0.000
1909	0.393	0.000
1910	0.541	0.000
1911	0.352	0.000
1912	1.162	0.000

1913	0.557	0.000
1914	0.136	0.000
1915	0.224	0.000
1916	0.349	0.000
1917	0.116	0.000
1918	0.373	0.000
1919	0.276	0.000
1920	0.355	0.000
1921	0.397	0.000
1922	0.398	0.000
1923	0.320	0.000
1924	0.146	0.000
1925	0.182	0.000
1926	0.338	0.000
1927	0.219	0.000
1928	0.271	0.000
1929	0.555	0.000
1930	0.356	0.000
1931	0.330	0.000
1932	0.258	0.000
1933	0.249	0.000
1934	0.731	0.000
1935	0.339	0.000
1936	0.295	0.000
1937	0.471	0.000
1938	0.287	0.000
1939	0.018	0.000
1940	0.318	0.000
1941	0.152	0.000
1942	0.479	0.000
1943	0.246	0.000
1944	0.452	0.000
1945	0.399	0.000
1946	0.216	0.000
1947	0.136	0.000
1948	0.751	0.000
1949	0.644	0.000
1950	0.182	0.000
1951	0.224	0.000
1952	0.979	0.000
1953	0.884	0.000
1954	0.319	0.000
1955	0.261	0.000
1956	0.128	0.000
1957	0.452	0.000
1958	0.945	0.000
1959	0.584	0.000
1960	0.155	0.000
1961	0.587	0.000
1962	0.315	0.000
1963	0.151	0.000
1964	0.166	0.000
1965	0.657	0.000
1966	0.184	0.000
1967	0.282	0.000
1968	0.288	0.000
1969	0.288	0.000
1970	0.450	0.000

1971	0.709	0.000
1972	0.460	0.000
1973	0.586	0.000
1974	0.317	0.000
1975	0.744	0.000
1976	0.394	0.000
1977	0.133	0.000
1978	0.663	0.000
1979	0.182	0.000
1980	0.375	0.000
1981	0.359	0.000
1982	0.147	0.000
1983	0.588	0.000
1984	0.239	0.000
1985	0.390	0.000
1986	0.349	0.000
1987	0.667	0.000
1988	0.423	0.000
1989	0.380	0.000
1990	0.430	0.000
1991	0.337	0.000
1992	0.482	0.000
1993	0.467	0.000
1994	0.700	0.000
1995	0.134	0.000
1996	0.767	0.000
1997	0.294	0.000
1998	0.350	0.000
1999	0.028	0.000
2000	0.266	0.000
2001	0.136	0.000
2002	0.487	0.000
2003	0.424	0.000
2004	0.390	0.000
2005	0.718	0.000
2006	0.217	0.000
2007	0.218	0.000
2008	0.371	0.000
2009	0.255	0.000
2010	0.217	0.000
2011	0.175	0.000
2012	0.254	0.000
2013	0.198	0.000
2014	0.148	0.000
2015	0.283	0.000
2016	0.113	0.000
2017	0.538	0.000
2018	0.978	0.000
2019	0.913	0.000
2020	0.298	0.000
2021	0.485	0.000
2022	0.201	0.000
2023	0.408	0.000
2024	0.766	0.000
2025	0.360	0.000
2026	0.587	0.000
2027	0.211	0.000
2028	0.183	0.000

2029	0.398	0.000
2030	0.738	0.000
2031	0.244	0.000
2032	0.133	0.000
2033	0.214	0.000
2034	0.210	0.000
2035	0.833	0.000
2036	0.433	0.000
2037	0.103	0.000
2038	0.345	0.000
2039	0.035	0.000
2040	0.192	0.000
2041	0.259	0.000
2042	0.810	0.000
2043	0.391	0.000
2044	0.528	0.000
2045	0.360	0.000
2046	0.421	0.000
2047	0.310	0.000
2048	0.401	0.000
2049	0.359	0.000
2050	0.257	0.000
2051	0.374	0.000
2052	0.215	0.000
2053	0.385	0.000
2054	0.489	0.000
2055	0.152	0.000
2056	0.170	0.000
2057	0.264	0.000
2058	0.335	0.000
2059	0.591	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #4

Rank	Predeveloped	Mitigated
1	1.1623	0.0000
2	0.9795	0.0000
3	0.9784	0.0000
4	0.9452	0.0000
5	0.9126	0.0000
6	0.8835	0.0000
7	0.8330	0.0000
8	0.8103	0.0000
9	0.7674	0.0000
10	0.7663	0.0000
11	0.7512	0.0000
12	0.7442	0.0000
13	0.7384	0.0000
14	0.7311	0.0000
15	0.7178	0.0000
16	0.7091	0.0000
17	0.7002	0.0000
18	0.6666	0.0000
19	0.6626	0.0000
20	0.6575	0.0000
21	0.6436	0.0000
22	0.5908	0.0000
23	0.5876	0.0000

24	0.5875	0.0000
25	0.5874	0.0000
26	0.5860	0.0000
27	0.5843	0.0000
28	0.5570	0.0000
29	0.5546	0.0000
30	0.5412	0.0000
31	0.5381	0.0000
32	0.5359	0.0000
33	0.5280	0.0000
34	0.4890	0.0000
35	0.4868	0.0000
36	0.4846	0.0000
37	0.4816	0.0000
38	0.4791	0.0000
39	0.4710	0.0000
40	0.4669	0.0000
41	0.4597	0.0000
42	0.4525	0.0000
43	0.4516	0.0000
44	0.4504	0.0000
45	0.4326	0.0000
46	0.4301	0.0000
47	0.4238	0.0000
48	0.4226	0.0000
49	0.4212	0.0000
50	0.4075	0.0000
51	0.4013	0.0000
52	0.3992	0.0000
53	0.3983	0.0000
54	0.3981	0.0000
55	0.3972	0.0000
56	0.3969	0.0000
57	0.3941	0.0000
58	0.3926	0.0000
59	0.3913	0.0000
60	0.3899	0.0000
61	0.3896	0.0000
62	0.3847	0.0000
63	0.3800	0.0000
64	0.3752	0.0000
65	0.3739	0.0000
66	0.3731	0.0000
67	0.3708	0.0000
68	0.3598	0.0000
69	0.3595	0.0000
70	0.3592	0.0000
71	0.3587	0.0000
72	0.3564	0.0000
73	0.3551	0.0000
74	0.3524	0.0000
75	0.3502	0.0000
76	0.3494	0.0000
77	0.3486	0.0000
78	0.3484	0.0000
79	0.3450	0.0000
80	0.3394	0.0000
81	0.3382	0.0000

82	0.3367	0.0000
83	0.3345	0.0000
84	0.3297	0.0000
85	0.3202	0.0000
86	0.3188	0.0000
87	0.3181	0.0000
88	0.3172	0.0000
89	0.3155	0.0000
90	0.3101	0.0000
91	0.2977	0.0000
92	0.2950	0.0000
93	0.2944	0.0000
94	0.2882	0.0000
95	0.2876	0.0000
96	0.2870	0.0000
97	0.2829	0.0000
98	0.2824	0.0000
99	0.2758	0.0000
100	0.2707	0.0000
101	0.2664	0.0000
102	0.2642	0.0000
103	0.2606	0.0000
104	0.2585	0.0000
105	0.2581	0.0000
106	0.2575	0.0000
107	0.2561	0.0000
108	0.2545	0.0000
109	0.2539	0.0000
110	0.2490	0.0000
111	0.2465	0.0000
112	0.2440	0.0000
113	0.2394	0.0000
114	0.2244	0.0000
115	0.2244	0.0000
116	0.2193	0.0000
117	0.2178	0.0000
118	0.2171	0.0000
119	0.2166	0.0000
120	0.2159	0.0000
121	0.2150	0.0000
122	0.2136	0.0000
123	0.2130	0.0000
124	0.2111	0.0000
125	0.2102	0.0000
126	0.2006	0.0000
127	0.1982	0.0000
128	0.1917	0.0000
129	0.1844	0.0000
130	0.1829	0.0000
131	0.1824	0.0000
132	0.1817	0.0000
133	0.1816	0.0000
134	0.1750	0.0000
135	0.1700	0.0000
136	0.1677	0.0000
137	0.1663	0.0000
138	0.1555	0.0000
139	0.1515	0.0000

140	0.1515	0.0000
141	0.1512	0.0000
142	0.1477	0.0000
143	0.1468	0.0000
144	0.1463	0.0000
145	0.1363	0.0000
146	0.1363	0.0000
147	0.1361	0.0000
148	0.1344	0.0000
149	0.1328	0.0000
150	0.1327	0.0000
151	0.1278	0.0000
152	0.1163	0.0000
153	0.1126	0.0000
154	0.1034	0.0000
155	0.0750	0.0000
156	0.0346	0.0000
157	0.0282	0.0000
158	0.0180	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1746	54658	0	0	Pass
0.1811	50226	0	0	Pass
0.1876	46886	0	0	Pass
0.1941	43379	0	0	Pass
0.2007	40548	0	0	Pass
0.2072	37523	0	0	Pass
0.2137	35163	0	0	Pass
0.2202	32637	0	0	Pass
0.2267	30570	0	0	Pass
0.2332	28343	0	0	Pass
0.2398	26614	0	0	Pass
0.2463	24842	0	0	Pass
0.2528	23473	0	0	Pass
0.2593	21983	0	0	Pass
0.2658	20781	0	0	Pass
0.2723	19479	0	0	Pass
0.2789	18426	0	0	Pass
0.2854	17279	0	0	Pass
0.2919	16293	0	0	Pass
0.2984	15191	0	0	Pass
0.3049	14382	0	0	Pass
0.3114	13496	0	0	Pass
0.3180	12781	0	0	Pass
0.3245	11983	0	0	Pass
0.3310	11341	0	0	Pass
0.3375	10620	0	0	Pass
0.3440	9972	0	0	Pass
0.3505	9418	0	0	Pass
0.3571	8847	0	0	Pass
0.3636	8377	0	0	Pass
0.3701	7861	0	0	Pass
0.3766	7490	0	0	Pass
0.3831	7036	0	0	Pass
0.3896	6643	0	0	Pass
0.3962	6277	0	0	Pass
0.4027	6005	0	0	Pass
0.4092	5712	0	0	Pass
0.4157	5467	0	0	Pass
0.4222	5203	0	0	Pass
0.4287	4973	0	0	Pass
0.4353	4708	0	0	Pass
0.4418	4533	0	0	Pass
0.4483	4343	0	0	Pass
0.4548	4176	0	0	Pass
0.4613	3964	0	0	Pass
0.4678	3788	0	0	Pass
0.4744	3587	0	0	Pass
0.4809	3433	0	0	Pass
0.4874	3270	0	0	Pass
0.4939	3146	0	0	Pass
0.5004	3032	0	0	Pass
0.5069	2942	0	0	Pass
0.5135	2816	0	0	Pass

0.5200	2698	0	0	Pass
0.5265	2562	0	0	Pass
0.5330	2451	0	0	Pass
0.5395	2365	0	0	Pass
0.5460	2256	0	0	Pass
0.5526	2150	0	0	Pass
0.5591	2038	0	0	Pass
0.5656	1957	0	0	Pass
0.5721	1860	0	0	Pass
0.5786	1787	0	0	Pass
0.5851	1691	0	0	Pass
0.5917	1625	0	0	Pass
0.5982	1561	0	0	Pass
0.6047	1489	0	0	Pass
0.6112	1409	0	0	Pass
0.6177	1351	0	0	Pass
0.6242	1275	0	0	Pass
0.6308	1222	0	0	Pass
0.6373	1164	0	0	Pass
0.6438	1109	0	0	Pass
0.6503	1057	0	0	Pass
0.6568	1012	0	0	Pass
0.6633	965	0	0	Pass
0.6699	922	0	0	Pass
0.6764	874	0	0	Pass
0.6829	817	0	0	Pass
0.6894	777	0	0	Pass
0.6959	742	0	0	Pass
0.7024	695	0	0	Pass
0.7090	648	0	0	Pass
0.7155	602	0	0	Pass
0.7220	560	0	0	Pass
0.7285	519	0	0	Pass
0.7350	477	0	0	Pass
0.7415	437	0	0	Pass
0.7481	394	0	0	Pass
0.7546	364	0	0	Pass
0.7611	339	0	0	Pass
0.7676	311	0	0	Pass
0.7741	296	0	0	Pass
0.7806	275	0	0	Pass
0.7872	252	0	0	Pass
0.7937	238	0	0	Pass
0.8002	223	0	0	Pass
0.8067	207	0	0	Pass
0.8132	195	0	0	Pass
0.8197	181	0	0	Pass

Water Quality

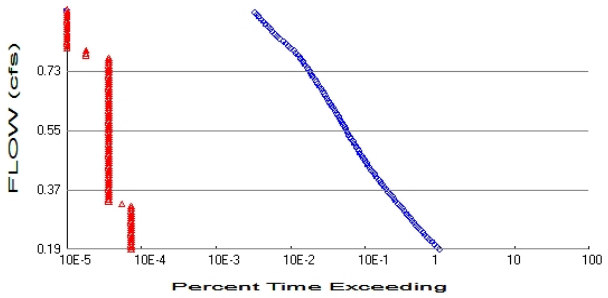
Water Quality BMP Flow and Volume for POC #4

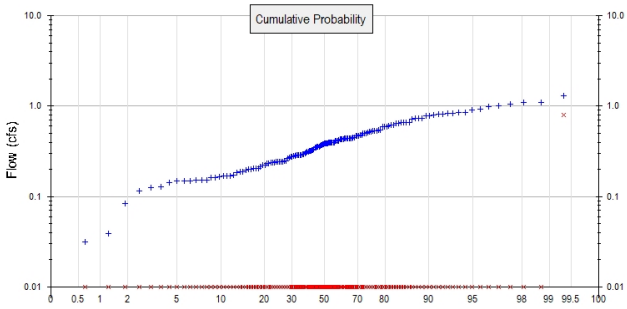
On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

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 4 POC	☐	4786.47			☐	100.00			
Total Volume Infiltrated		4786.47	0.00	0.00		100.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

POC 5





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #5
Total Pervious Area: 18.43
Total Impervious Area: 0

Mitigated Landuse Totals for POC #5
Total Pervious Area: 7.95
Total Impervious Area: 10.48

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #5

Return Period	**Flow(cfs)**
2 year	0.388372
5 year	0.604192
10 year	0.72146
25 year	0.840818
50 year	0.911762
100 year	0.970098

Flow Frequency Return Periods for Mitigated. POC #5

Return Period	**Flow(cfs)**
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #5

Year	**Predeveloped**	**Mitigated**
1902	0.285	0.000
1903	0.237	0.000
1904	0.387	0.000
1905	0.186	0.000
1906	0.083	0.000
1907	0.596	0.000
1908	0.441	0.000
1909	0.437	0.000
1910	0.602	0.000
1911	0.392	0.000
1912	1.293	0.000

1913	0.619	0.000
1914	0.151	0.000
1915	0.250	0.000
1916	0.388	0.000
1917	0.129	0.000
1918	0.415	0.000
1919	0.307	0.000
1920	0.395	0.000
1921	0.442	0.000
1922	0.443	0.000
1923	0.356	0.000
1924	0.163	0.000
1925	0.202	0.000
1926	0.376	0.000
1927	0.244	0.000
1928	0.301	0.000
1929	0.617	0.000
1930	0.396	0.000
1931	0.367	0.000
1932	0.287	0.000
1933	0.277	0.000
1934	0.813	0.000
1935	0.378	0.000
1936	0.328	0.000
1937	0.524	0.000
1938	0.319	0.000
1939	0.020	0.000
1940	0.354	0.000
1941	0.169	0.000
1942	0.533	0.000
1943	0.274	0.000
1944	0.502	0.000
1945	0.444	0.000
1946	0.240	0.000
1947	0.152	0.000
1948	0.835	0.000
1949	0.716	0.000
1950	0.203	0.000
1951	0.250	0.000
1952	1.089	0.798
1953	0.983	0.000
1954	0.355	0.000
1955	0.290	0.000
1956	0.142	0.000
1957	0.503	0.000
1958	1.051	0.000
1959	0.650	0.000
1960	0.173	0.000
1961	0.653	0.000
1962	0.351	0.000
1963	0.168	0.000
1964	0.185	0.000
1965	0.731	0.000
1966	0.205	0.000
1967	0.314	0.000
1968	0.321	0.000
1969	0.320	0.000
1970	0.501	0.000

1971	0.789	0.000
1972	0.511	0.000
1973	0.652	0.000
1974	0.353	0.000
1975	0.828	0.000
1976	0.438	0.000
1977	0.148	0.000
1978	0.737	0.000
1979	0.202	0.000
1980	0.417	0.000
1981	0.400	0.000
1982	0.163	0.000
1983	0.654	0.000
1984	0.266	0.000
1985	0.433	0.000
1986	0.389	0.000
1987	0.741	0.000
1988	0.470	0.000
1989	0.423	0.000
1990	0.478	0.000
1991	0.375	0.000
1992	0.536	0.000
1993	0.519	0.000
1994	0.779	0.000
1995	0.149	0.000
1996	0.853	0.000
1997	0.327	0.000
1998	0.390	0.000
1999	0.031	0.000
2000	0.296	0.000
2001	0.152	0.000
2002	0.541	0.000
2003	0.471	0.000
2004	0.434	0.000
2005	0.798	0.000
2006	0.241	0.000
2007	0.242	0.000
2008	0.412	0.000
2009	0.283	0.000
2010	0.241	0.000
2011	0.195	0.000
2012	0.282	0.000
2013	0.220	0.000
2014	0.164	0.000
2015	0.315	0.000
2016	0.125	0.000
2017	0.599	0.000
2018	1.088	0.000
2019	1.015	0.000
2020	0.331	0.000
2021	0.539	0.000
2022	0.223	0.000
2023	0.453	0.000
2024	0.852	0.000
2025	0.400	0.000
2026	0.653	0.000
2027	0.235	0.000
2028	0.203	0.000

2029	0.443	0.000
2030	0.821	0.000
2031	0.271	0.000
2032	0.148	0.000
2033	0.238	0.000
2034	0.234	0.000
2035	0.926	0.000
2036	0.481	0.000
2037	0.115	0.000
2038	0.384	0.000
2039	0.039	0.000
2040	0.213	0.000
2041	0.288	0.000
2042	0.901	0.000
2043	0.435	0.000
2044	0.587	0.000
2045	0.400	0.000
2046	0.468	0.000
2047	0.345	0.000
2048	0.446	0.000
2049	0.399	0.000
2050	0.286	0.000
2051	0.416	0.000
2052	0.239	0.000
2053	0.428	0.000
2054	0.544	0.000
2055	0.169	0.000
2056	0.189	0.000
2057	0.294	0.000
2058	0.372	0.000
2059	0.657	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #5

Rank	Predeveloped	Mitigated
1	1.2928	0.7984
2	1.0894	0.0000
3	1.0883	0.0000
4	1.0513	0.0000
5	1.0151	0.0000
6	0.9827	0.0000
7	0.9265	0.0000
8	0.9013	0.0000
9	0.8535	0.0000
10	0.8523	0.0000
11	0.8355	0.0000
12	0.8277	0.0000
13	0.8213	0.0000
14	0.8132	0.0000
15	0.7984	0.0000
16	0.7887	0.0000
17	0.7788	0.0000
18	0.7414	0.0000
19	0.7370	0.0000
20	0.7313	0.0000
21	0.7158	0.0000
22	0.6571	0.0000
23	0.6536	0.0000

24	0.6534	0.0000
25	0.6533	0.0000
26	0.6517	0.0000
27	0.6499	0.0000
28	0.6195	0.0000
29	0.6168	0.0000
30	0.6019	0.0000
31	0.5985	0.0000
32	0.5960	0.0000
33	0.5873	0.0000
34	0.5439	0.0000
35	0.5415	0.0000
36	0.5390	0.0000
37	0.5356	0.0000
38	0.5329	0.0000
39	0.5239	0.0000
40	0.5193	0.0000
41	0.5113	0.0000
42	0.5033	0.0000
43	0.5023	0.0000
44	0.5009	0.0000
45	0.4811	0.0000
46	0.4783	0.0000
47	0.4714	0.0000
48	0.4701	0.0000
49	0.4684	0.0000
50	0.4533	0.0000
51	0.4463	0.0000
52	0.4440	0.0000
53	0.4430	0.0000
54	0.4428	0.0000
55	0.4418	0.0000
56	0.4415	0.0000
57	0.4383	0.0000
58	0.4366	0.0000
59	0.4353	0.0000
60	0.4336	0.0000
61	0.4333	0.0000
62	0.4279	0.0000
63	0.4226	0.0000
64	0.4173	0.0000
65	0.4159	0.0000
66	0.4149	0.0000
67	0.4125	0.0000
68	0.4002	0.0000
69	0.3999	0.0000
70	0.3996	0.0000
71	0.3990	0.0000
72	0.3964	0.0000
73	0.3950	0.0000
74	0.3920	0.0000
75	0.3895	0.0000
76	0.3887	0.0000
77	0.3877	0.0000
78	0.3875	0.0000
79	0.3837	0.0000
80	0.3775	0.0000
81	0.3761	0.0000

82	0.3745	0.0000
83	0.3721	0.0000
84	0.3667	0.0000
85	0.3561	0.0000
86	0.3546	0.0000
87	0.3538	0.0000
88	0.3528	0.0000
89	0.3509	0.0000
90	0.3449	0.0000
91	0.3311	0.0000
92	0.3281	0.0000
93	0.3274	0.0000
94	0.3205	0.0000
95	0.3199	0.0000
96	0.3193	0.0000
97	0.3147	0.0000
98	0.3141	0.0000
99	0.3068	0.0000
100	0.3010	0.0000
101	0.2963	0.0000
102	0.2938	0.0000
103	0.2898	0.0000
104	0.2875	0.0000
105	0.2871	0.0000
106	0.2864	0.0000
107	0.2848	0.0000
108	0.2831	0.0000
109	0.2824	0.0000
110	0.2769	0.0000
111	0.2742	0.0000
112	0.2714	0.0000
113	0.2663	0.0000
114	0.2496	0.0000
115	0.2496	0.0000
116	0.2440	0.0000
117	0.2422	0.0000
118	0.2415	0.0000
119	0.2409	0.0000
120	0.2401	0.0000
121	0.2392	0.0000
122	0.2376	0.0000
123	0.2369	0.0000
124	0.2348	0.0000
125	0.2338	0.0000
126	0.2231	0.0000
127	0.2205	0.0000
128	0.2133	0.0000
129	0.2051	0.0000
130	0.2034	0.0000
131	0.2029	0.0000
132	0.2021	0.0000
133	0.2019	0.0000
134	0.1946	0.0000
135	0.1890	0.0000
136	0.1865	0.0000
137	0.1850	0.0000
138	0.1729	0.0000
139	0.1686	0.0000

140	0.1685	0.0000
141	0.1681	0.0000
142	0.1642	0.0000
143	0.1633	0.0000
144	0.1627	0.0000
145	0.1517	0.0000
146	0.1516	0.0000
147	0.1514	0.0000
148	0.1494	0.0000
149	0.1477	0.0000
150	0.1476	0.0000
151	0.1421	0.0000
152	0.1293	0.0000
153	0.1252	0.0000
154	0.1150	0.0000
155	0.0834	0.0000
156	0.0385	0.0000
157	0.0314	0.0000
158	0.0200	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1942	54392	4	0	Pass
0.2014	50392	4	0	Pass
0.2087	46880	4	0	Pass
0.2159	43689	4	0	Pass
0.2232	40321	4	0	Pass
0.2304	37600	4	0	Pass
0.2377	35130	4	0	Pass
0.2449	32864	4	0	Pass
0.2522	30365	4	0	Pass
0.2594	28376	4	0	Pass
0.2667	26570	4	0	Pass
0.2739	24975	4	0	Pass
0.2812	23318	4	0	Pass
0.2884	21994	4	0	Pass
0.2957	20742	4	0	Pass
0.3029	19556	4	0	Pass
0.3102	18304	4	0	Pass
0.3174	17279	4	0	Pass
0.3247	16249	4	0	Pass
0.3319	15252	3	0	Pass
0.3392	14282	2	0	Pass
0.3464	13479	2	0	Pass
0.3536	12731	2	0	Pass
0.3609	12022	2	0	Pass
0.3681	11246	2	0	Pass
0.3754	10598	2	0	Pass
0.3826	10022	2	0	Pass
0.3899	9435	2	0	Pass
0.3971	8853	2	0	Pass
0.4044	8354	2	0	Pass
0.4116	7895	2	0	Pass
0.4189	7501	2	0	Pass
0.4261	7036	2	0	Pass
0.4334	6631	2	0	Pass
0.4406	6294	2	0	Pass
0.4479	6017	2	0	Pass
0.4551	5706	2	0	Pass
0.4624	5450	2	0	Pass
0.4696	5216	2	0	Pass
0.4769	4973	2	0	Pass
0.4841	4706	2	0	Pass
0.4914	4519	2	0	Pass
0.4986	4348	2	0	Pass
0.5059	4176	2	0	Pass
0.5131	3958	2	0	Pass
0.5204	3772	2	0	Pass
0.5276	3590	2	0	Pass
0.5349	3432	2	0	Pass
0.5421	3265	2	0	Pass
0.5493	3138	2	0	Pass
0.5566	3033	2	0	Pass
0.5638	2938	2	0	Pass
0.5711	2814	2	0	Pass

0.5783	2685	2	0	Pass
0.5856	2562	2	0	Pass
0.5928	2465	2	0	Pass
0.6001	2359	2	0	Pass
0.6073	2258	2	0	Pass
0.6146	2150	2	0	Pass
0.6218	2046	2	0	Pass
0.6291	1952	2	0	Pass
0.6363	1862	2	0	Pass
0.6436	1787	2	0	Pass
0.6508	1702	2	0	Pass
0.6581	1619	2	0	Pass
0.6653	1563	2	0	Pass
0.6726	1487	2	0	Pass
0.6798	1417	2	0	Pass
0.6871	1338	2	0	Pass
0.6943	1275	2	0	Pass
0.7016	1222	2	0	Pass
0.7088	1170	2	0	Pass
0.7161	1103	2	0	Pass
0.7233	1057	2	0	Pass
0.7306	1009	2	0	Pass
0.7378	966	2	0	Pass
0.7451	919	2	0	Pass
0.7523	873	2	0	Pass
0.7595	815	2	0	Pass
0.7668	777	2	0	Pass
0.7740	737	2	0	Pass
0.7813	695	1	0	Pass
0.7885	641	1	0	Pass
0.7958	604	1	0	Pass
0.8030	553	0	0	Pass
0.8103	517	0	0	Pass
0.8175	478	0	0	Pass
0.8248	438	0	0	Pass
0.8320	394	0	0	Pass
0.8393	363	0	0	Pass
0.8465	342	0	0	Pass
0.8538	312	0	0	Pass
0.8610	295	0	0	Pass
0.8683	273	0	0	Pass
0.8755	253	0	0	Pass
0.8828	238	0	0	Pass
0.8900	223	0	0	Pass
0.8973	206	0	0	Pass
0.9045	195	0	0	Pass
0.9118	181	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #5

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 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 5 POC	☐	5067.64			☐	100.00			
Total Volume Infiltrated		5067.64	0.00	0.00		100.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

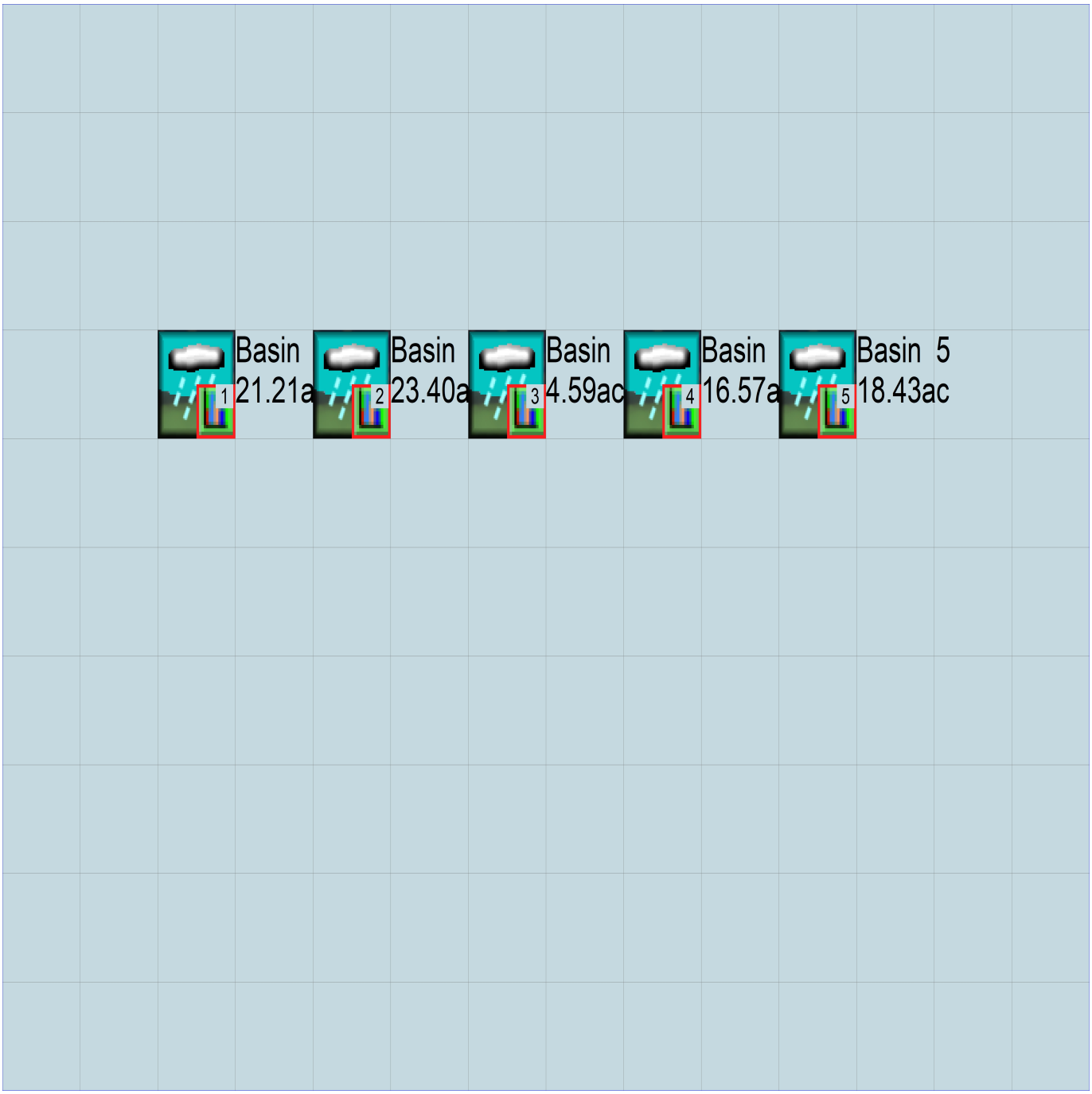
No PERLND changes have been made.

IMPLND Changes

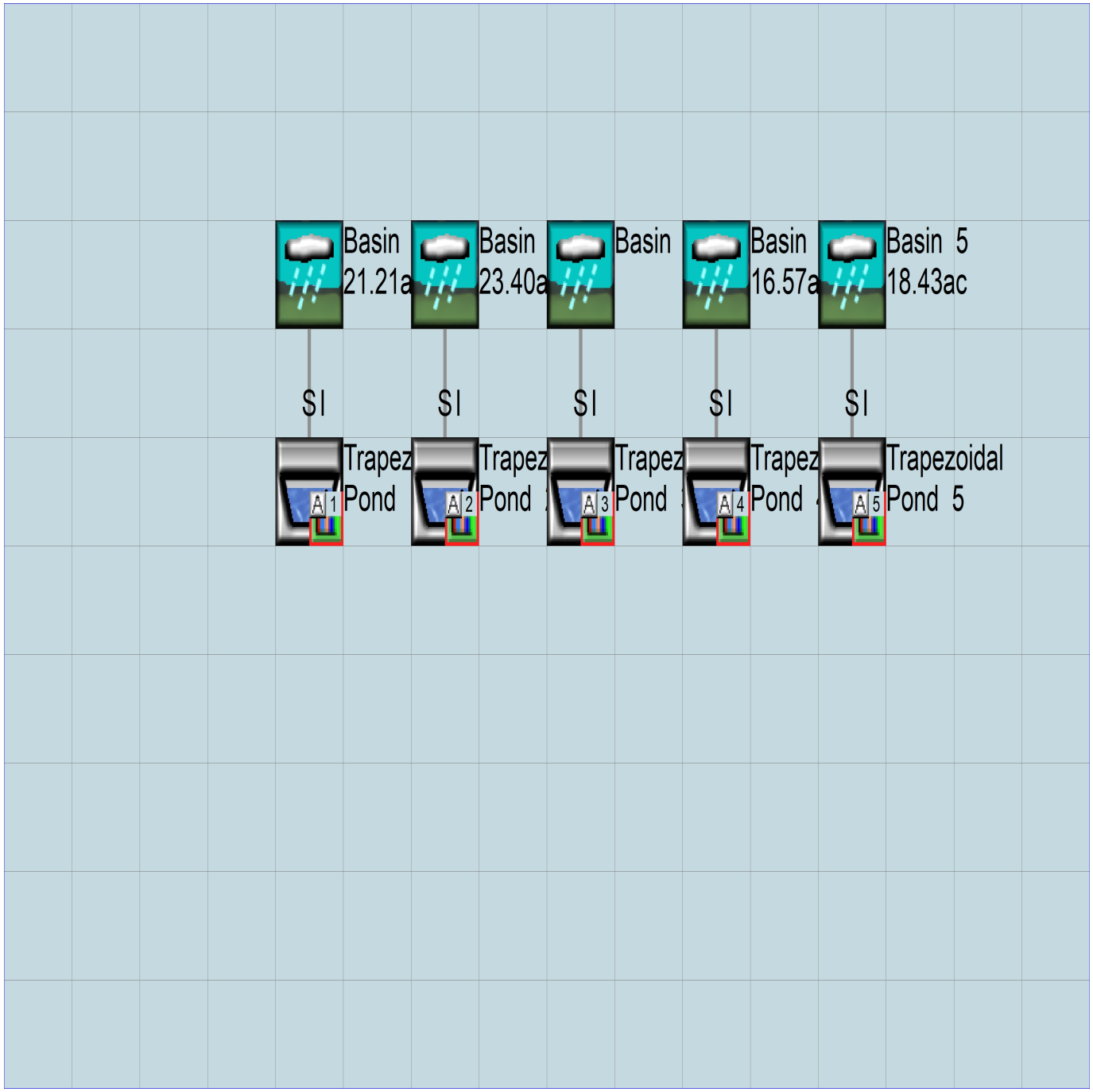
No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   default[0].wdm
MESSU       25   Predefault[0].MES
            27   Predefault[0].L61
            28   Predefault[0].L62
            30   POCdefault[0]1.dat
            31   POCdefault[0]2.dat
            32   POCdefault[0]3.dat
            33   POCdefault[0]4.dat
            34   POCdefault[0]5.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      10
      COPY       501
      COPY       502
      COPY       503
      COPY       504
      COPY       505
      DISPLY       1
      DISPLY       2
      DISPLY       3
      DISPLY       4
      DISPLY       5
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
    2        Basin  2                   MAX                    1    2   31    9
    3        Basin  3                   MAX                    1    2   32    9
    4        Basin  4                   MAX                    1    2   33    9
    5        Basin  5                   MAX                    1    2   34    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  502         1    1
  503         1    1
  504         1    1
  505         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
```

```
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                         User  t-series Engl Metr ***
                                      in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10             0       4.5      0.08       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10            0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   10             0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                    in  out           ***
  END GEN-INFO
  *** Section IWATER***

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

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO
```

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

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

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

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

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  10                       21.21     COPY   501     12
PERLND  10                       21.21     COPY   501     13
Basin  2***
PERLND  10                        23.4     COPY   502     12
PERLND  10                        23.4     COPY   502     13
Basin  3***
PERLND  10                        4.59     COPY   503     12
PERLND  10                        4.59     COPY   503     13
Basin  4***
PERLND  10                       16.57     COPY   504     12
PERLND  10                       16.57     COPY   504     13
Basin  5***
PERLND  10                       18.43     COPY   505     12
PERLND  10                       18.43     COPY   505     13

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

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1
COPY   502 OUTPUT MEAN   1 1   48.4        DISPLY   2     INPUT  TIMSER 1
COPY   503 OUTPUT MEAN   1 1   48.4        DISPLY   3     INPUT  TIMSER 1
COPY   504 OUTPUT MEAN   1 1   48.4        DISPLY   4     INPUT  TIMSER 1
COPY   505 OUTPUT MEAN   1 1   48.4        DISPLY   5     INPUT  TIMSER 1



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

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

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

```
  END ACTIVITY

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

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

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

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

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

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
COPY   502 OUTPUT MEAN   1 1     48.4      WDM    502 FLOW     ENGL      REPL
COPY   503 OUTPUT MEAN   1 1     48.4      WDM    503 FLOW     ENGL      REPL
COPY   504 OUTPUT MEAN   1 1     48.4      WDM    504 FLOW     ENGL      REPL
COPY   505 OUTPUT MEAN   1 1     48.4      WDM    505 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   default[0].wdm
MESSU       25   Mitdefault[0].MES
            27   Mitdefault[0].L61
            28   Mitdefault[0].L62
            30   POCdefault[0]1.dat
            31   POCdefault[0]2.dat
            32   POCdefault[0]3.dat
            33   POCdefault[0]4.dat
            34   POCdefault[0]5.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      16
      IMPLND       1
      IMPLND       4
      RCHRES       1
      RCHRES       2
      RCHRES       3
      RCHRES       4
      RCHRES       5
      COPY         1
      COPY       501
      COPY         2
      COPY       502
      COPY         3
      COPY       503
      COPY         4
      COPY       504
      COPY         5
      COPY       505
      DISPLY       1
      DISPLY       2
      DISPLY       3
      DISPLY       4
      DISPLY       5
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  1         MAX                    1    2   30    9
    2        Trapezoidal Pond  2         MAX                    1    2   31    9
    3        Trapezoidal Pond  3         MAX                    1    2   32    9
    4        Trapezoidal Pond  4         MAX                    1    2   33    9
    5        Trapezoidal Pond  5         MAX                    1    2   34    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
    2         1    1
  502         1    1
    3         1    1
```

```
  503         1    1
    4         1    1
  504         1    1
    5         1    1
  505         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                        in  out           ***
   16     C, Lawn, Flat           1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   16         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   16         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   16         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   16              0       4.5      0.03       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   16              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   16            0.1      0.25      0.25         6       0.5      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   16              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
```

```
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    ***
    1         0    0    1    0    0    0
    4         0    0    1    0    0    0
  END ACTIVITY

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

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    0
    4         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            400      0.01       0.1       0.1
    4            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
    4              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
    4              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  16                      9.64     RCHRES   1      2
PERLND  16                      9.64     RCHRES   1      3
IMPLND   1                      6.98     RCHRES   1      5
IMPLND   4                      4.59     RCHRES   1      5
Basin  2***
PERLND  16                     13.34     RCHRES   2      2
PERLND  16                     13.34     RCHRES   2      3
IMPLND   1                     10.06     RCHRES   2      5
Basin  3***
IMPLND   4                      4.59     RCHRES   3      5
Basin  4***
PERLND  16                      6.06     RCHRES   4      2
PERLND  16                      6.06     RCHRES   4      3
IMPLND   1                      5.92     RCHRES   4      5
```

```
IMPLND   4                          4.59     RCHRES   4      5
Basin  5***
PERLND  16                          7.95     RCHRES   5      2
PERLND  16                          7.95     RCHRES   5      3
IMPLND   1                          5.89     RCHRES   5      5
IMPLND   4                          4.59     RCHRES   5      5

******Routing******
PERLND  16                          9.64     COPY     1     12
IMPLND   1                          6.98     COPY     1     15
IMPLND   4                          4.59     COPY     1     15
PERLND  16                          9.64     COPY     1     13
PERLND  16                         13.34     COPY     2     12
IMPLND   1                         10.06     COPY     2     15
PERLND  16                         13.34     COPY     2     13
IMPLND   4                          4.59     COPY     3     15
PERLND  16                          6.06     COPY     4     12
IMPLND   1                          5.92     COPY     4     15
IMPLND   4                          4.59     COPY     4     15
PERLND  16                          6.06     COPY     4     13
PERLND  16                          7.95     COPY     5     12
IMPLND   1                          5.89     COPY     5     15
IMPLND   4                          4.59     COPY     5     15
PERLND  16                          7.95     COPY     5     13
RCHRES   1                             1     COPY   501     17
RCHRES   2                             1     COPY   502     17
RCHRES   3                             1     COPY   503     17
RCHRES   4                             1     COPY   504     17
RCHRES   5                             1     COPY   505     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1
COPY   502 OUTPUT MEAN   1 1   48.4        DISPLY   2     INPUT  TIMSER 1
COPY   503 OUTPUT MEAN   1 1   48.4        DISPLY   3     INPUT  TIMSER 1
COPY   504 OUTPUT MEAN   1 1   48.4        DISPLY   4     INPUT  TIMSER 1
COPY   505 OUTPUT MEAN   1 1   48.4        DISPLY   5     INPUT  TIMSER 1



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

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<-----------------><---> User T-series  Engl Metr LKFG            ***
                                        in  out                             ***
    1     Trapezoidal Pond-013    2    1    1    1   28    0    1
    2     Trapezoidal Pond-014    2    1    1    1   28    0    1
    3     Trapezoidal Pond-015    2    1    1    1   28    0    1
    4     Trapezoidal Pond-016    2    1    1    1   28    0    1
    5     Trapezoidal Pond-017    2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
    4         1    0    0    0    0    0    0    0    0    0
    5         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
```

```
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
    4         4    0    0    0    0    0    0    0    0    0    1    9
    5         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    *  *  *  *  *      *  *  *  *  *        ***
    1       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
    2       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
    3       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
    4       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
    5       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN      DELTH     STCOR        KS      DB50        ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.02       0.0       0.0       0.5       0.0
    2              2      0.01       0.0       0.0       0.5       0.0
    3              3      0.01       0.0       0.0       0.5       0.0
    4              4      0.01       0.0       0.0       0.5       0.0
    5              5      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    4            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    5            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)     (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.161983  0.000000  0.000000  0.000000
  0.077778  0.163788  0.012669  0.000000  1.651532
  0.155556  0.165603  0.025479  0.000000  1.669831
  0.233333  0.167428  0.038430  0.000000  1.688231
  0.311111  0.169263  0.051523  0.000000  1.706733
  0.388889  0.171108  0.064760  0.000000  1.725334
  0.466667  0.172962  0.078140  0.000000  1.744037
  0.544444  0.174827  0.091666  0.000000  1.762841
  0.622222  0.176702  0.105336  0.000000  1.781745
  0.700000  0.178587  0.119153  0.000000  1.800750
  0.777778  0.180482  0.133117  0.000000  1.819856
  0.855556  0.182386  0.147228  0.000000  1.839063
  0.933333  0.184301  0.161488  0.000000  1.858370
  1.011111  0.186226  0.175898  0.000000  1.877779
  1.088889  0.188161  0.190457  0.000000  1.897288
  1.166667  0.190106  0.205168  0.000000  1.916898
  1.244444  0.192060  0.220030  0.000000  1.936609
  1.322222  0.194025  0.235044  0.000000  1.956421
  1.400000  0.196000  0.250212  0.000000  1.976333
  1.477778  0.197985  0.265533  0.000000  1.996347
```

1.555556	0.199980	0.281010	0.000000	2.016461
1.633333	0.201984	0.296642	0.000000	2.036676
1.711111	0.203999	0.312430	0.000000	2.056992
1.788889	0.206024	0.328375	0.000000	2.077408
1.866667	0.208059	0.344478	0.000000	2.097926
1.944444	0.210104	0.360740	0.000000	2.118544
2.022222	0.212158	0.377162	0.000000	2.139263
2.100000	0.214223	0.393743	0.000000	2.160083
2.177778	0.216298	0.410486	0.000000	2.181004
2.255556	0.218383	0.427390	0.000000	2.202026
2.333333	0.220478	0.444457	0.000000	2.223148
2.411111	0.222582	0.461687	0.000000	2.244371
2.488889	0.224697	0.479081	0.000000	2.265695
2.566667	0.226822	0.496640	0.000000	2.287120
2.644444	0.228957	0.514365	0.000000	2.308646
2.722222	0.231101	0.532256	0.000000	2.330273
2.800000	0.233256	0.550314	0.000000	2.352000
2.877778	0.235421	0.568541	0.000000	2.373828
2.955556	0.237596	0.586936	0.000000	2.395757
3.033333	0.239781	0.605500	0.000000	2.417787
3.111111	0.241975	0.624235	0.000000	2.439918
3.188889	0.244180	0.643141	0.000000	2.462149
3.266667	0.246395	0.662219	0.000000	2.484481
3.344444	0.248620	0.681470	0.000000	2.506915
3.422222	0.250854	0.700894	0.000000	2.529449
3.500000	0.253099	0.720492	0.000000	2.552083
3.577778	0.255354	0.740265	0.000000	2.574819
3.655556	0.257619	0.760214	0.000000	2.597655
3.733333	0.259893	0.780339	0.000000	2.620593
3.811111	0.262178	0.800642	0.000000	2.643631
3.888889	0.264473	0.821123	0.000000	2.666770
3.966667	0.266778	0.841783	0.000000	2.690009
4.044444	0.269093	0.862622	0.000000	2.713350
4.122222	0.271417	0.883642	0.000000	2.736791
4.200000	0.273752	0.904843	0.000000	2.760333
4.277778	0.276097	0.926226	0.000000	2.783976
4.355556	0.278452	0.947792	0.000000	2.807720
4.433333	0.280816	0.969541	0.000000	2.831565
4.511111	0.283191	0.991475	0.000000	2.855510
4.588889	0.285576	1.013594	0.000000	2.879557
4.666667	0.287971	1.035898	0.000000	2.903704
4.744444	0.290375	1.058389	0.000000	2.927952
4.822222	0.292790	1.081068	0.000000	2.952300
4.900000	0.295215	1.103935	0.000000	2.976750
4.977778	0.297650	1.126991	0.000000	3.001300
5.055556	0.300094	1.150236	0.000000	3.025952
5.133333	0.302549	1.173673	0.000000	3.050704
5.211111	0.305014	1.197300	0.000000	3.075557
5.288889	0.307489	1.221120	0.000000	3.100510
5.366667	0.309973	1.245132	0.000000	3.125565
5.444444	0.312468	1.269338	0.000000	3.150720
5.522222	0.314973	1.293738	0.000000	3.175976
5.600000	0.317488	1.318334	0.000000	3.201333
5.677778	0.320012	1.343126	0.000000	3.226791
5.755556	0.322547	1.368114	0.000000	3.252350
5.833333	0.325092	1.393300	0.000000	3.278009
5.911111	0.327647	1.418684	0.000000	3.303770
5.988889	0.330211	1.444268	0.000000	3.329631
6.066667	0.332786	1.470051	0.273695	3.355593
6.144444	0.335371	1.496035	0.868991	3.381655
6.222222	0.337966	1.522220	1.636945	3.407819
6.300000	0.340570	1.548608	2.501261	3.434083
6.377778	0.343185	1.575198	3.386283	3.460449
6.455556	0.345810	1.601992	4.216091	3.486915
6.533333	0.348444	1.628991	4.924197	3.513481
6.611111	0.351089	1.656195	5.468342	3.540149
6.688889	0.353744	1.683605	5.848795	3.566918
6.766667	0.356409	1.711223	6.205051	3.593787
6.844444	0.359083	1.739047	6.512198	3.620757
6.922222	0.361768	1.767080	6.805497	3.647828

```
7.000000  0.364463  1.795323  7.086668  3.675000
END FTABLE  1
FTABLE      2
 91    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)     (cfs)   (ft/sec)    (Minutes)***
0.000000  0.129132  0.000000  0.000000  0.000000
0.077778  0.130744  0.010106  0.000000  1.318337
0.155556  0.132366  0.020338  0.000000  1.334692
0.233333  0.133998  0.030697  0.000000  1.351148
0.311111  0.135640  0.041183  0.000000  1.367705
0.388889  0.137292  0.051797  0.000000  1.384362
0.466667  0.138954  0.062540  0.000000  1.401120
0.544444  0.140626  0.073412  0.000000  1.417979
0.622222  0.142308  0.084415  0.000000  1.434939
0.700000  0.144000  0.095550  0.000000  1.452000
0.777778  0.145702  0.106816  0.000000  1.469162
0.855556  0.147414  0.118215  0.000000  1.486424
0.933333  0.149136  0.129747  0.000000  1.503787
1.011111  0.150868  0.141414  0.000000  1.521251
1.088889  0.152610  0.153216  0.000000  1.538816
1.166667  0.154362  0.165154  0.000000  1.556481
1.244444  0.156124  0.177228  0.000000  1.574248
1.322222  0.157896  0.189440  0.000000  1.592115
1.400000  0.159678  0.201790  0.000000  1.610083
1.477778  0.161470  0.214279  0.000000  1.628152
1.555556  0.163272  0.226908  0.000000  1.646322
1.633333  0.165084  0.239677  0.000000  1.664593
1.711111  0.166906  0.252588  0.000000  1.682964
1.788889  0.168737  0.265641  0.000000  1.701436
1.866667  0.170579  0.278837  0.000000  1.720009
1.944444  0.172431  0.292176  0.000000  1.738683
2.022222  0.174293  0.305660  0.000000  1.757458
2.100000  0.176165  0.319289  0.000000  1.776333
2.177778  0.178047  0.333063  0.000000  1.795310
2.255556  0.179939  0.346985  0.000000  1.814387
2.333333  0.181841  0.361054  0.000000  1.833565
2.411111  0.183753  0.375272  0.000000  1.852844
2.488889  0.185675  0.389639  0.000000  1.872223
2.566667  0.187607  0.404155  0.000000  1.891704
2.644444  0.189549  0.418822  0.000000  1.911285
2.722222  0.191501  0.433641  0.000000  1.930967
2.800000  0.193463  0.448612  0.000000  1.950750
2.877778  0.195435  0.463735  0.000000  1.970634
2.955556  0.197417  0.479013  0.000000  1.990618
3.033333  0.199409  0.494445  0.000000  2.010704
3.111111  0.201411  0.510033  0.000000  2.030890
3.188889  0.203423  0.525776  0.000000  2.051177
3.266667  0.205444  0.541676  0.000000  2.071565
3.344444  0.207476  0.557734  0.000000  2.092053
3.422222  0.209518  0.573951  0.000000  2.112643
3.500000  0.211570  0.590327  0.000000  2.133333
3.577778  0.213632  0.606862  0.000000  2.154124
3.655556  0.215704  0.623559  0.000000  2.175016
3.733333  0.217786  0.640417  0.000000  2.196009
3.811111  0.219878  0.657437  0.000000  2.217103
3.888889  0.221980  0.674620  0.000000  2.238297
3.966667  0.224092  0.691967  0.000000  2.259593
4.044444  0.226214  0.709479  0.000000  2.280989
4.122222  0.228346  0.727157  0.000000  2.302486
4.200000  0.230488  0.745000  0.000000  2.324083
4.277778  0.232640  0.763011  0.000000  2.345782
4.355556  0.234801  0.781189  0.000000  2.367581
4.433333  0.236973  0.799536  0.000000  2.389481
4.511111  0.239155  0.818052  0.000000  2.411483
4.588889  0.241347  0.836738  0.000000  2.433584
4.666667  0.243549  0.855595  0.000000  2.455787
4.744444  0.245761  0.874624  0.000000  2.478091
4.822222  0.247983  0.893825  0.000000  2.500495
4.900000  0.250215  0.913199  0.000000  2.523000
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4.977778  0.252457  0.932748  0.000000  2.545606
5.055556  0.254709  0.952471  0.000000  2.568313
5.133333  0.256971  0.972369  0.000000  2.591120
5.211111  0.259243  0.992444  0.000000  2.614029
5.288889  0.261524  1.012696  0.000000  2.637038
5.366667  0.263816  1.033126  0.000000  2.660148
5.444444  0.266118  1.053735  0.000000  2.683359
5.522222  0.268430  1.074523  0.000000  2.706671
5.600000  0.270752  1.095491  0.000000  2.730083
5.677778  0.273084  1.116640  0.000000  2.753597
5.755556  0.275426  1.137971  0.000000  2.777211
5.833333  0.277778  1.159485  0.000000  2.800926
5.911111  0.280140  1.181182  0.000000  2.824742
5.988889  0.282512  1.203062  0.000000  2.848658
6.066667  0.284893  1.225128  0.273695  2.872676
6.144444  0.287285  1.247380  0.868991  2.896794
6.222222  0.289687  1.269817  1.636945  2.921013
6.300000  0.292099  1.292442  2.501261  2.945333
6.377778  0.294521  1.315255  3.386283  2.969754
6.455556  0.296953  1.338257  4.216091  2.994276
6.533333  0.299395  1.361449  4.924197  3.018898
6.611111  0.301847  1.384830  5.468342  3.043621
6.688889  0.304309  1.408403  5.848795  3.068445
6.766667  0.306781  1.432167  6.205051  3.093370
6.844444  0.309262  1.456125  6.512198  3.118396
6.922222  0.311754  1.480275  6.805497  3.143523
7.000000  0.314256  1.504620  7.086668  3.168750
END FTABLE  2
FTABLE      3
 91    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.023508  0.000000  0.000000  0.000000
0.077778  0.024198  0.001855  0.000000  0.244001
0.155556  0.024899  0.003765  0.000000  0.251066
0.233333  0.025610  0.005729  0.000000  0.258231
0.311111  0.026330  0.007749  0.000000  0.265498
0.388889  0.027061  0.009825  0.000000  0.272865
0.466667  0.027802  0.011959  0.000000  0.280333
0.544444  0.028552  0.014150  0.000000  0.287902
0.622222  0.029313  0.016400  0.000000  0.295572
0.700000  0.030084  0.018710  0.000000  0.303343
0.777778  0.030864  0.021081  0.000000  0.311214
0.855556  0.031655  0.023512  0.000000  0.319186
0.933333  0.032455  0.026005  0.000000  0.327259
1.011111  0.033266  0.028561  0.000000  0.335433
1.088889  0.034087  0.031180  0.000000  0.343708
1.166667  0.034917  0.033864  0.000000  0.352083
1.244444  0.035758  0.036612  0.000000  0.360560
1.322222  0.036609  0.039426  0.000000  0.369137
1.400000  0.037469  0.042307  0.000000  0.377815
1.477778  0.038340  0.045255  0.000000  0.386594
1.555556  0.039220  0.048272  0.000000  0.395473
1.633333  0.040111  0.051357  0.000000  0.404454
1.711111  0.041012  0.054511  0.000000  0.413535
1.788889  0.041922  0.057737  0.000000  0.422717
1.866667  0.042843  0.061033  0.000000  0.432000
1.944444  0.043774  0.064401  0.000000  0.441384
2.022222  0.044714  0.067843  0.000000  0.450868
2.100000  0.045665  0.071357  0.000000  0.460454
2.177778  0.046625  0.074946  0.000000  0.470140
2.255556  0.047596  0.078611  0.000000  0.479927
2.333333  0.048577  0.082351  0.000000  0.489815
2.411111  0.049567  0.086167  0.000000  0.499803
2.488889  0.050568  0.090062  0.000000  0.509893
2.566667  0.051579  0.094034  0.000000  0.520083
2.644444  0.052599  0.098085  0.000000  0.530374
2.722222  0.053630  0.102216  0.000000  0.540766
2.800000  0.054670  0.106428  0.000000  0.551259
2.877778  0.055721  0.110721  0.000000  0.561853
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2.955556  0.056782  0.115096  0.000000  0.572547
3.033333  0.057852  0.119554  0.000000  0.583343
3.111111  0.058933  0.124096  0.000000  0.594239
3.188889  0.060023  0.128722  0.000000  0.605236
3.266667  0.061124  0.133433  0.000000  0.616333
3.344444  0.062235  0.138230  0.000000  0.627532
3.422222  0.063355  0.143114  0.000000  0.638831
3.500000  0.064486  0.148086  0.000000  0.650231
3.577778  0.065626  0.153146  0.000000  0.661733
3.655556  0.066777  0.158295  0.000000  0.673334
3.733333  0.067938  0.163534  0.000000  0.685037
3.811111  0.069108  0.168863  0.000000  0.696841
3.888889  0.070289  0.174284  0.000000  0.708745
3.966667  0.071479  0.179798  0.000000  0.720750
4.044444  0.072680  0.185404  0.000000  0.732856
4.122222  0.073891  0.191104  0.000000  0.745063
4.200000  0.075111  0.196898  0.000000  0.757370
4.277778  0.076342  0.202788  0.000000  0.769779
4.355556  0.077582  0.208774  0.000000  0.782288
4.433333  0.078833  0.214857  0.000000  0.794898
4.511111  0.080093  0.221037  0.000000  0.807609
4.588889  0.081364  0.227316  0.000000  0.820421
4.666667  0.082645  0.233694  0.000000  0.833333
4.744444  0.083935  0.240172  0.000000  0.846347
4.822222  0.085236  0.246751  0.000000  0.859461
4.900000  0.086546  0.253432  0.000000  0.872676
4.977778  0.087867  0.260214  0.000000  0.885992
5.055556  0.089198  0.267100  0.000000  0.899408
5.133333  0.090538  0.274090  0.000000  0.912926
5.211111  0.091889  0.281184  0.000000  0.926544
5.288889  0.093249  0.288384  0.000000  0.940263
5.366667  0.094620  0.295690  0.000000  0.954083
5.444444  0.096000  0.303103  0.000000  0.968004
5.522222  0.097391  0.310624  0.000000  0.982026
5.600000  0.098792  0.318253  0.000000  0.996148
5.677778  0.100202  0.325992  0.000000  1.010371
5.755556  0.101623  0.333841  0.000000  1.024695
5.833333  0.103053  0.341800  0.000000  1.039120
5.911111  0.104494  0.349872  0.000000  1.053646
5.988889  0.105944  0.358055  0.000000  1.068273
6.066667  0.107405  0.366352  0.273695  1.083000
6.144444  0.108876  0.374763  0.868991  1.097828
6.222222  0.110356  0.383289  1.636945  1.112757
6.300000  0.111847  0.391930  2.501261  1.127787
6.377778  0.113347  0.400688  3.386283  1.142918
6.455556  0.114858  0.409562  4.216091  1.158149
6.533333  0.116378  0.418555  4.924197  1.173481
6.611111  0.117909  0.427666  5.468342  1.188915
6.688889  0.119449  0.436897  5.848795  1.204449
6.766667  0.121000  0.446247  6.205051  1.220083
6.844444  0.122561  0.455719  6.512198  1.235819
6.922222  0.124131  0.465313  6.805497  1.251655
7.000000  0.125712  0.475029  7.086668  1.267593
END FTABLE  3
FTABLE      4
 91    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.132599  0.000000  0.000000  0.000000
0.077778  0.134232  0.010377  0.000000  1.353507
0.155556  0.135876  0.020881  0.000000  1.370078
0.233333  0.137529  0.031513  0.000000  1.386750
0.311111  0.139192  0.042275  0.000000  1.403523
0.388889  0.140866  0.053166  0.000000  1.420396
0.466667  0.142549  0.064188  0.000000  1.437370
0.544444  0.144243  0.075341  0.000000  1.454445
0.622222  0.145946  0.086626  0.000000  1.471621
0.700000  0.147659  0.098044  0.000000  1.488898
0.777778  0.149383  0.109595  0.000000  1.506276
0.855556  0.151116  0.121281  0.000000  1.523754
```

0.933333	0.152860	0.133103	0.000000	1.541333
1.011111	0.154613	0.145060	0.000000	1.559013
1.088889	0.156376	0.157154	0.000000	1.576794
1.166667	0.158150	0.169385	0.000000	1.594676
1.244444	0.159933	0.181755	0.000000	1.612658
1.322222	0.161726	0.194264	0.000000	1.630742
1.400000	0.163530	0.206913	0.000000	1.648926
1.477778	0.165343	0.219703	0.000000	1.667211
1.555556	0.167167	0.232634	0.000000	1.685597
1.633333	0.169000	0.245707	0.000000	1.704083
1.711111	0.170843	0.258923	0.000000	1.722671
1.788889	0.172697	0.272283	0.000000	1.741359
1.866667	0.174560	0.285787	0.000000	1.760148
1.944444	0.176434	0.299437	0.000000	1.779038
2.022222	0.178317	0.313233	0.000000	1.798029
2.100000	0.180210	0.327176	0.000000	1.817120
2.177778	0.182114	0.341266	0.000000	1.836313
2.255556	0.184027	0.355505	0.000000	1.855606
2.333333	0.185950	0.369893	0.000000	1.875000
2.411111	0.187884	0.384431	0.000000	1.894495
2.488889	0.189827	0.399120	0.000000	1.914091
2.566667	0.191781	0.413960	0.000000	1.933787
2.644444	0.193744	0.428952	0.000000	1.953584
2.722222	0.195717	0.444098	0.000000	1.973483
2.800000	0.197701	0.459398	0.000000	1.993481
2.877778	0.199694	0.474852	0.000000	2.013581
2.955556	0.201697	0.490462	0.000000	2.033782
3.033333	0.203711	0.506228	0.000000	2.054083
3.111111	0.205734	0.522150	0.000000	2.074486
3.188889	0.207767	0.538231	0.000000	2.094989
3.266667	0.209811	0.554470	0.000000	2.115593
3.344444	0.211864	0.570869	0.000000	2.136297
3.422222	0.213928	0.587427	0.000000	2.157103
3.500000	0.216001	0.604147	0.000000	2.178009
3.577778	0.218084	0.621028	0.000000	2.199016
3.655556	0.220178	0.638071	0.000000	2.220124
3.733333	0.222281	0.655278	0.000000	2.241333
3.811111	0.224394	0.672649	0.000000	2.262643
3.888889	0.226518	0.690184	0.000000	2.284053
3.966667	0.228651	0.707885	0.000000	2.305565
4.044444	0.230794	0.725752	0.000000	2.327177
4.122222	0.232948	0.743787	0.000000	2.348890
4.200000	0.235111	0.761989	0.000000	2.370704
4.277778	0.237284	0.780360	0.000000	2.392618
4.355556	0.239468	0.798900	0.000000	2.414634
4.433333	0.241661	0.817611	0.000000	2.436750
4.511111	0.243865	0.836493	0.000000	2.458967
4.588889	0.246078	0.855546	0.000000	2.481285
4.666667	0.248301	0.874772	0.000000	2.503704
4.744444	0.250535	0.894171	0.000000	2.526223
4.822222	0.252778	0.913744	0.000000	2.548844
4.900000	0.255031	0.933492	0.000000	2.571565
4.977778	0.257295	0.953416	0.000000	2.594387
5.055556	0.259568	0.973516	0.000000	2.617310
5.133333	0.261851	0.993794	0.000000	2.640333
5.211111	0.264145	1.014249	0.000000	2.663458
5.288889	0.266448	1.034883	0.000000	2.686683
5.366667	0.268761	1.055697	0.000000	2.710009
5.444444	0.271085	1.076691	0.000000	2.733436
5.522222	0.273418	1.097866	0.000000	2.756964
5.600000	0.275761	1.119223	0.000000	2.780593
5.677778	0.278115	1.140763	0.000000	2.804322
5.755556	0.280478	1.162486	0.000000	2.828152
5.833333	0.282851	1.184393	0.000000	2.852083
5.911111	0.285235	1.206485	0.000000	2.876115
5.988889	0.287628	1.228763	0.000000	2.900248
6.066667	0.290031	1.251228	0.273695	2.924481
6.144444	0.292445	1.273880	0.868991	2.948816
6.222222	0.294868	1.296719	1.636945	2.973251
6.300000	0.297301	1.319748	2.501261	2.997787

```
6.377778  0.299745  1.342967  3.386283  3.022424
6.455556  0.302198  1.366376  4.216091  3.047162
6.533333  0.304661  1.389976  4.924197  3.072000
6.611111  0.307134  1.413768  5.468342  3.096939
6.688889  0.309618  1.437752  5.848795  3.121979
6.766667  0.312111  1.461931  6.205051  3.147120
6.844444  0.314614  1.486303  6.512198  3.172362
6.922222  0.317128  1.510871  6.805497  3.197705
7.000000  0.319651  1.535635  7.086668  3.223148
END FTABLE  4
FTABLE      5
 91    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.129132  0.000000  0.000000  0.000000
0.077778  0.130744  0.010106  0.000000  1.318337
0.155556  0.132366  0.020338  0.000000  1.334692
0.233333  0.133998  0.030697  0.000000  1.351148
0.311111  0.135640  0.041183  0.000000  1.367705
0.388889  0.137292  0.051797  0.000000  1.384362
0.466667  0.138954  0.062540  0.000000  1.401120
0.544444  0.140626  0.073412  0.000000  1.417979
0.622222  0.142308  0.084415  0.000000  1.434939
0.700000  0.144000  0.095550  0.000000  1.452000
0.777778  0.145702  0.106816  0.000000  1.469162
0.855556  0.147414  0.118215  0.000000  1.486424
0.933333  0.149136  0.129747  0.000000  1.503787
1.011111  0.150868  0.141414  0.000000  1.521251
1.088889  0.152610  0.153216  0.000000  1.538816
1.166667  0.154362  0.165154  0.000000  1.556481
1.244444  0.156124  0.177228  0.000000  1.574248
1.322222  0.157896  0.189440  0.000000  1.592115
1.400000  0.159678  0.201790  0.000000  1.610083
1.477778  0.161470  0.214279  0.000000  1.628152
1.555556  0.163272  0.226908  0.000000  1.646322
1.633333  0.165084  0.239677  0.000000  1.664593
1.711111  0.166906  0.252588  0.000000  1.682964
1.788889  0.168737  0.265641  0.000000  1.701436
1.866667  0.170579  0.278837  0.000000  1.720009
1.944444  0.172431  0.292176  0.000000  1.738683
2.022222  0.174293  0.305660  0.000000  1.757458
2.100000  0.176165  0.319289  0.000000  1.776333
2.177778  0.178047  0.333063  0.000000  1.795310
2.255556  0.179939  0.346985  0.000000  1.814387
2.333333  0.181841  0.361054  0.000000  1.833565
2.411111  0.183753  0.375272  0.000000  1.852844
2.488889  0.185675  0.389639  0.000000  1.872223
2.566667  0.187607  0.404155  0.000000  1.891704
2.644444  0.189549  0.418822  0.000000  1.911285
2.722222  0.191501  0.433641  0.000000  1.930967
2.800000  0.193463  0.448612  0.000000  1.950750
2.877778  0.195435  0.463735  0.000000  1.970634
2.955556  0.197417  0.479013  0.000000  1.990618
3.033333  0.199409  0.494445  0.000000  2.010704
3.111111  0.201411  0.510033  0.000000  2.030890
3.188889  0.203423  0.525776  0.000000  2.051177
3.266667  0.205444  0.541676  0.000000  2.071565
3.344444  0.207476  0.557734  0.000000  2.092053
3.422222  0.209518  0.573951  0.000000  2.112643
3.500000  0.211570  0.590327  0.000000  2.133333
3.577778  0.213632  0.606862  0.000000  2.154124
3.655556  0.215704  0.623559  0.000000  2.175016
3.733333  0.217786  0.640417  0.000000  2.196009
3.811111  0.219878  0.657437  0.000000  2.217103
3.888889  0.221980  0.674620  0.000000  2.238297
3.966667  0.224092  0.691967  0.000000  2.259593
4.044444  0.226214  0.709479  0.000000  2.280989
4.122222  0.228346  0.727157  0.000000  2.302486
4.200000  0.230488  0.745000  0.000000  2.324083
4.277778  0.232640  0.763011  0.000000  2.345782
```

```
  4.355556  0.234801  0.781189  0.000000  2.367581
  4.433333  0.236973  0.799536  0.000000  2.389481
  4.511111  0.239155  0.818052  0.000000  2.411483
  4.588889  0.241347  0.836738  0.000000  2.433584
  4.666667  0.243549  0.855595  0.000000  2.455787
  4.744444  0.245761  0.874624  0.000000  2.478091
  4.822222  0.247983  0.893825  0.000000  2.500495
  4.900000  0.250215  0.913199  0.000000  2.523000
  4.977778  0.252457  0.932748  0.000000  2.545606
  5.055556  0.254709  0.952471  0.000000  2.568313
  5.133333  0.256971  0.972369  0.000000  2.591120
  5.211111  0.259243  0.992444  0.000000  2.614029
  5.288889  0.261524  1.012696  0.000000  2.637038
  5.366667  0.263816  1.033126  0.000000  2.660148
  5.444444  0.266118  1.053735  0.000000  2.683359
  5.522222  0.268430  1.074523  0.000000  2.706671
  5.600000  0.270752  1.095491  0.000000  2.730083
  5.677778  0.273084  1.116640  0.000000  2.753597
  5.755556  0.275426  1.137971  0.000000  2.777211
  5.833333  0.277778  1.159485  0.000000  2.800926
  5.911111  0.280140  1.181182  0.000000  2.824742
  5.988889  0.282512  1.203062  0.000000  2.848658
  6.066667  0.284893  1.225128  0.273695  2.872676
  6.144444  0.287285  1.247380  0.868991  2.896794
  6.222222  0.289687  1.269817  1.636945  2.921013
  6.300000  0.292099  1.292442  2.501261  2.945333
  6.377778  0.294521  1.315255  3.386283  2.969754
  6.455556  0.296953  1.338257  4.216091  2.994276
  6.533333  0.299395  1.361449  4.924197  3.018898
  6.611111  0.301847  1.384830  5.468342  3.043621
  6.688889  0.304309  1.408403  5.848795  3.068445
  6.766667  0.306781  1.432167  6.205051  3.093370
  6.844444  0.309262  1.456125  6.512198  3.118396
  6.922222  0.311754  1.480275  6.805497  3.143523
  7.000000  0.314256  1.504620  7.086668  3.168750
  END FTABLE  5
END FTABLES

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

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1001 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      2 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
RCHRES   2 HYDR   RO     1 1        1      WDM   1004 FLOW     ENGL      REPL
RCHRES   2 HYDR   O      1 1        1      WDM   1005 FLOW     ENGL      REPL
RCHRES   2 HYDR   O      2 1        1      WDM   1006 FLOW     ENGL      REPL
RCHRES   2 HYDR   STAGE  1 1        1      WDM   1007 STAG     ENGL      REPL
COPY     2 OUTPUT MEAN   1 1     48.4      WDM    702 FLOW     ENGL      REPL
COPY   502 OUTPUT MEAN   1 1     48.4      WDM    802 FLOW     ENGL      REPL
RCHRES   3 HYDR   RO     1 1        1      WDM   1008 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1009 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1010 FLOW     ENGL      REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1011 STAG     ENGL      REPL
COPY     3 OUTPUT MEAN   1 1     48.4      WDM    703 FLOW     ENGL      REPL
COPY   503 OUTPUT MEAN   1 1     48.4      WDM    803 FLOW     ENGL      REPL
RCHRES   4 HYDR   RO     1 1        1      WDM   1012 FLOW     ENGL      REPL
```

```
RCHRES    4 HYDR   O      1 1         1      WDM   1013 FLOW     ENGL      REPL
RCHRES    4 HYDR   O      2 1         1      WDM   1014 FLOW     ENGL      REPL
RCHRES    4 HYDR   STAGE  1 1         1      WDM   1015 STAG     ENGL      REPL
COPY      4 OUTPUT MEAN   1 1      48.4      WDM    704 FLOW     ENGL      REPL
COPY    504 OUTPUT MEAN   1 1      48.4      WDM    804 FLOW     ENGL      REPL
RCHRES    5 HYDR   RO     1 1         1      WDM   1016 FLOW     ENGL      REPL
RCHRES    5 HYDR   O      1 1         1      WDM   1017 FLOW     ENGL      REPL
RCHRES    5 HYDR   O      2 1         1      WDM   1018 FLOW     ENGL      REPL
RCHRES    5 HYDR   STAGE  1 1         1      WDM   1019 STAG     ENGL      REPL
COPY      5 OUTPUT MEAN   1 1      48.4      WDM    705 FLOW     ENGL      REPL
COPY    505 OUTPUT MEAN   1 1      48.4      WDM    805 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17


END MASS-LINK

END RUN
```

Mitigated HSPF Message File

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Local (360)943-0304

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6.0 CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN

The site has been previous cleared and graded. The erosion control measures proposed under this plan include a sediment trap, v-ditches with rock check dams, silt fence, inlet protection and construction entrances. For further detail please see the attached SWPPP.

Attachment C
Construction Stormwater Pollution Prevention Plan

Construction Stormwater General Permit

Stormwater Pollution Prevention Plan (SWPPP)

for

Founders ridge

Prepared for:

The Washington State Department of Ecology

Southwest Regional Office

Permittee / Owner	Developer	Operator / Contractor
Northpoint Development 4825 NW 41st St, Suite 500 Riverside, MO 64150	Northpoint Development 4825 NW 41st St, Suite 500 Riverside, MO 64150	TBD

A PORTION OF SECTIONS 22, 56 AND 27, TOWNSHIP 19 NORTH, RANGE 1 EAST

W.M.Certified Erosion and Sediment Control Lead (CESCL)

Name	Organization	Contact Phone Number
TBD	TBD	TBD

SWPPP Prepared By

Name	Organization	Contact Phone Number
Ben Eldridge	Barghausen Consulting Engineers, Inc.	(425) 251-6222

SWPPP Preparation Date

March 24, 2021

Project Construction Dates

Start Date	End Date
TBD	TBD

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Appendix/Glossary

A. Site Map

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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: Founder's Ridge
Street/Location: A Portion of Sections 22, 56 And 27, Township 19 North, Range 1 East, W.M.
City: DuPont **State:** WA **Zip code:** 98327
Subdivision: Northwest Landing
Receiving waterbody: Full Infiltration

1.1 Existing Conditions

Total acreage (including support activities such as off-site equipment staging yards, material storage areas, borrow areas).

Total acreage: 101.16 ac
Disturbed acreage: 101.16 ac
Existing structures: None.
Landscape topography: The existing parcel is vacant/undeveloped with existing landscaping at the perimeter and some vegetation including small brush and shrubs through out the site. The parcel is has been previously cleared and graded. The site is relatively flat in grade
Drainage patterns: The site currently infiltrates on-site through outwash soils.
Existing Vegetation: The existing site has grasses and other small shrubs.
Critical Areas: None.

List of known impairments for 303(d) listed or Total Maximum Daily Load (TMDL) for the receiving waterbody: No impairments for 303(d) are known for the receiving waterbody.

Table 1 – Summary of Site Pollutant Constituents

Constituent (Pollutant)	Location	Depth	Max. Concentration Detected (mg/kg)

1.2 Proposed Construction Activities

Description of site development (example: subdivision):
The proposed conditions for this site include vehicular parking and drive aisles, industrial building, sidewalks, landscape area, and an underground infiltration pond for stormwater management.

Description of construction activities (example: site preparation, demolition, excavation):
The construction activities covered under this SWPPP for this project will include site preparation, TESC installation, site grading, utility installation, building footprint construction and site paving.

Description of site drainage including flow from and onto adjacent properties. Must be consistent with Site Map in Appendix A:

The sites and roadways surrounding this project have conveyance systems in place, so there is no runoff expected to enter this site from off site properties. The soils on site are outwash soils with high infiltration rates, therefore any potential site runoff is assumed to infiltrate into these soils.

Description of final stabilization (example: extent of revegetation, paving, landscaping):
With the completion of construction, the entire Industrial site area of 114.56 acres will be approximately 73% impervious surfaces and 27% will be landscape areas or existing vegetation.

Contaminated Site Information:

Proposed activities regarding contaminated soils or groundwater (example: on-site treatment system, authorized sanitary sewer discharge):
The site is not expected to encounter any contaminated soils or groundwater.

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 13 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. Areas 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. A silt fence will be installed around the perimeter of the project site to mark the limits of construction as well as protect surrounding properties from any possible sediment laden runoff and grading will occur around the perimeter the site to insure there is no runoff of any ponded stormwater.

List and describe BMPs:

BMP C233: Silt Fence

Installation Schedules: TBD

Inspection and Maintenance plan:

Silt Fence Maintenance

- 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.

Responsible Staff: Contractor/CESL

2.1.2 Element 2: Establish Construction Access

Access points shall be stabilized to prevent the tracking of sediment onto public roads. Street sweeping and street cleaning shall be employed to prevent sediment from entering state waters.

One stabilized construction entrance will be installed to the southeast entrance to the project site. The roads shall be swept daily should sediment collect on them.

List and describe BMPs:

BMP C105: Stabilized Construction Entrance

Installation Schedules: TBD

Inspection and Maintenance plan:

Stabilized Construction Entrance Maintenance

- 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, and an increase in the dimensions of the entrance.
- 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.

Responsible Staff: Contractor/CESL

2.1.3 Element 3: Control Flow Rates

In order to protect the properties and waterways downstream of the project site, stormwater from the site will be controlled by construction of temporary sediment trap as one of the first items of construction along with installation of silt fence around the downstream property boundary areas. Once the trap is constructed, stormwater during construction will be captured through v-ditches with rock check dams in order to control the flow of stormwater runoff before reaching the temporary sediment trap. The temporary trap has been located at a low point on site with adequate surface area for sediment settlement per the DOE requirements from BMP C240 and also outside the limits of permanent infiltration facilities. The sediment trap discharge will infiltrate onsite. The facilities must be functioning properly before construction of site improvements.

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:
BMP C240: Sediment Trap

BMP C207: Check Dams

Installation Schedules: TBD

Inspection and Maintenance plan:

Sediment Trap Maintenance

- Sediment shall be removed from the trap when it reaches 1-foot in depth.
- Any damage to the pond embankments or slopes shall be repaired.

Check Dam Maintenance

- 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.

Responsible Staff: Contractor/CESCL

2.1.4 Element 4: Install Sediment Controls

Constructing the silt fence and sediment trap are the first steps to create the necessary gradients to prevent off-site discharge of sediment. Rock check dams and v-ditches will be used to convey stormwater runoff into the sediment trap to collect out sediment. The sediment trap is expected to be adequate for sediment control for the site. The surface area requirements for the sediment trap is met with the designed TESC plan and it is not expected that further treatment or other sediment controlling measures are necessary.

However, if the proposed sediment controls are ineffective as determined by the CESCL, they will promptly initiate the implementation of one or more of the alternative BMPs listed in Appendix B.

List and describe BMPs:

BMP C233: Silt Fence

BMP C240: Sediment Trap

Installation Schedules: TBD

Inspection and Maintenance plan:

Silt Fence Maintenance

- 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.

Sediment Trap Maintenance

- Sediment shall be removed from the trap when it reaches 1-foot in depth.
- Any damage to the pond embankments or slopes shall be repaired.

Responsible Staff: Contractor/CESL

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. In general, cut and fill slopes will be stabilized as soon as possible and soil stockpiles will be stabilized through hydroseeding. 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. To minimize the amount of soil exposed through the life of the project, grading will be completed within a reasonable time frame after the preloading of the building footprints is completed. To minimize soil compaction, a construction entrance will be used as well as keeping heavy equipment and machinery off unpaved areas as much as possible.

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: May 2021 **End date:** May 2022

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

List and describe BMPs:

BMP C121: Mulching

BMP C140: Dust Control

Installation Schedules: TBD

Inspection and Maintenance plan:

Dust Control Maintenance

- Respray area as necessary to keep dust to a minimum.

Mulching Maintenance

- The thickness of the cover must be maintained.
- Any areas that experience erosion shall be remulched and/or protected with a net or blanket. If the erosion problem is drainage related, then the problem shall be fixed and the eroded area remulched.

Responsible Staff: Contractor/CESL

2.1.6 Element 6: Protect Slopes

All cut and fill slopes will be designed, constructed, and protected in a manner that minimizes erosion. It is required that any 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. For modeling the condition with the Western Washington Hydrology Model (WWHM) to predict flows, bare soil areas have been modeled as "landscaped area". Scouring will be reduced by using v-ditches to convey stormwater to the sediment trap on site. However, if the proposed BMPs to protect slopes are ineffective as determined by the CESCL, they will promptly initiate the implementation of one or more of the alternative BMPs listed in Appendix B.

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

List and describe BMPs:

BMP C120: Temporary and Permanent Seeding

Installation Schedules: TBD

Inspection and Maintenance plan:

Temporary and Permanent Seeding Maintenance

- 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.

Responsible Staff: Contractor/CESL

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 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. If this is deemed ineffective by the CESCL, additional BMPs may be necessary, as listed in Appendix B. Inlet protection is the last component of a treatment train and protection of drain inlets include additional sediment and erosion control measures. Inlet protection devices will be cleaned (or removed and replaced), when sediment has filled the device by one third (1/3) or as specified by the manufacturer.

List and describe BMPs:

BMP C220: Storm Drain Inlet Protection

Installation Schedules: TBD

Inspection and Maintenance plan:

Storm Drain Inlet Protection Maintenance

- 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.
- Inlets to be inspected weekly and a minimum of daily during storm events

Responsible Staff: Contractor/CESL

2.1.8 Element 8: Stabilize Channels and Outlets

For construction stormwater conveyance, v-ditches with rock check dams will be installed to stabilize channels. Stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent streambanks, slopes, and downstream reaches shall be provided at the outlets of all conveyance systems. The project site is located west of the Cascade Mountain Crest. As such, all temporary on-site conveyance channels shall be designed, constructed, and stabilized to prevent erosion from the expected peak 10 minute velocity of flow 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 WWHM to predict flows, bare soil areas should be modeled as "landscaped area".

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:

BMP C207: Check Dams

Installation Schedules: TBD

Inspection and Maintenance plan:

Check Dam Maintenance

- 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.

Responsible Staff: Contractor/CESCL

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)
Hydraulic fluid - May be present on site with construction equipment.
Diesel - May be present on site with construction equipment.
Motor Oil - May be present on site with construction equipment.

All pollutants, including waste materials and demolition debris, that occur onsite 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. Chemicals, liquid products, petroleum products, and other polluting materials will be kept covered, stored appropriately, and locked when not in use to prevent vandalism or misuse of these materials that may pollute state waters.

If required, BMPs to be implemented to control specific sources of pollutants are discussed below. Vehicles, construction equipment, and/or petroleum product storage/dispensing:

All vehicles, equipment, and petroleum product storage/dispensing areas will be inspected regularly to detect any leaks or spills, and to identify maintenance needs to prevent leaks or spills.

On-site fueling tanks and petroleum product storage containers shall include secondary containment.

Spill prevention measures, such as drip pans, will be used when conducting maintenance and repair of vehicles or equipment.

In order to perform emergency repairs on site, temporary plastic will be placed beneath and, if raining, over the vehicle.

Contaminated surfaces shall be cleaned immediately following any discharge or spill incident.

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).

List and describe BMPs:

BMP C151: Concrete Handling

BMP C152: Sawcutting and Surfacing Pollution Prevention

Installation Schedules: TBD

Inspection and Maintenance plan:

Concrete Handling Maintenance

- Check containers for holes in the liner daily during concrete pours and repair the same day.

Sawcutting and Surfacing Pollution Prevention

- 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.

Responsible Staff: Contractor/CESL

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:]

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

All dewatering water from open cut excavation, tunneling, foundation work, trench, or underground vaults will be collected into a controlled holding tank prior to discharge to the sanitary sewer. Highly turbid dewatering water from soils known or suspected to be contaminated, or from use of construction equipment, may require additional monitoring and treatment as required for the specific pollutants based on the sanitary sewer permit conditions. Such monitoring is the responsibility of the contractor. It is not anticipated that any dewatering will be needed however, BMPs from Appendix B may be implemented by the CESCL if needed.

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: N/A

Installation Schedules: N/A

Inspection and Maintenance plan: N/A

Responsible Staff: N/A

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)

Table 6 – BMP Implementation Schedule

Phase of Construction Project	Stormwater BMPs	Date	Wet/Dry Season
TBD			

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

In order to protect LID BMPs during the construction process, many steps can be taken through proper erosion and sedimentation control. For this project, an infiltration trench is proposed for the flow control. In order to protect the BMP care should be taken not to compact the area for the trench during construction. To ensure the high infiltration rate of the soil is maintained, the site should be swept before the stormwater facility goes online as well. Care should also be taken not to discharge sediment laden water to the existing infiltration galleries for the southern developed sites.

3 Pollution Prevention Team

Table 7 – Team Information

Title	Name(s)	Phone Number
Certified Erosion and Sediment Control Lead (CESCL)	TBD	
Resident Engineer	Dan Balmelli	(425) 251-6222
Emergency Ecology Contact	Southwest Regional Office: WA Emergency Management Division	1-800-258-5990
Emergency Permittee/ Owner Contact	TBD	(818) 888-7380
Non-Emergency Owner Contact	TBD	
Monitoring Personnel	TBD	
Ecology Regional Office	Southwest Regional Office	(360) 407-6300

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

File a blank form 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.

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) to the sanitary sewer are indicated on the Site Map (see Appendix A) and in accordance with the applicable requirements of the CSWGP.

5 Reporting and Record Keeping

5.1 Record Keeping

5.1.1 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

5.1.2 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.

5.1.3 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.

5.2 Reporting

5.2.1 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.

5.2.2 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.

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.

A. Site Map

B. BMP Detail

Please see following pages for appropriate BMP details.
Below is a list of Alternative BMPs to be used if the BMPs listed in the body of this document are deemed ineffective by the CESCL.

Element No. 1 - Mark Clearing Limits
BMP C101: Preserving Natural Vegetation
BMP C102: Buffer Zones
BMP C103: High Visibility Fence

Element No. 2 - Establish Construction Access
BMP C107: Construction Road/Parking Area Stabilization

Element No. 3 - Control Flow Rates
BMP C203: Water Bars
BMP C209: Outlet Protection
BMP C235: Wattles

Element No. 4 - Install Sediment Controls
BMP C231: Brush Barrier
BMP C232: Gravel Filter Berm
BMP C234: Vegetated Strip
BMP C235: Wattles
BMP C250: Construction Stormwater Chemical Treatment
BMP C251: Construction Stormwater Filtration
Other Proprietary Sediment Control Technologies

Element No. 5 - Stabilize Soils
BMP C122: Nets and Blankets
BMP C124: Sodding
BMP C125 Compost
BMP C126: Topsoiling
BMP C127: Polyacrylamide for Soil Erosion Protection
BMP C130: Surface Roughening
BMP C131: Gradient Terraces

Element No. 6 - Protect Slopes
BMP C121: Mulching
BMP C122: Nets and Blankets
BMP C131: Gradient Terraces
BMP C200: Interceptor Dike and Swale
BMP C201: Grass-Lined Channels
BMP C203: Water Bars
BMP C204: Pipe Slope Drains
BMP C205: Subsurface Drains
BMP C206: Level Spreader
BMP C208: Triangular Silt Dike (Geotextile-Encased Check Dam)

Element No. 7 - Protect Drain Inlets
BMP C220: Storm Drain Inlet Protection

Element No. 8 - Stabilize Channels and Outlets
BMP C122: Nets and Blankets
BMP C202: Channel Lining
BMP C209: Outlet Protection

Element No. 9 - Control Pollutants
BMP C152: Sawcutting and Surface Pollution Prevention
BMP C153: Material Delivery, Storage, Containment
BMP C154: Concrete Washout Area
BMP C250: Construction Stormwater Chemical Treatment
BMP C251: Construction Stormwater Filtration
BMP C252: High pH Neutralization Using Co_2
BMP C253: pH Control for High pH Water
Source Control BMPs As Appropriate

Element No. 10 - Control Dewatering
BMP C203: Water Bars
BMP C226: Vegetative Filtration

Element No. 11 - Maintain BMPs
BMP C150: Materials on Hand
BMP C160 Erosion and Sedimentation Control Lead

Element No. 12 - Manage the Project
BMP C150: Materials on Hand
BMP C160: Erosion and Sediment Control Lead
BMP C162: Scheduling

Element No. 13: Protect Low Impact Development
BMP C102: Buffer Zone
BMP C103: High Visibility Fence
BMP C200: Interceptor Dike and Swale
BMP C201: Grass-Lined Channels
BMP C207: Check Dams
BMP C208: Triangular Silt Dike (TSD) (Geotextile-Encased Check Dam)
BMP C231: Brush Barrier
BMP C233: Silt Fence
BMP C234: Vegetated Strip

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: Silt Fence (p.367) 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 II-4.1.1 Stabilized Construction Entrance (p.273) 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: High Visibility Fence (p.269)) 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.

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 (p.284) 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 per-

manent 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 (p.284) 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 II-4.1.2 Temporary Erosion Control Seed Mix (p.280) lists the standard mix for areas requiring a temporary vegetative cover.

Table II-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 II-4.1.3 Landscaping Seed Mix (p.281) lists a recommended mix for landscaping seed.

Table II-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 II-4.1.4 Low-Growing Turf Seed Mix (p.281) lists a turf seed mix for dry situations where there is no need for watering. This mix requires very little maintenance.

Table II-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 II-4.1.5 Bioswale Seed Mix* (p.281) lists a mix for bioswales and other intermittently wet areas.

Table II-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 II-4.1.6 Wet Area Seed Mix* (p.282) 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 II-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 II-4.1.7 Meadow Seed Mix (p.282) 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 II-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: Temporary and Permanent Seeding. 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 during the hot summer months.
- During the wet season on slopes steeper than 3H:1V with more than 10 feet of vertical relief.

Mulch may be applied at any time of the year and must be refreshed periodically.

- For seeded areas mulch may be made up of 100 percent: cottonseed meal; fibers made of wood, recycled cellulose, hemp, kenaf; compost; or blends of these. Tackifier shall be plant-based, such as guar or alpha plantago, or chemical-based such as polyacrylamide or polymers. Any mulch or tackifier product used shall be installed per manufacturer's instructions. Generally, mulches come in 40-50 pound bags. Seed and fertilizer are added at time of application.

Design and Installation Specifications

For mulch materials, application rates, and specifications, see Table II-4.1.8 Mulch Standards and Guidelines (p.286). Always use a 2-inch minimum mulch thickness; increase the thickness until the ground is 95% covered (i.e. not visible under the mulch layer). Note: Thickness may be increased for disturbed areas in or near sensitive areas or other areas highly susceptible to erosion.

Where the option of "Compost" is selected, it should be a coarse compost that meets the following size gradations when tested in accordance with the U.S. Composting Council "Test Methods for the Examination of Compost and Composting" (TMECC) Test Method 02.02-B.

Coarse Compost

Minimum Percent passing 3" sieve openings 100%

Minimum Percent passing 1" sieve openings 90%

Minimum Percent passing ¾" sieve openings 70%

Minimum Percent passing ¼" sieve openings 40%

Mulch used within the ordinary high-water mark of surface waters should be selected to minimize potential flotation of organic matter. Composted organic materials have higher specific gravities (densities) than straw, wood, or chipped material. Consult Hydraulic Permit Authority (HPA) for mulch mixes if applicable.

Maintenance Standards

- The thickness of the cover must be maintained.
- Any areas that experience erosion shall be remulched and/or protected with a net

or blanket. If the erosion problem is drainage related, then the problem shall be fixed and the eroded area remulched.

Table II-4.1.8 Mulch Standards and Guidelines

Mulch Material	Quality Standards	Application Rates	Remarks
Straw	Air-dried; free from undesirable seed and coarse material.	2"-3" thick; 5 bales per 1,000 sf or 2-3 tons per acre	Cost-effective protection when applied with adequate thickness. Hand-application generally requires greater thickness than blown straw. The thickness of straw may be reduced by half when used in conjunction with seeding. In windy areas straw must be held in place by crimping, using a tackifier, or covering with netting. Blown straw always has to be held in place with a tackifier as even light winds will blow it away. Straw, however, has several deficiencies that should be considered when selecting mulch materials. It often introduces and/or encourages the propagation of weed species and it has no significant long-term benefits It should also not be used within the ordinary high-water elevation of surface waters (due to flotation).
Hydromulch	No growth inhibiting factors.	Approx. 25-30 lbs per 1,000 sf or 1,500 - 2,000 lbs per acre	Shall be applied with hydromulcher. Shall not be used without seed and tackifier unless the application rate is at least doubled. Fibers longer than about 3/4 - 1 inch clog hydromulch equipment. Fibers should be kept to less than 3/4 inch.
Compost	No visible water or dust during handling. Must be produced per WAC 173-350, Solid Waste Handling Standards, but may have up to 35%	2" thick min.; approx. 100 tons per acre (approx. 800 lbs per yard)	More effective control can be obtained by increasing thickness to 3". Excellent mulch for protecting final grades until landscaping because it can be directly seeded or tilled into soil as an amendment. Compost used for mulch has a coarser size gradation than compost used for BMP C125: Topsoiling / Composting (p.297) or BMP T5.13: Post-Construction Soil Quality and Depth (p.911). It is more stable and practical to use in wet areas and during rainy weather conditions. Do not use near wetlands or near phosphorous impaired water bodies.

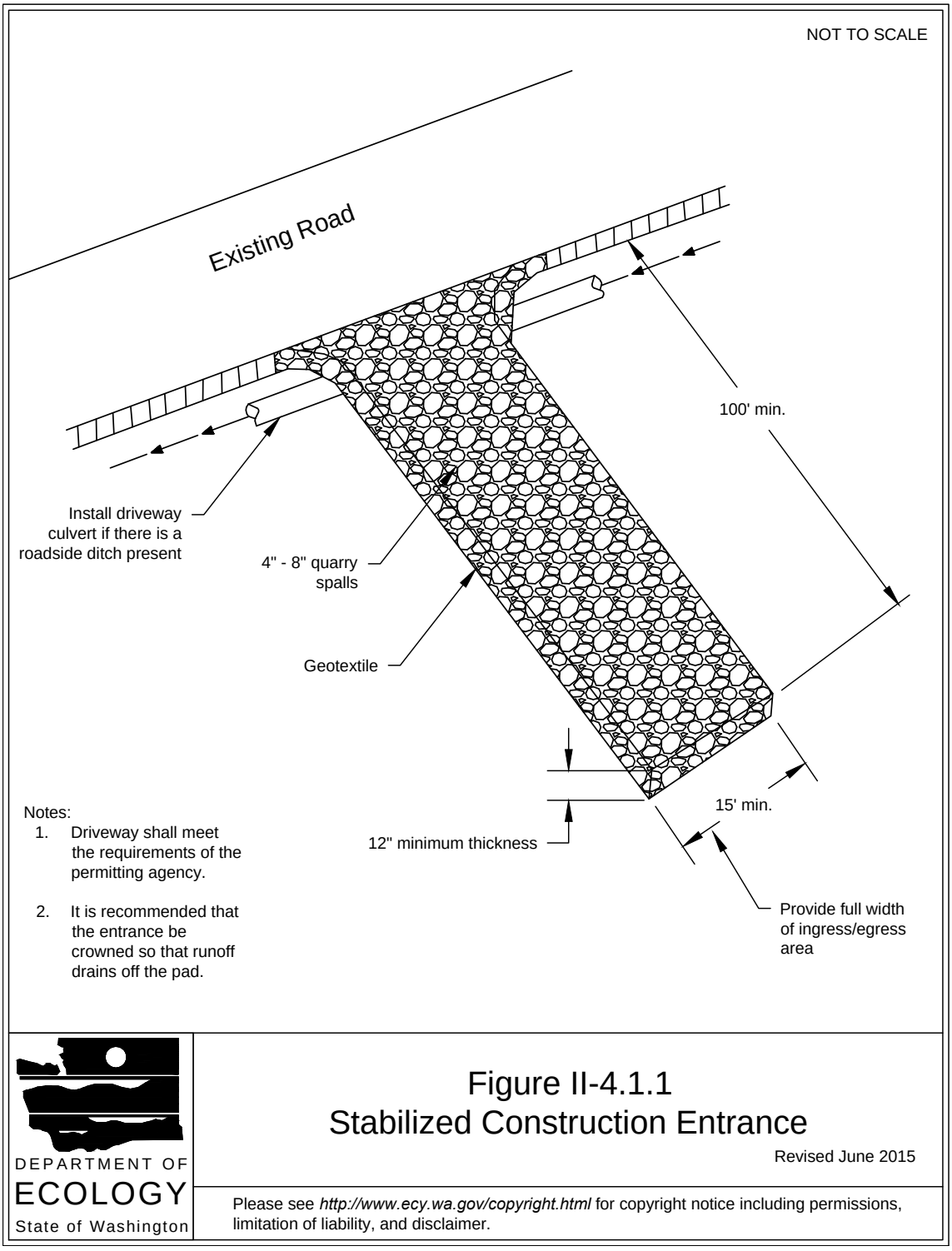
Table II-4.1.8 Mulch Standards and Guidelines (continued)

Mulch Material	Quality Standards	Application Rates	Remarks
	biosolids.		
Chipped Site Vegetation	Average size shall be several inches. Gradations from fines to 6 inches in length for texture, variation, and interlocking properties.	2" thick min.;	This is a cost-effective way to dispose of debris from clearing and grubbing, and it eliminates the problems associated with burning. Generally, it should not be used on slopes above approx. 10% because of its tendency to be transported by run-off. It is not recommended within 200 feet of surface waters. If seeding is expected shortly after mulch, the decomposition of the chipped vegetation may tie up nutrients important to grass establishment.
Wood-based Mulch or Wood Straw	No visible water or dust during handling. Must be purchased from a supplier with a Solid Waste Handling Permit or one exempt from solid waste regulations.	2" thick min.; approx. 100 tons per acre (approx. 800 lbs. per cubic yard)	This material is often called "hog or hogged fuel". The use of mulch ultimately improves the organic matter in the soil. Special caution is advised regarding the source and composition of wood-based mulches. Its preparation typically does not provide any weed seed control, so evidence of residual vegetation in its composition or known inclusion of weed plants or seeds should be monitored and prevented (or minimized).
Wood Strand Mulch	A blend of loose, long, thin wood pieces derived from native conifer or deciduous trees with	2" thick min.	Cost-effective protection when applied with adequate thickness. A minimum of 95-percent of the wood strand shall have lengths between 2 and 10-inches, with a width and thickness between 1/16 and 3/8-inches. The mulch shall not contain resin, tannin, or other compounds in quantities that would be detrimental to plant life. Sawdust or wood shavings shall not be used as mulch. (WSDOT specification (9-14.4(4))

Table II-4.1.8 Mulch Standards and Guidelines (continued)

Mulch Material	Quality Standards	Application Rates	Remarks
	high length-to-width ratio.		

Figure II-4.1.1 Stabilized Construction Entrance



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 BMP C105: Stabilized Construction Entrance Exit (p.270)
- 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: Polyacrylamide (PAM) for Soil Erosion Protection (p.300)) 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 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 Specifications

- Assure that washout of concrete trucks, chutes, pumps, and internals is performed at an approved off-site location 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: Concrete Washout Area (p.317) 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 BMP C252: High pH Neutralization Using CO2 (p.409) and BMP C253: pH Control for High pH Water (p.412) 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 C154: Concrete Washout Area

Purpose

Prevent or reduce the discharge of pollutants to stormwater from concrete waste by conducting washout off-site, or performing on-site washout in a designated area to prevent pollutants from entering surface waters or ground water.

Conditions of Use

Concrete washout area best management practices are implemented on construction projects where:

- Concrete is used as a construction material
- It is not possible to dispose of all concrete wastewater and washout off-site (ready mix plant, etc.).
- Concrete trucks, pumpers, or other concrete coated equipment are washed on-site.
- Note: If less than 10 concrete trucks or pumpers need to be washed out on-site, the washwater may be disposed of in a formed area awaiting concrete or an upland disposal site where it will not contaminate surface or ground water. The upland disposal site shall be at least 50 feet from sensitive areas such as storm drains, open ditches, or water bodies, including wetlands.

Design and Installation Specifications

Implementation

The following steps will help reduce stormwater pollution from concrete wastes:

- Perform washout of concrete trucks at an approved off-site location or in designated concrete washout areas only.
- Do not wash out concrete trucks onto the ground, or into storm drains, open ditches, streets, or streams.
- Do not allow excess concrete to be dumped on-site, except in designated concrete washout areas.
- Concrete washout areas may be prefabricated concrete washout containers, or self-installed structures (above-grade or below-grade).
- Prefabricated containers are most resistant to damage and protect against spills and leaks. Companies may offer delivery service and provide regular maintenance and disposal of solid and liquid waste.
- If self-installed concrete washout areas are used, below-grade structures are preferred over above-grade structures because they are less prone to spills and leaks.
- Self-installed above-grade structures should only be used if excavation is not practical.

Education

- Discuss the concrete management techniques described in this BMP with the ready-mix concrete supplier before any deliveries are made.

- Educate employees and subcontractors on the concrete waste management techniques described in this BMP.
- Arrange for contractor's superintendent or Certified Erosion and Sediment Control Lead (CESCL) to oversee and enforce concrete waste management procedures.
- A sign should be installed adjacent to each temporary concrete washout facility to inform concrete equipment operators to utilize the proper facilities.

Contracts

Incorporate requirements for concrete waste management into concrete supplier and subcontractor agreements.

Location and Placement

- Locate washout area at least 50 feet from sensitive areas such as storm drains, open ditches, or water bodies, including wetlands.
- Allow convenient access for concrete trucks, preferably near the area where the concrete is being poured.
- If trucks need to leave a paved area to access washout, prevent track-out with a pad of rock or quarry spalls (see BMP C105: Stabilized Construction Entrance / Exit (p.270)). These areas should be far enough away from other construction traffic to reduce the likelihood of accidental damage and spills.
- The number of facilities you install should depend on the expected demand for storage capacity.
- On large sites with extensive concrete work, washouts should be placed in multiple locations for ease of use by concrete truck drivers.

On-site Temporary Concrete Washout Facility, Transit Truck Washout Procedures:

- Temporary concrete washout facilities shall be located a minimum of 50 feet from sensitive areas including storm drain inlets, open drainage facilities, and watercourses. See Figure II-4.1.7a Concrete Washout Area (p.322), Figure II-4.1.7b Concrete Washout Area (p.323), and Figure II-4.1.8 Prefabricated Concrete Washout Container w/Ramp (p.324).
- Concrete washout facilities shall be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.
- Washout of concrete trucks shall be performed in designated areas only.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed of off-site.
- Once concrete wastes are washed into the designated area and allowed to harden, the concrete should be broken up, removed, and disposed of per applicable solid waste regulations. Dispose of hardened concrete on a regular basis.
- Temporary Above-Grade Concrete Washout Facility

- Temporary concrete washout facility (type above grade) should be constructed as shown on the details below, with a recommended minimum length and minimum width of 10 ft, but with sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations.
- Plastic lining material should be a minimum of 10 mil polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.
- Temporary Below-Grade Concrete Washout Facility.
- Temporary concrete washout facilities (type below grade) should be constructed as shown on the details below, with a recommended minimum length and minimum width of 10 ft. The quantity and volume should be sufficient to contain all liquid and concrete waste generated by washout operations.
- Lath and flagging should be commercial type.
- Plastic lining material shall be a minimum of 10 mil polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.
- Liner seams shall be installed in accordance with manufacturers' recommendations.
- Soil base shall be prepared free of rocks or other debris that may cause tears
- or holes in the plastic lining material.

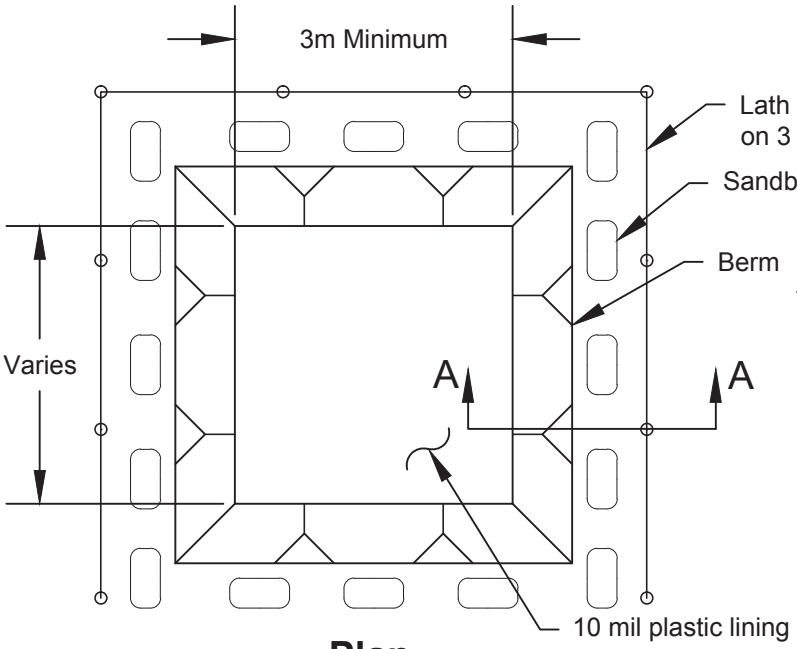
Maintenance Standards
Inspection and Maintenance

- Inspect and verify that concrete washout BMPs are in place prior to the commencement of concrete work.
- During periods of concrete work, inspect daily to verify continued performance.
    - Check overall condition and performance.
    - Check remaining capacity (% full).
    - If using self-installed washout facilities, verify plastic liners are intact and sidewalls are not damaged.
    - If using prefabricated containers, check for leaks.
- Washout facilities shall be maintained to provide adequate holding capacity with a minimum freeboard of 12 inches.
- Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.
- If the washout is nearing capacity, vacuum and dispose of the waste material in an approved manner.
- Do not discharge liquid or slurry to waterways, storm drains or directly onto ground.
- Do not use sanitary sewer without local approval.
- Place a secure, non-collapsing, non-water collecting cover over the concrete washout facility prior to predicted wet weather to prevent accumulation and overflow of precipitation.

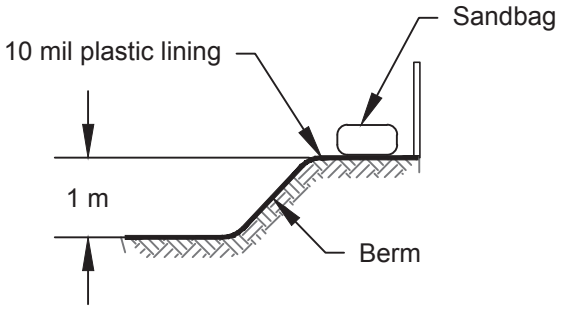
- Remove and dispose of hardened concrete and return the structure to a functional condition. Concrete may be reused on-site or hauled away for disposal or recycling.
- When you remove materials from the self-installed concrete washout, build a new structure; or, if the previous structure is still intact, inspect for signs of weakening or damage, and make any necessary repairs. Re-line the structure with new plastic after each cleaning.

Removal of Temporary Concrete Washout Facilities

- When temporary concrete washout facilities are no longer required for the work, the hardened concrete, slurries and liquids shall be removed and properly disposed of.
- Materials used to construct temporary concrete washout facilities shall be removed from the site of the work and disposed of or recycled.
- Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities shall be backfilled, repaired, and stabilized to prevent erosion.



Plan

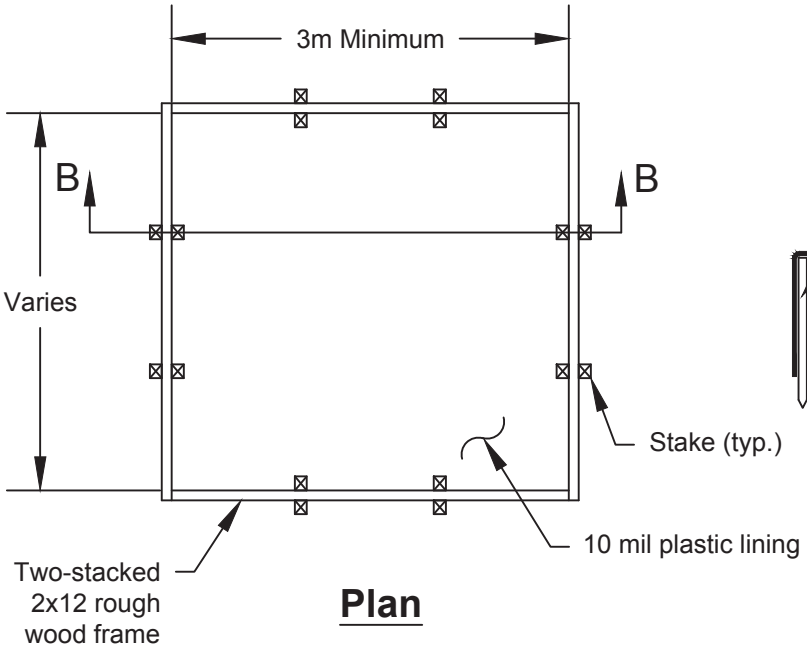


Section A-A

Type "Below Grade"

Notes:

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



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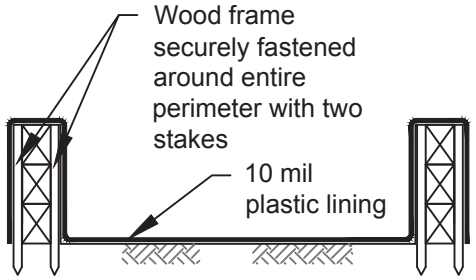

Section B-B

Type "Above Grade" with Wood Planks

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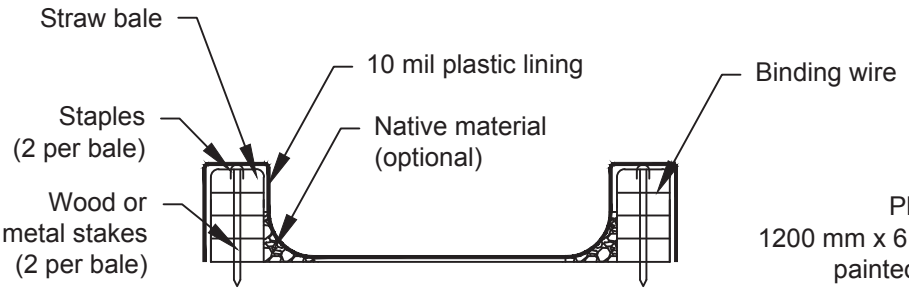
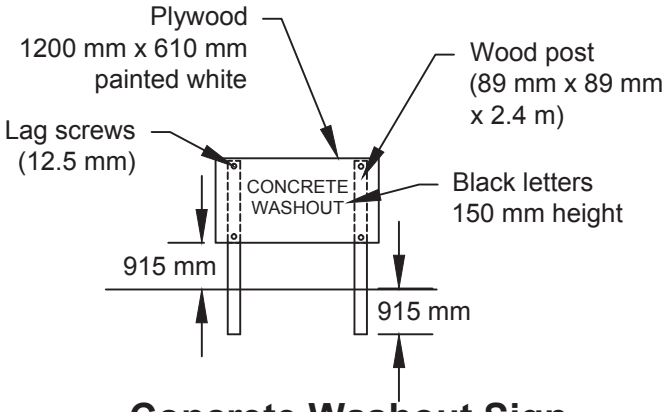
Figure II-4.1.7a
Concrete Washout Area

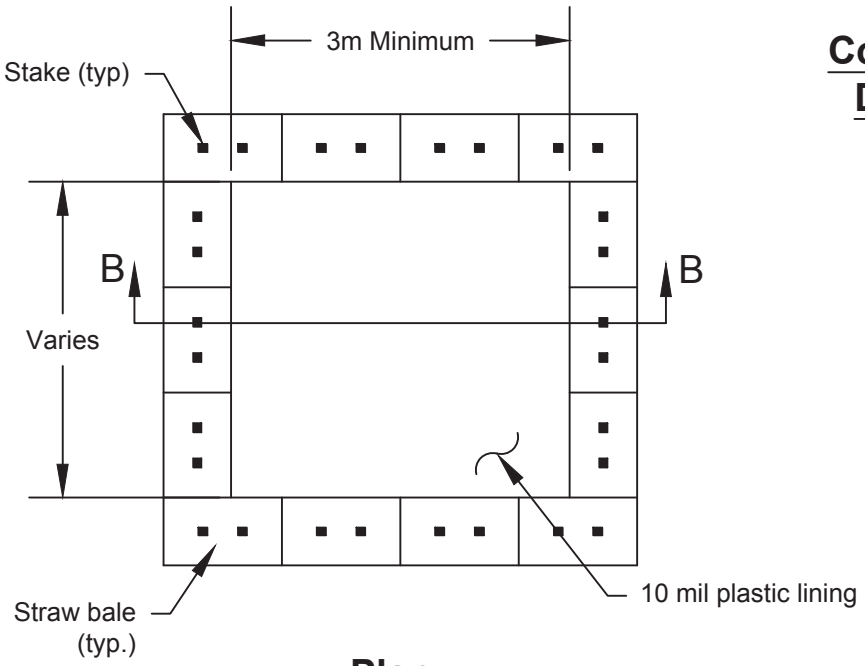
Revised June 2015



Section B-B



Concrete Washout Sign Detail (or equivalent)



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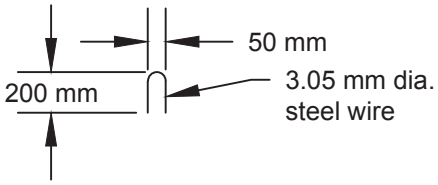

Staple Detail

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

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Figure II-4.1.7b
Concrete Washout Area

Revised June 2015

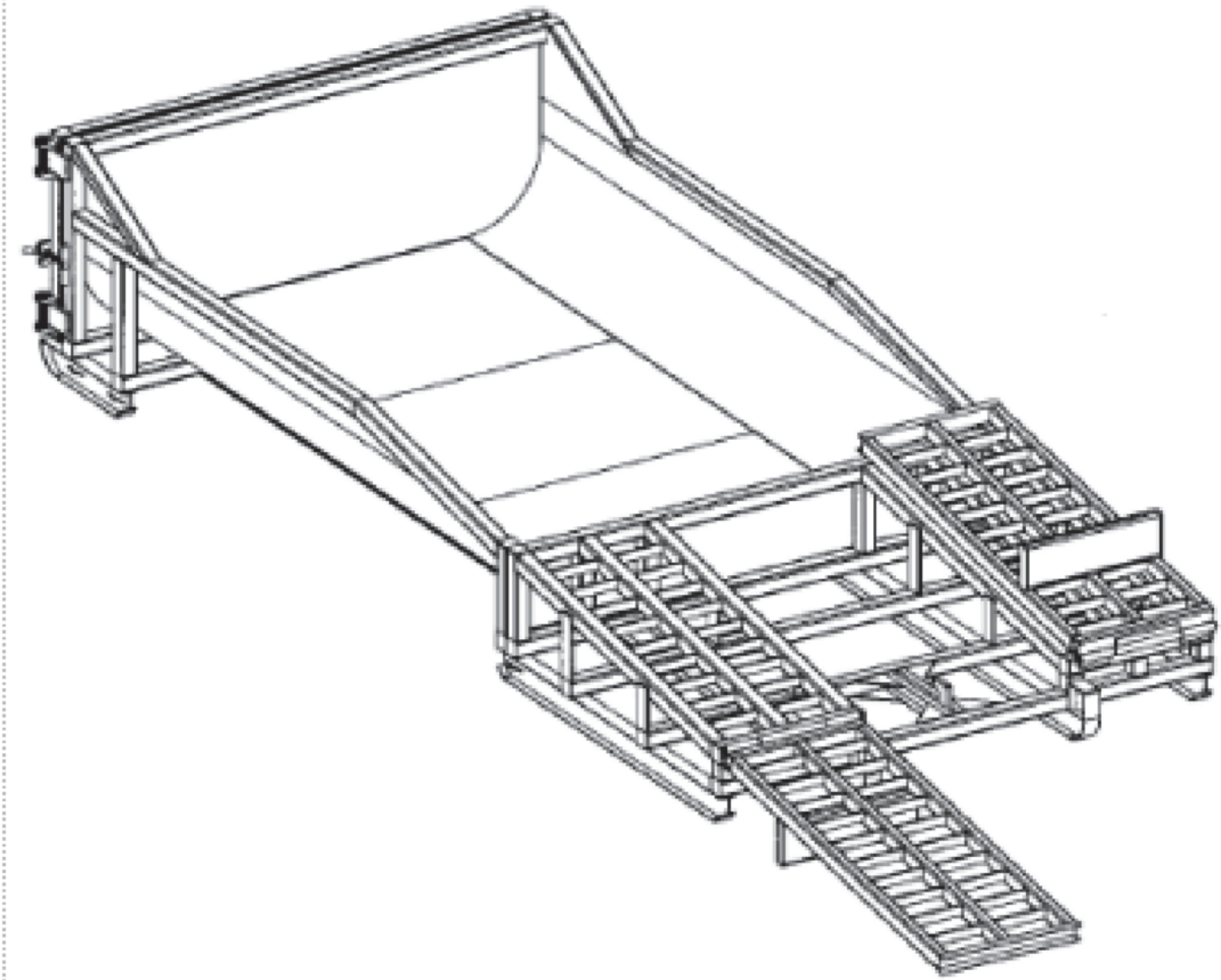

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Figure II-4.1.8
Prefabricated Concrete Washout Container w/Ramp

Revised June 2015

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: http://www.envirocertintl.org/cpesc/

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:
    - Locations of BMPs inspected.
    - Locations of BMPs that need maintenance.
    - Locations of BMPs that failed to operate as designed or intended
    - 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 erosion. Construction procedures that limit land clearing provide timely installation of erosion and sedimentation controls, and restore protective cover quickly can significantly reduce the erosion potential of a site.

Design Considerations
- Minimize construction during rainy periods.
- Schedule projects to disturb only small portions of the site at any one time. Complete grading as soon as possible. Immediately stabilize the disturbed portion before grading the next portion. Practice staged seeding in order to revegetate cut and fill slopes as the work progresses.

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 reusable, 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 II-4.2.7 Rock Check Dam (p.354) 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.

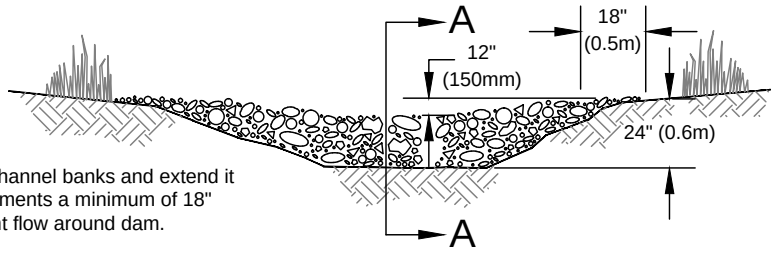
- Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam.
- If significant erosion occurs between dams, install a protective riprap liner in that portion of the channel.

Approved as Equivalent

Ecology has approved products as able to meet the requirements of BMP C207: Check Dams. 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

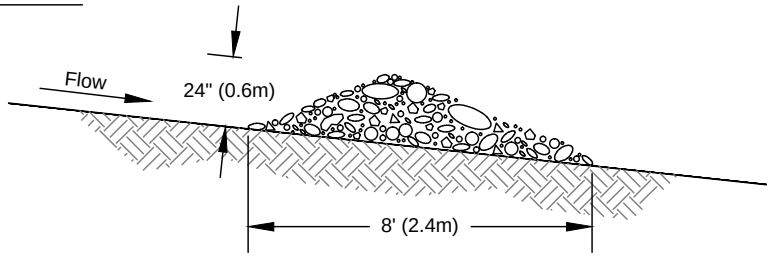
Figure II-4.2.7 Rock Check Dam

View Looking Upstream



Note:
Key stone into channel banks and extend it beyond the abutments a minimum of 18" (0.5m) to prevent flow around dam.

Section A-A



Spacing Between Check Dams

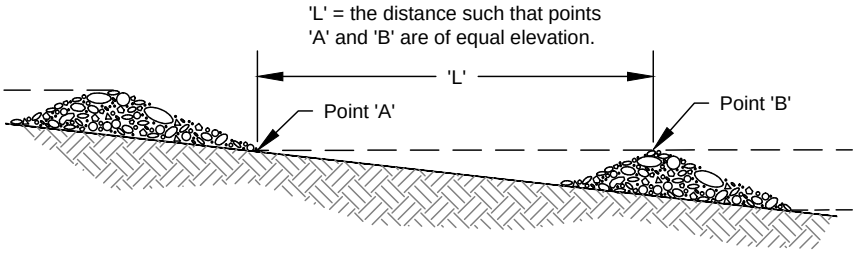


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Figure II-4.2.7
Rock Check Dam

Revised July 2015

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 pre- vent sediment from entering the system until completion of landscaping. Provide 18- inches of sod around each finished lawn and yard drain.

Table II-4.2.2 Storm Drain Inlet Protection (p.358) 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.

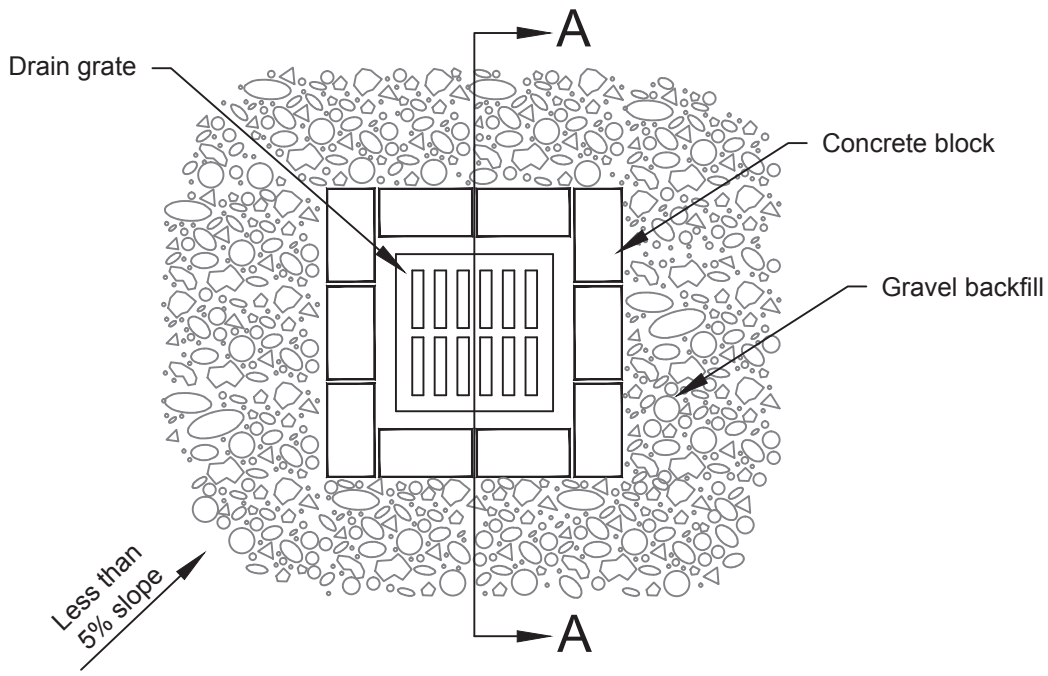
Design and Installation Specifications
Excavated Drop Inlet Protection - An excavated impoundment around the storm drain. Sediment settles out of the stormwater prior to entering the storm drain.

- 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 yard.
- 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.

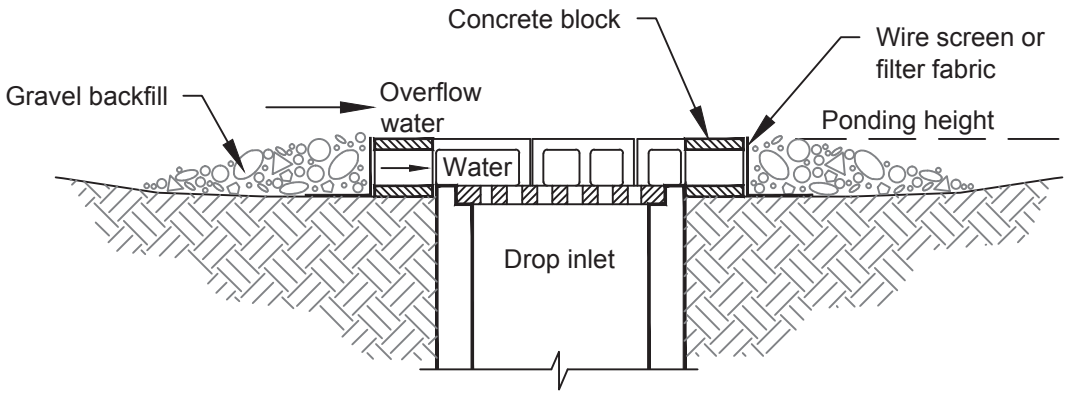
Block and Gravel Filter - A barrier formed around the storm drain inlet with standard concrete blocks and gravel. See Figure II-4.2.8 Block and Gravel Filter (p.360).

- 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.



Plan View



Section A-A

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.

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Figure II-4.2.8
Block and Gravel Filter

Revised August 2015

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 II-4.2.9 Block and Gravel Curb Inlet Protection (p.363).

- 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 II-4.2.10 Curb and Gutter Barrier (p.364).

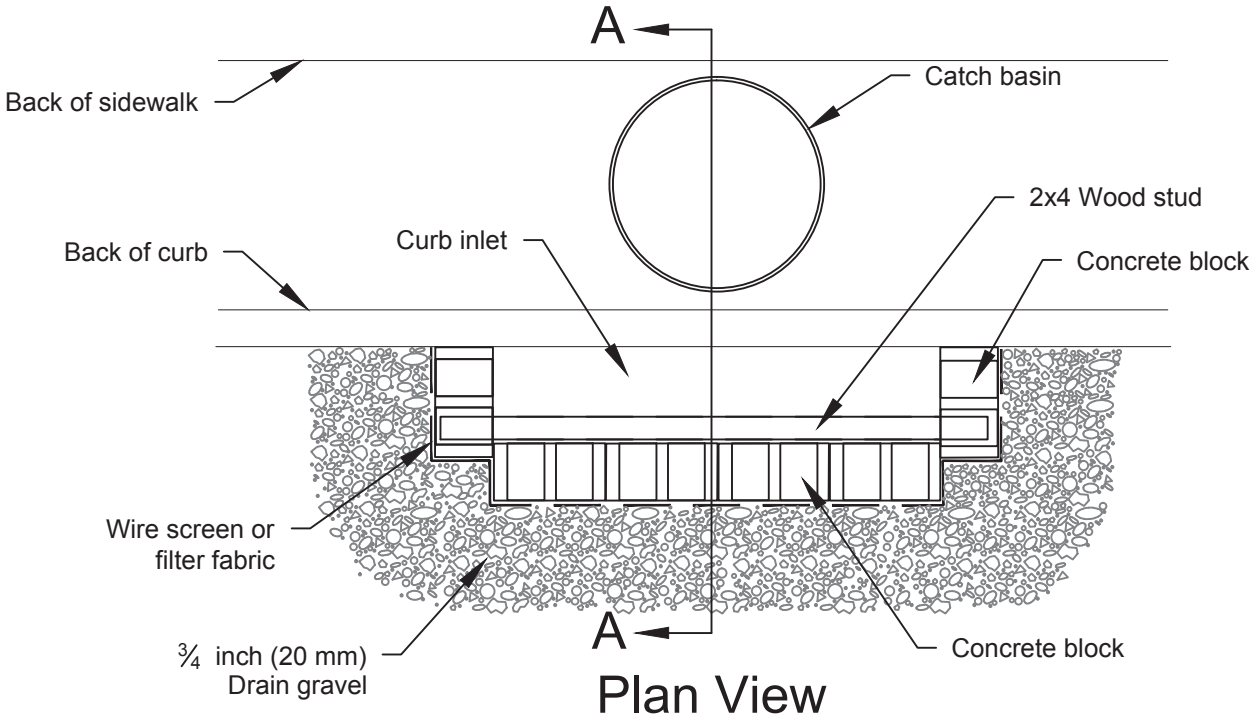
- Construct a horseshoe shaped berm, faced with coarse aggregate if using riprap, 3 feet high and 3 feet wide, at least 2 feet from the inlet.
- Construct a horseshoe shaped sedimentation trap on the outside of the berm sized to sediment trap standards for protecting a culvert inlet.

Maintenance Standards

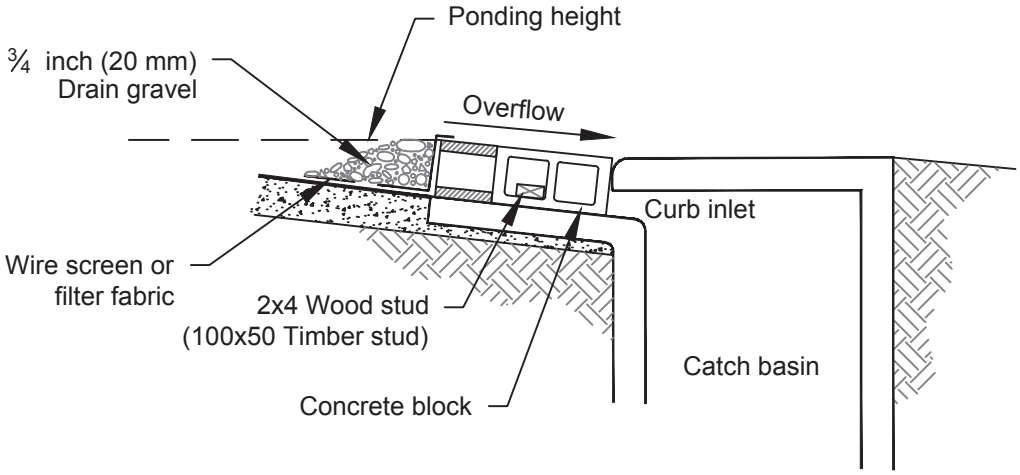
- Inspect catch basin filters frequently, especially after storm events. Clean and replace clogged inserts. For systems with clogged stone filters: pull away the stones from the inlet and clean or replace. An alternative approach would be to use the clogged stone as fill and put fresh stone around the 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: Storm Drain Inlet Protection. 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



Section A-A

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.

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Figure II-4.2.9
Block and Gravel Curb Inlet Protection

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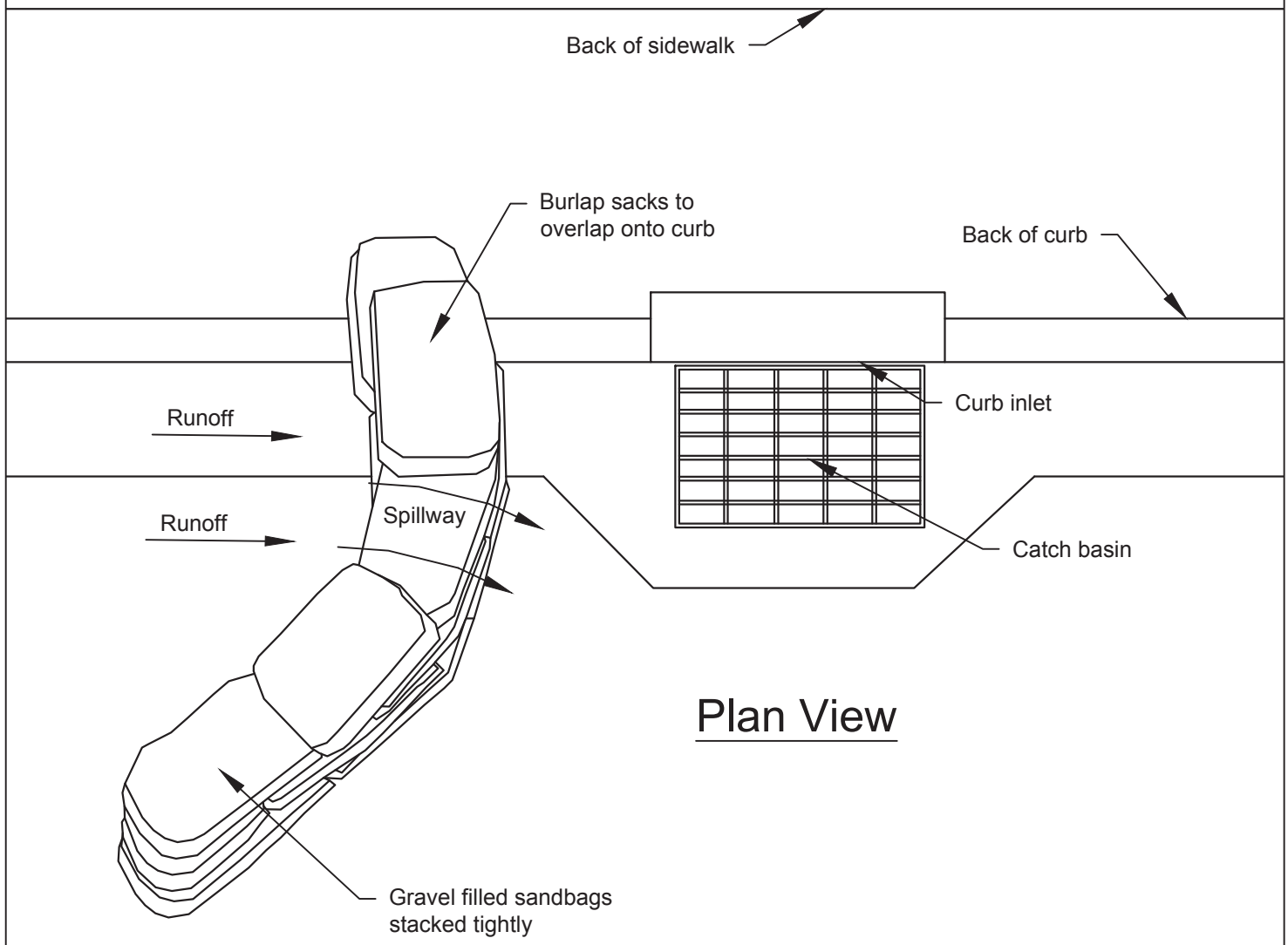

Plan View

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.

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Figure II-4.2.10
Curb and Gutter Barrier

Revised September 2015

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 II-4.2.12 Silt Fence (p.369) 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 II-4.2.12 Silt Fence

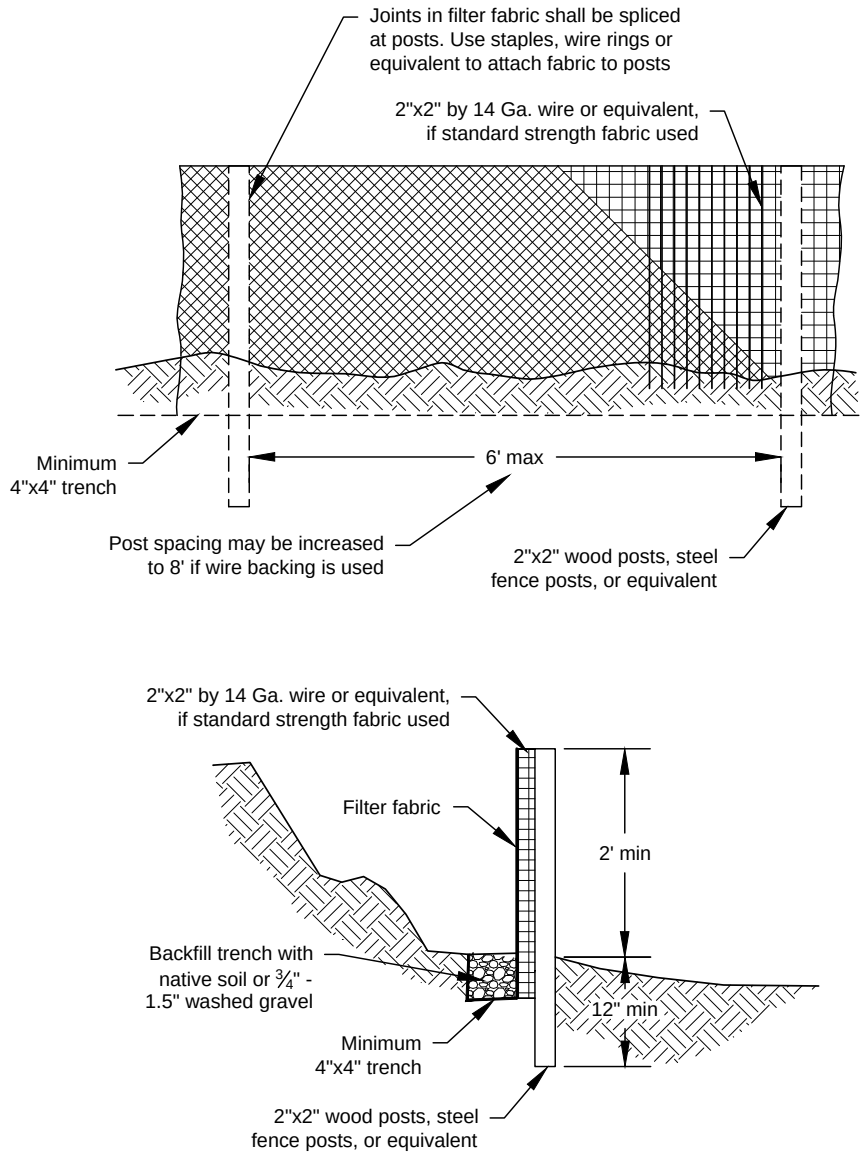

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Figure II-4.2.12
Silt Fence

Revised October 2014

BMP C240: Sediment Trap

Purpose

A sediment trap is a small temporary ponding area with a gravel outlet used to collect and store sediment from sites cleared and/or graded during construction. Sediment traps, along with other perimeter controls, shall be installed before any land disturbance takes place in the drainage area.

Conditions of Use

Prior to leaving a construction site, stormwater runoff must pass through a sediment pond or trap or other appropriate sediment removal best management practice. Non-engineered sediment traps may be used on-site prior to an engineered sediment trap or sediment pond to provide additional sediment removal capacity.

It is intended for use on sites where the tributary drainage area is less than 3 acres, with no unusual drainage features, and a projected build-out time of six months or less. The sediment trap is a temporary measure (with a design life of approximately 6 months) and shall be maintained until the site area is permanently protected against erosion by vegetation and/or structures.

Sediment traps and ponds are only effective in removing sediment down to about the medium silt size fraction. Runoff with sediment of finer grades (fine silt and clay) will pass through untreated, emphasizing the need to control erosion to the maximum extent first.

Whenever possible, sediment-laden water shall be discharged into on-site, relatively level, vegetated areas (see BMP C234: Vegetated Strip (p.375)). This is the only way to effectively remove fine particles from runoff unless chemical treatment or filtration is used. This can be particularly useful after initial treatment in a sediment trap or pond. The areas of release must be evaluated on a site-by-site basis in order to determine appropriate locations for and methods of releasing runoff. Vegetated wetlands shall not be used for this purpose. Frequently, it may be possible to pump water from the collection point at the downhill end of the site to an upslope vegetated area. Pumping shall only augment the treatment system, not replace it, because of the possibility of pump failure or runoff volume in excess of pump capacity.

All projects that are constructing permanent facilities for runoff quantity control should use the rough-graded or final-graded permanent facilities for traps and ponds. This includes combined facilities and infiltration facilities. When permanent facilities are used as temporary sedimentation facilities, the surface area requirement of a sediment trap or pond must be met. If the surface area requirements are larger than the surface area of the permanent facility, then the trap or pond shall be enlarged to comply with the surface

area requirement. The permanent pond shall also be divided into two cells as required for sediment ponds.

Either a permanent control structure or the temporary control structure (described in BMP C241: Temporary Sediment Pond (p.388)) can be used. If a permanent control structure is used, it may be advisable to partially restrict the lower orifice with gravel to increase residence time while still allowing dewatering of the pond. A shut-off valve may be added to the control structure to allow complete retention of stormwater in emergency situations. In this case, an emergency overflow weir must be added.

A skimmer may be used for the sediment trap outlet if approved by the Local Permitting Authority.

Design and Installation Specifications

- See Figure II-4.2.16 Cross Section of Sediment Trap (p.386) and Figure II-4.2.17 Sediment Trap Outlet (p.387) for details.
- If permanent runoff control facilities are part of the project, they should be used for sediment retention.
- To determine the sediment trap geometry, first calculate the design surface area (SA) of the trap, measured at the invert of the weir. Use the following equation:

$$SA = FS(Q_2/V_s)$$

where

Q_2 = Design inflow based on the peak discharge from the developed 2-year runoff event from the contributing drainage area as computed in the hydrologic analysis. 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.

V_s = The settling velocity of the soil particle of interest. The 0.02 mm (medium silt) particle with an assumed density of 2.65 g/cm3 has been selected as the particle of interest and has a settling velocity (Vs) of 0.00096 ft/sec.

FS = A safety factor of 2 to account for non-ideal settling.

Therefore, the equation for computing surface area becomes:

$$SA = 2 \times Q_2/0.00096$$

or

2080 square feet per cfs of inflow

Note: Even if permanent facilities are used, they must still have a surface area that is at least as large as that derived from the above formula. If they do not, the pond must be enlarged.

- To aid in determining sediment depth, all sediment traps shall have a staff gauge with a prominent mark 1-foot above the bottom of the trap.
- Sediment traps may not be feasible on utility projects due to the limited work space or the short-term nature of the work. Portable tanks may be used in place of sediment traps for utility projects.

Maintenance Standards

- Sediment shall be removed from the trap when it reaches 1-foot in depth.
- Any damage to the pond embankments or slopes shall be repaired.

Figure II-4.2.16 Cross Section of Sediment Trap

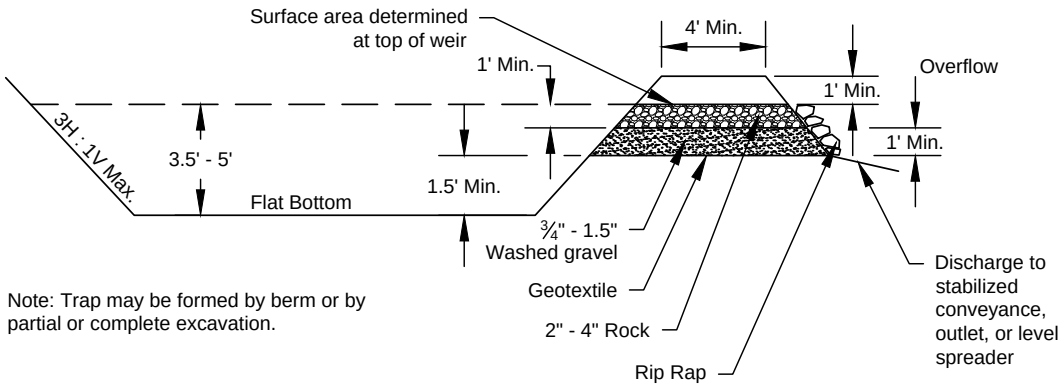

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Figure II-4.2.16
Cross Section of Sediment Trap

Revised November 2015

Figure II-4.2.17 Sediment Trap Outlet

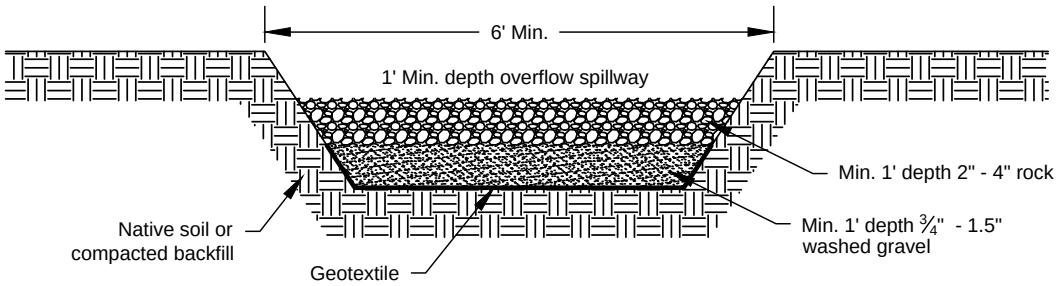

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Figure II-4.2.17
Sediment Trap Outlet

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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 Figure II-4.2.18 Sediment Pond Plan View (p.391), Figure II-4.2.19 Sediment Pond Cross Section (p.392), and Figure II-4.2.20 Sediment Pond Riser Detail (p.393) 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: Sediment Trap (p.383) 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:

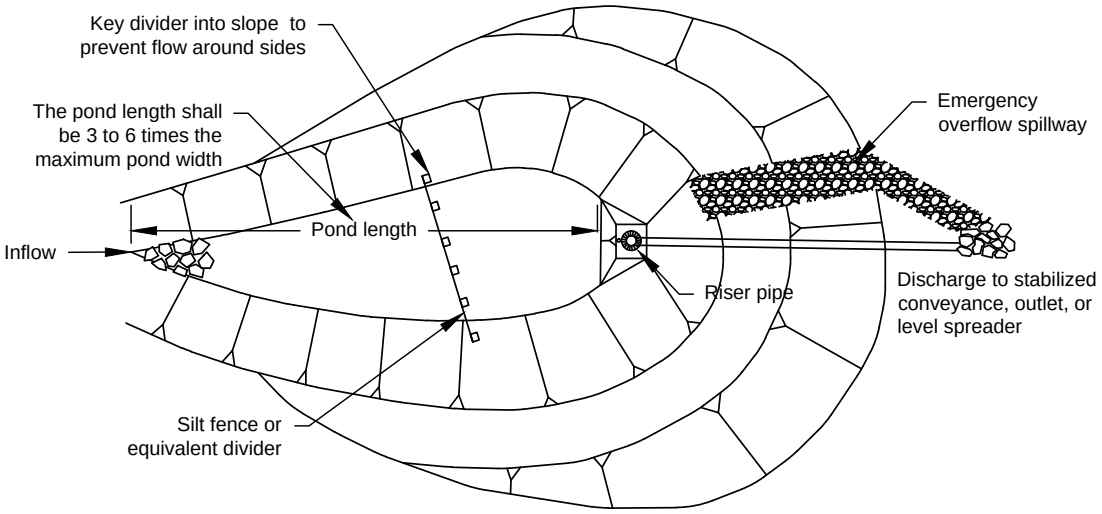
- Required surface area SA (from Step 2 above) at top of riser.
- Minimum 3.5-foot depth from top of riser to bottom of pond.
- Maximum 3H:1V interior side slopes and maximum 2H:1V exterior slopes. The interior slopes can be increased to a maximum of 2H:1V if fencing is provided at or above the maximum 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 spill-ways. These outlets must pass the peak runoff expected from the contributing drain-age area for a 100-year storm. If, due to site conditions and basin geometry, a separate emergency spill-way 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 cal-culations 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 I-2.5.7 Minimum Requirement #7: Flow Control (p.64). 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 II-4.2.21 Riser Inflow Curves (p.394) for riser inflow curves.

Figure II-4.2.18 Sediment Pond Plan View



Note: Pond may be formed by berm or by partial or complete excavation

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Figure II-4.2.18
Sediment Pond Plan View

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Figure II-4.2.19 Sediment Pond Cross Section

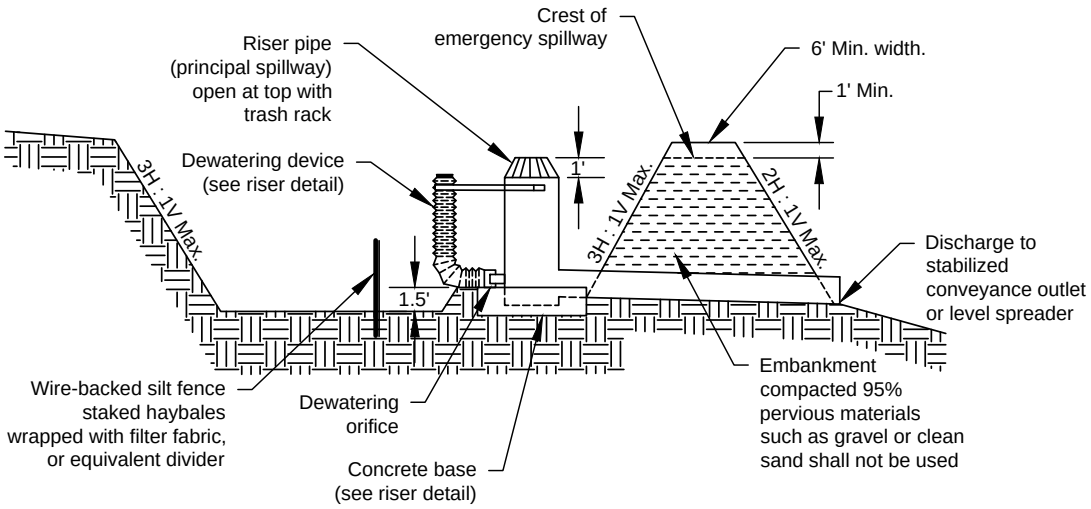

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Figure II-4.2.19
Sediment Pond Cross Section

Revised November 2015

Figure II-4.2.20 Sediment Pond Riser Detail

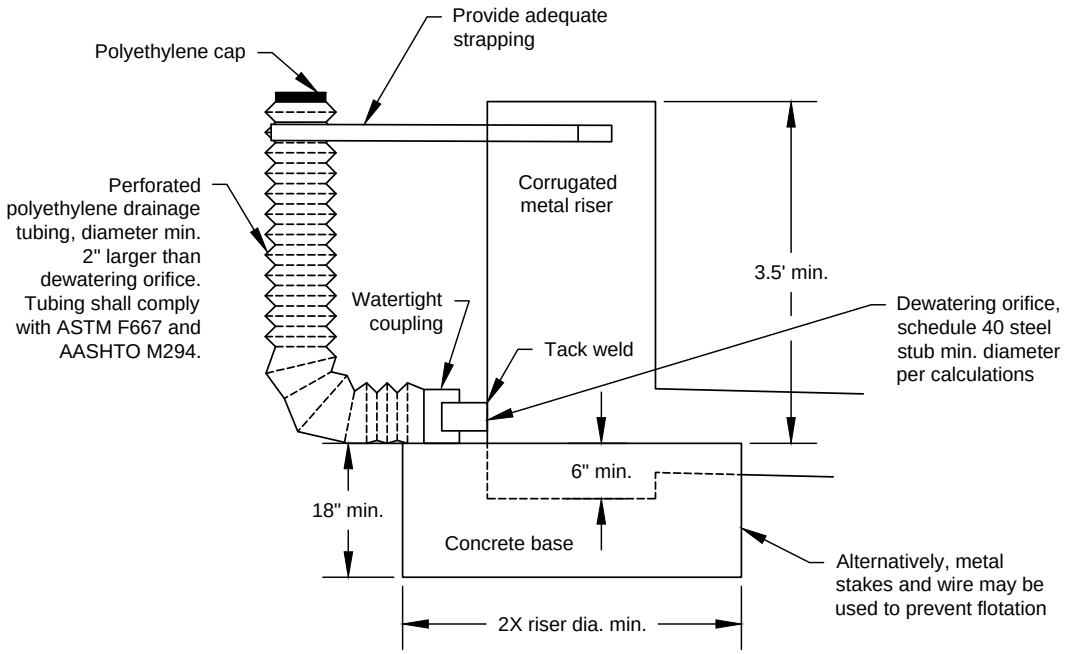

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Figure II-4.2.20
Sediment Pond Riser Detail

Revised November 2015

C. Site Inspection Form

Please see following pages for the 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?						
13 Protect LID	Is all Bioretention and Rain Garden Facilities protected from sedimentation with appropriate BMPs?						
	Is the Bioretention and Rain Garden protected against over compaction of construction equipment and foot traffic to retain its infiltration capabilities?						
	Permeable pavements are clean and free of sediment and sediment laden-water runoff. Muddy construction equipment has not been on the base material or pavement.						
	Have soiled permeable pavements been cleaned of sediments and pass infiltration test as required by stormwater manual methodology?						
	Heavy equipment has been kept off existing soils under LID facilities to retain infiltration rate.						

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: _____

7.0 SPECIAL REPORTS AND STUDIES

Special reports for this project include:

- Infiltration Memo prepared by Terra Associates dated Oct 10, 2020

Attachment D
Infiltration Memo

8.0 OTHER PERMITS

Other permits for this project include:

- Site Development Permit
- Building Permit
- Sanitary Sewer Connection Permit
- Right-of-Way Use Permit
- Construction Stormwater General Permit (NPDES)

9.0 OPERATION AND MAINTENANCE MANUAL

Applicable Operations and Maintenance Manual are to be provided with future submittals in this Section.

10.0 BOND QUANTITIES WORKSHEET

Performance bonding or other appropriate financial instruments shall be provided as determined necessary by the City of Dupont.