Exhibit 3

Preliminary Stormwater Site Plan

Wellington Preliminary Plat
1204 Yew Street
City Project No.s SUB2023-0011, DR2023-0008, CAP2023-0008, VAR2023-0004, SEP2023-0008

Prepared for:
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July 2023

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1.0 PROJECT OVERVIEW

This Preliminary Stormwater Site Plan is proposed for the development of a 2.51-acre parcel (the parent parcel) located at 1204 Yew Street in the City of Bellingham (Figure 1). The parent parcel lies within Section 33, Township 38 North, Range 3 East, W.M. in Whatcom County, Tax Parcel Number 380333-038441-0000.

The parent parcel is in Area 7 of the Whatcom Falls neighborhood, and is zoned Residential Single, Detached Cluster.

1.1 General Description

A single-family residence is located on the property and is accessed by a gravel drive. The un-developed areas are vegetated with trees and shrubs. The topography slopes downward to the west. Stormwater runoff currently flows to the west to West Cemetery Creek via the public storm system (see Qualitative Downstream Analysis, Jones Engineers, Inc. dated September 21, 2022). One wetland is located on the eastern end of the parent parcel. This wetland has a culvert that drains water south to the Alvarado Drive stormwater system. This water is routed west into the Yew Street conveyance system.

The proposed development includes construction of ten lots for single-family residences and a new public access road from Yew Street ending in a cul-de-sac together with a private access road and private driveways. The project requires site grading, access improvements, construction of on-site stormwater management facilities, and utility infrastructure improvements.

A single underground vault system is proposed at the westerly end of the proposed road to manage stormwater runoff. A stormwater filter cartridge system is proposed for runoff treatment.

1.2 Methods, Design Requirements & Criteria

This report has been prepared in accordance with the requirements of Bellingham Municipal Code 15.42 *Stormwater Management* (BMC 15.42), current ordinance December 11, 2017. These regulations require the implementation of the latest Washington State Department of Ecology (DOE) stormwater management manual for the stormwater BMPs.

The Washington State Department of Ecology's *Stormwater Management Manual for Western Washington*, July 2019, (DOE Manual) was used to model and design the proposed stormwater plan.

In accordance with the DOE Manual, the study area's hydrologic analysis was performed using the *Western Washington Hydrologic Model 2012* (WWHM), February 2016, software version 4.2.18. The WWHM is a continuous simulation hydrologic model developed by the DOE.

The pre-development condition was modeled with forested and partially developed land cover. Half of the existing developed area was modeled with forested cover in accordance with BMC 15.42.060 (E).

2.0 EXISTING CONDITIONS SUMMARY

This section presents information on the study area at the start of the project.

2.1 Pre-Development Conditions

The topography used for this analysis is based on a field survey by Northwest Survey and GPS, Inc. of Lynden Washington. The topography naturally divides the parent parcel into two major basins, eastern and western. The eastern basin, located at the eastern 120± feet of the property, is a depression approximately four feet deep. This area contains a wetland (see Section 2.3 below). This eastern basin and wetland is drained by an existing culvert that conveys stormwater runoff south to the Alvarado Drive stormwater system. There are no proposed improvements in this eastern wetland area basin.

The western basin includes the area roughly from the existing overhead power line (to the existing house) to the western property boundary (see Figures 1 and 3). The western basin is the location of the proposed improvements and the primary subject of this report. Presently, runoff sheet-flows across the basin to where it is captured by the existing stormwater system in Yew Street.

2.2 Soils Information

General soil information was obtained from the *Soil Survey of Whatcom County Area, Washington* published by the Natural Resource Conservation Service (NRCS). Soils in the study area include Chuckanut and Squalicum Urban Land Complexes. Appendix B contains the soil unit descriptions and a soil map of the study area.

Table 1. Soil Unit Information.

Soil ID	Soil Name	% Slope	Hydrologic Group
29	Chuckanut Urban Land Complex	5-20	B
159	Squalicum-Urban Land Complex	5-20	B

A geotechnical investigation was performed for the stormwater design. A site-specific Geotechnical Report was prepared by Geotest Engineering, Inc. titled *Geotechnical Engineering Report for 1204 Yew Street*. The report's "Findings and Recommendations" section addresses stormwater infiltration potential. For most of the site, Geotest's finds
"the presence of a "restrictive layer," as defined by the 2019 Stormwater Management Manual for Western Washington. Maintaining a minimum separation from the base of traditional stormwater infiltration systems to this restrictive layer

does not appear feasible across most of the project site. Thus, it is our opinion that the site is not suitable for conventional stormwater infiltration."

For the purpose of this analysis most of the existing soils are assumed to drain like a till soil and will be modeled as Hydrologic Group "C."

2.3 Wetland Information

Wetlands are located the eastern basin. Wetland A is an 8,400 square foot Category III wetland as described in the *Critical Area Assessment and Mitigation Plan* by Northwest Ecological Services, 2022. The report was submitted as a stand-alone item for the critical area permit CAP2023-0008 (*q.v.*) as part of the preliminary plat application.

3.0 OFF-SITE ANALYSIS

3.1 Drainage

Figure 5, Stormwater Off-Site Analysis, shows the stormwater drainage system in the vicinity of the project site. As shown in the figure, there is an east-west grade break at the east wetland area. The east portion of the site (with no proposed development) drains south to Alvarado Drive, where it enters the storm sewer system. From there it flows west to Yew Street, then south past the study area in the storm drain. All the water from the study area drains west to West Cemetery Creek. The proposed development will occur in the west portion of the site, which drains to the West Cemetery Creek system.

3.2 City of Bellingham Watershed and Stormwater Comprehensive Plans

The 1995 City of Bellingham Watershed Master Plan and the City's 2020 Stormwater Comprehensive Plan provide descriptions of the Cemetery Creek Basin and have identified deficiencies in the conveyance system.

There are no known upland erosion impacts or localized flooding areas in the site vicinity. Proposed detention of all runoff to a pre-development condition will mitigate runoff impacts from development.

4.0 PERMANENT STORMWATER CONTROL PLAN

A single Basin "A" is used to represent both pre-development and post-development conditions.

4.1 Basin A Runoff Control

Basin A is located at the west end of the study area and has an area of 1.92 acres. This basin contains all of the proposed site improvements. All runoff, except for area P1 (refer to Figure 4) will be routed to a concrete detention vault (32' wide, 68' long, 8' deep). See Figure 2 and Figure 6. A control structure will restrict runoff to predeveloped conditions.

Runoff from area P1 (refer to Figure 4) cannot be routed to the proposed vault due to elevation constraints. According to BMC 15.40.060 stormwater runoff mitigation "*may be met for an equivalent (flow and pollution characteristics) area within the same site*." The area of P1 is 1,515 square feet of impervious surface. The detention system has been oversized to provide flow control for areas P21 and P5. These two existing impervious areas total 3,513 square feet of impervious surface, are within the same site and half would not otherwise require detention.

4.2 Runoff Treatment

Water treatment will be provided by a Contech Filtration System located adjacent to the detention vault. Additional treatment for area P1 will be provided with two Contech water quality filters in catch basins located at the site intersection with Yew Street Road.

This proposed stormwater management system described above, with additional information provided in "Section 5.0 - Summary of Minimum Development Requirements," and as shown in Figures 4 and 7, makes up the Permanent Stormwater Control Plan.

4.3 Wetland Basin

The Wetland Basin is located on the east end of the study area. This basin consists of the open space / wetland area. The basin drains through a pipe to the Alvarado Place drainage system. No changes or improvements are proposed within this basin and no stormwater control facilities are proposed for this basin. The Wetland Basin has an area of 0.60 acres. Refer to Figure 3.

Table 2: Basin A - Summary of Ground Cover

Description	Area (acres)
Pre-Developed Basin A	
Pervious, C, Forest, Flat	0.08
Pervious, C, Forest, Moderate	0.55
Pervious, C, Forest, Steep	1.02
Pervious, C, Pasture, Flat	0.04
Pervious, C, Pasture, Moderate	0.06
Pervious, C, Pasture, Steep	0.07
Total Pervious	**1.81**
Impervious, Driveway, Flat	0.01
Impervious, Driveway, Moderate	0.04
Impervious, Driveways, Steep	0.03
Impervious, Roof, Flat	0.03
Total Impervious	**0.11**
Pre-development Basin A Total	**1.92**
Post-Development Basin A	
Pervious, C, Lawn, Flat	0.46
Pervious, C, Lawn, Moderate	0.21
Pervious, C, Lawn, Steep	0.40
Total Pervious	**1.07**
Impervious, Roads, Flat	0.03
Impervious, Roads, Moderate	0.34
Impervious, Roof Tops, Flat	0.33
Impervious, Driveways, Flat	0.08
Impervious, Driveways, Moderate	0.06
Impervious Total	**0.84**
Post-Development Basin A Total	**1.92**

5.0 SUMMARY OF MINIMUM DEVELOPMENT REQUIREMENTS

As shown in Table 2, the proposed development will add over 5,000 square feet of new impervious area. As stated in Section 3.0 of this report, the project site is in the West Cemetery Creek Basin. The minimum stormwater development requirements for the project have been determined using the BMC 15.42.060 Approval Standards, Section A.2, as noted below:

2. The following new development shall comply with Minimum Requirements No. 1 through No. 9 within subsection (F) of this section:

a. Creation or addition of 5,000 square feet, or more, of new, replaced or new plus replaced hard surface area; or

b. Convert three-fourths acres, or more, of native vegetation to lawn or landscaped areas; or

c. Convert two and one-half acres, or more, of native vegetation to pasture; or

d. One acre or more of land-disturbing activity; or

e. A subdivision containing two or more lots that is likely to exceed the land disturbance and/or hard surface thresholds from future property development; or

f. Other development that is determined by the public works director to contain a significant risk for the degradation of stormwater.

5.1 Minimum Requirement 1 – Preparation of Stormwater Site Plans

This report is the Stormwater Site Plan, prepared in accordance with Chapter 3 of Volume I of the DOE Manual.

5.2 Minimum Requirement 2 – Construction Stormwater Pollution Prevention Plan (SWPPP)

A Stormwater Pollution Prevention Plan (SWPPP) will be included in the final plan. This Plan will provide erosion and sediment control information, locations where Best Management Practices (BMPs) shall be implemented, and requirements that the contractor must follow throughout construction.

5.3 Minimum Requirement 3 – Source Control of Pollution

No improvements are proposed which will require additional source control BMPs. Treatment for the driveways, roads and buildings is provided by a Contech Stormwater System and two Contech Stormwater Filters. During the construction phase of the project, temporary construction erosion source controls measures will be implemented.

5.4 Minimum Requirement 4 – Preservation of Natural Drainage Systems and Outfalls

Under the proposed drainage system, the present drainage pattern will be maintained and the discharge points from the study area will occur at the present locations. Under existing conditions surface runoff follows the overall site topography travels and travels east to west across Basin A and is captured in the Yew Street stormwater conveyance system. Under the proposed development, runoff will be captured, treated, detained, and conveyed to the Yew Street stormwater conveyance system.

5.5 Minimum Requirement 5 – On-Site Stormwater Management

As stated in Section 5.0 of this report, the project site threshold discharge basin is required to comply with Minimum Requirements No. 1 through No. 9. BMC 15.42.060.F.5.b.ii states the following:

> ii. Thresholds. Projects triggering Minimum Requirements No. 1 through No. 9 shall meet the requirements stated in the Ecology Manual.

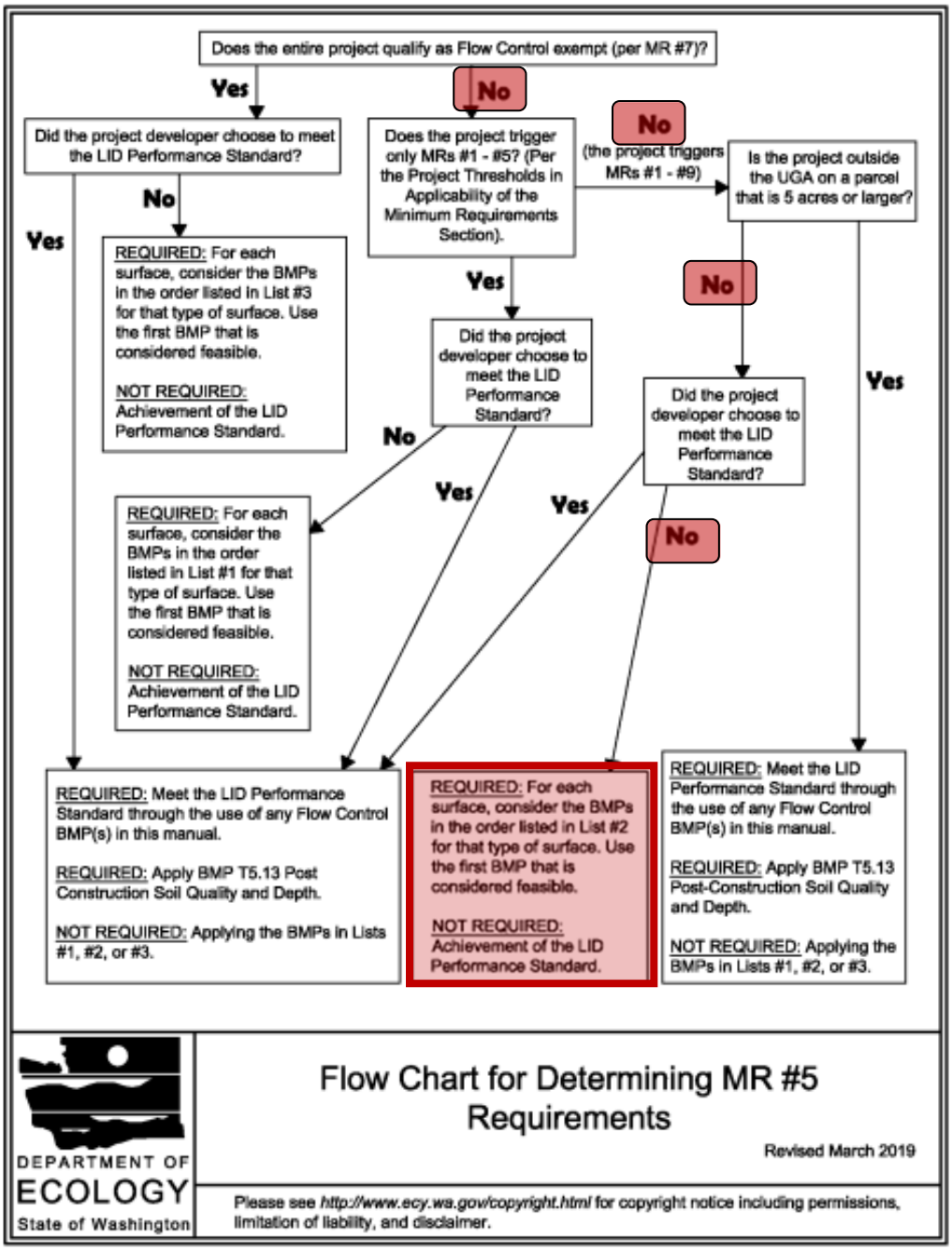
Flow Chart for Determining LID MR # 5 of the DOE Manual is provided below:

Table I-3.1: Minimum Requirement #5 Compliance Options for Projects Triggering Minimum Requirements #1 - #9

Project Location and Parcel Size	Minimum Requirement #5 Compliance Options
Projects inside the UGA, on any size parcel	• Use the LID BMPs from List #2 for all surfaces within each type of surface in List #2; or • Use any Flow Control BMPs desired to achieve the LID Performance Standard, and apply BMP T5.13: Post-Construction Soil Quality and Depth.
Projects outside the UGA, on a parcel smaller than 5 acres	
Projects outside the UGA, on a parcel 5 acres or larger	Use any Flow Control BMPs desired to achieve the LID Performance Standard, and apply BMP T5.13: Post-Construction Soil Quality and Depth.
Note: This text refers to the Urban Growth Area (UGA) as designated under the Growth Management Act (GMA) (Chapter 36.70A RCW) of the State of Washington. If the project is located in a county that is not subject to planning under the GMA, the city limits shall be used instead.	

Each of the threshold discharge areas triggers Minimum Requirements 1-9 and thereby either the Low Impact Development Performance Standards and BMP T5.13, Post-Construction Soil Quality and Depth, or the List #2 Requirements need to be addressed.

Figure I-3.3: Flow Chart for Determining MR #5 Requirements



Meeting the flow control requirements for Low Impact Development Performance Standards Stormwater (additionally matching developed discharge durations to pre-developed forest durations below the 50% of the 2-year peak threshold down to 8% of the 2-year peak flow) will have an insignificant benefit because of the small project area. Additionally, meeting this extra detention requirement will make the flow control facility prohibitively large. Therefore, the first BMP considered feasible in the List #2 Requirement option will be used.

Table I-3.2: The List Approach for MR5 Compliance

List #1 (For MR #1 - #5 Projects That Are Not Flow Control Exempt)	List #2 (For MR #1 - #9 Projects That Are Not Flow Control Exempt)	List #3 (For Flow Control Exempt Projects)
Surface Type: Lawn and Landscaped Areas		
BMP T5.13: Post-Construction Soil Quality and Depth	BMP T5.13: Post-Construction Soil Quality and Depth	BMP T5.13: Post-Construction Soil Quality and Depth
Surface Type: Roofs		
1. BMP T5.30: Full Dispersion or BMP T5.10A: Downspout Full Infiltration	1. BMP T5.30: Full Dispersion or BMP T5.10A: Downspout Full Infiltration	1. BMP T5.10A: Downspout Full Infiltration
2. BMP T5.14: Rain Gardens or BMP T7.30: Bioretention	2. BMP T7.30: Bioretention	2. BMP T5.10B: Downspout Dispersion Systems
3. BMP T5.10B: Downspout Dispersion Systems	3. BMP T5.10B: Downspout Dispersion Systems	3. BMP T5.10C: Perforated Stub-out Connections
4. BMP T5.10C: Perforated Stub-out Connections	4. BMP T5.10C: Perforated Stub-out Connections	
Surface Type: Other Hard Surfaces		
1. BMP T5.30: Full Dispersion	1. BMP T5.30: Full Dispersion	BMP T5.12: Sheet Flow Dispersion or BMP T5.11: Concentrated Flow Dispersion
2. BMP T5.15: Permeable Pavements or BMP T5.14: Rain Gardens or BMP T7.30: Bioretention	2. BMP T5.15: Permeable Pavements	
3. BMP T5.12: Sheet Flow Dispersion or BMP T5.11: Concentrated Flow Dispersion	3. BMP T7.30: Bioretention	
	4. BMP T5.12: Sheet Flow Dispersion or BMP T5.11: Concentrated Flow Dispersion	

Notes for using the List Approach:

1. Size BMP T5.14: Rain Gardens and BMP T7.30: Bioretention used in the List Approach to have a minimum horizontal projected surface area below the overflow which is at least 5% of the area drain-

List #2 Requirements:

Lawn and landscape areas:

- *Post-Construction Soil Quality and Depth in accordance with BMP T5.13 in Chapter 5 of Volume V.*

BMP T5.13 will be followed.

Roofs:

Roof runoff will be directed to the proposed street conveyance system for treatment and detention. Other BMPs are discussed below.

- *Full Dispersion in accordance with BMP T5.30 in Chapter 5 of Volume V, or Downspout Full*
- *Infiltration Systems in accordance with BMP T5.10A in Section 3.1.1 in Chapter 3 of Volume III.*

BMP T5.30: The geotechnical report indicates that the site soils are inappropriate for infiltration.
BMP T5.10A: The geotechnical report indicates that the site soils are inappropriate for infiltration.

Bioretention

According to the geotechnical report "the site has a shallow silty sand layer over a dense relatively impervious layer. Should the bottom of a bioretention facility extend into this dense soil layer, the bioretention facility would require an underdrain that would make the benefit negligible".

Downspout Dispersion Systems in accordance with BMP T5.10B in Section 3.1.2 in Chapter 3 of Volume III.

A downspout dispersion system is not practical due to the lot size and the inability to achieve a 50-foot vegetated flow path from the downspouts to a property line. Roofs shall be connected to the roadway storm drainage system.

Perforated Stub-out Connections in accordance with BMP T5.10C in Section 3.1.3 in Chapter 3 of Volume III

Perforated stub-out connections are not practical as they require infiltration not available from the site soils.

Other Hard Surfaces:
Full Dispersion in accordance with BMP T5.30 in Chapter 5 of Volume V BMP T5.30:

The geotechnical report indicates that only a small area at the west end of the site is suitable for full dispersion.

Permeable pavement in accordance with BMP T5.15 in Chapter 5 of Volume V.

The geotechnical report indicates that the site soils are inappropriate for infiltration.

Bioretention BMP's (See Chapter 7, Volume V of the SMMWW) that have a minimum horizontally projected surface area below the overflow which is at least 5% of the total surface area draining to it.

See response to Roofs #2 above.

Sheet Flow Dispersion in accordance with BMP T5.12, or Concentrated Flow Dispersion in accordance with BMP T5.11 in Chapter 5 of Volume V.

The geotechnical report indicates that the site soils are limited in performance of dispersion and infiltration except in a small area.

5.6 Minimum Requirement 6 – Runoff Treatment

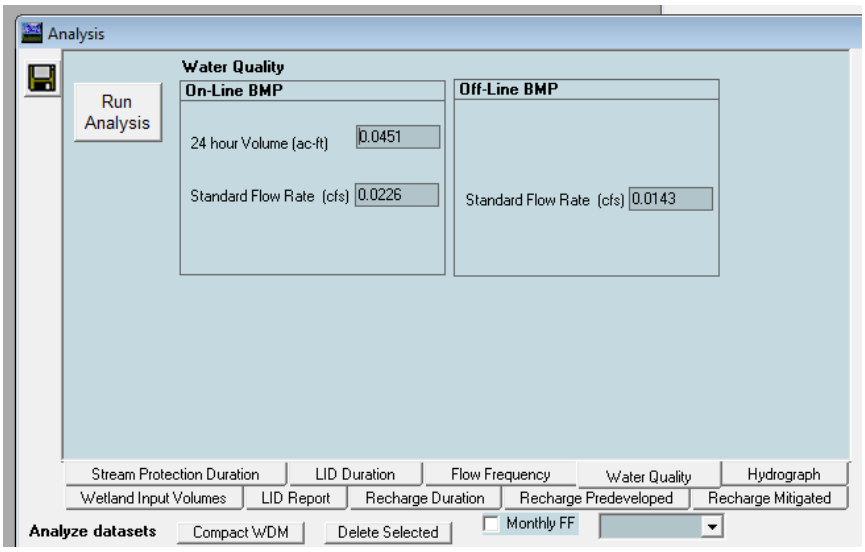
Stormwater runoff will be treated with a Contech Storm Filter as described below.

BMC 15.42.060.F.6.b states the following:

> b. Thresholds. When assessing the applicability of Minimum Requirement No. 6, only consider those hard and pervious surfaces listed below.
>
> i. The following require construction of stormwater treatment facilities:
>
> (A) Projects in which the total of new, replaced or new plus replaced effective pollution-generating hard surface (PGHS) is 5,000 square feet or more in a threshold discharge area of the project; or
>
> (B) Projects in which the total of new, replaced or new plus replaced effective pollution-generating pervious surfaces (PGPS) – not including permeable pavements – is three-quarters of an acre or more in a threshold discharge area, and from which there will be a surface discharge in a natural or manmade conveyance system from the site.
>
> ii. Additional thresholds for oil control, phosphorus treatment, enhanced treatment, and basic treatment are stated in the Ecology Manual.

In accordance with the Enhanced Treatment Criteria provided in *Volume V, Section III-1.2, Step 5* of the DOE Manual, enhanced treatment for stormwater runoff is not required. Only Basic Treatment is required for this single-family residence project with an anticipated ADT of less than 7,500.

As shown in Figure 2, stormwater runoff from the pollution generating surfaces is routed to the vault detention system. The discharge from this facility will be routed to a water quality treatment system.



As shown above, the WWHM water quality discharge rate from the detention facilities is 0.023 cfs. The tentative treatment facility will treat 0.023 cfs.
The proposed Contech Storm Filter system was chosen because it can handle low flows. The Storm Filter system was specified to process a discharge of 0.03 cfs with a minimum head of 1.0 feet, as shown in Figures 2 and 7.

Two Contech Storm Filter will be installed at the proposed site access road, one on either side of road. These will treat un-detained runoff from area P1.

5.7 Minimum Requirement 7 – Flow Control

BMC 15.42.060.F.6.b states the following:

> b. Thresholds. When assessing the applicability of Minimum Requirement No. 7, consider the following:
>
> i. Projects in which the total of new, replaced or new plus replaced effective hard surfaces are 10,000 square feet or more in a threshold discharge area; or
>
> ii. Projects that convert three-fourths acres or more of native vegetation to lawn or landscape, or convert two and one-half acres or more of native vegetation to pasture in a threshold discharge area, and from which there is a surface discharge in a natural or manmade conveyance system from the site; or
>
> iii. Projects that, through a combination of new, replaced or new plus replaced effective impervious surfaces and converted pervious surfaces, cause a 0.1 cubic feet per second increase in the 100-year flow frequency from a threshold discharge area as estimated using the Western Washington Hydrology Model or other approved model using one-hour time steps (or a 0.15 cfs increase using 15-minute time steps); or
>
> iv. Projects within Basin One of the Lake Whatcom watershed.
>
> c. Standard Flow Control Methodology. Stormwater discharges shall match developed discharge durations to predeveloped durations for the range of predeveloped discharge rates from 50 percent of the two-year peak flow up to the full 50-year peak flow. The predeveloped condition to be matched shall be a forested land cover unless reasonable, historic information is provided that indicates the site was prairie prior to settlement (modeled as "pasture" in the Western Washington Hydrology Model); or

Since this project will add more than 10,000 square feet of new effective hard surfaces, flow control is required. No work will be performed in the wetland or the Wetland Tract, so this area is not included in the analysis. A detention system will be provided as shown in Appendix C – Western Washington Hydrology Model Analysis Results and on Figures 2 and 6. Table 3 provides information on the site's performance during the design storm events.

Table 3. Summary of Flow Rates.

Basin A	Pre-development Flow (cfs)	Post-Development Flow (cfs)
2-Year Storm	0.078	0.030
5-Year Storm	0.113	0.047
10-Year Storm	0.138	0.061
25-Year Storm	0.171	0.083
50-Year Storm	0.197	0.104
100-Year Storm	0.224	0.127

5.8 Minimum Requirement 8 – Wetlands Protection

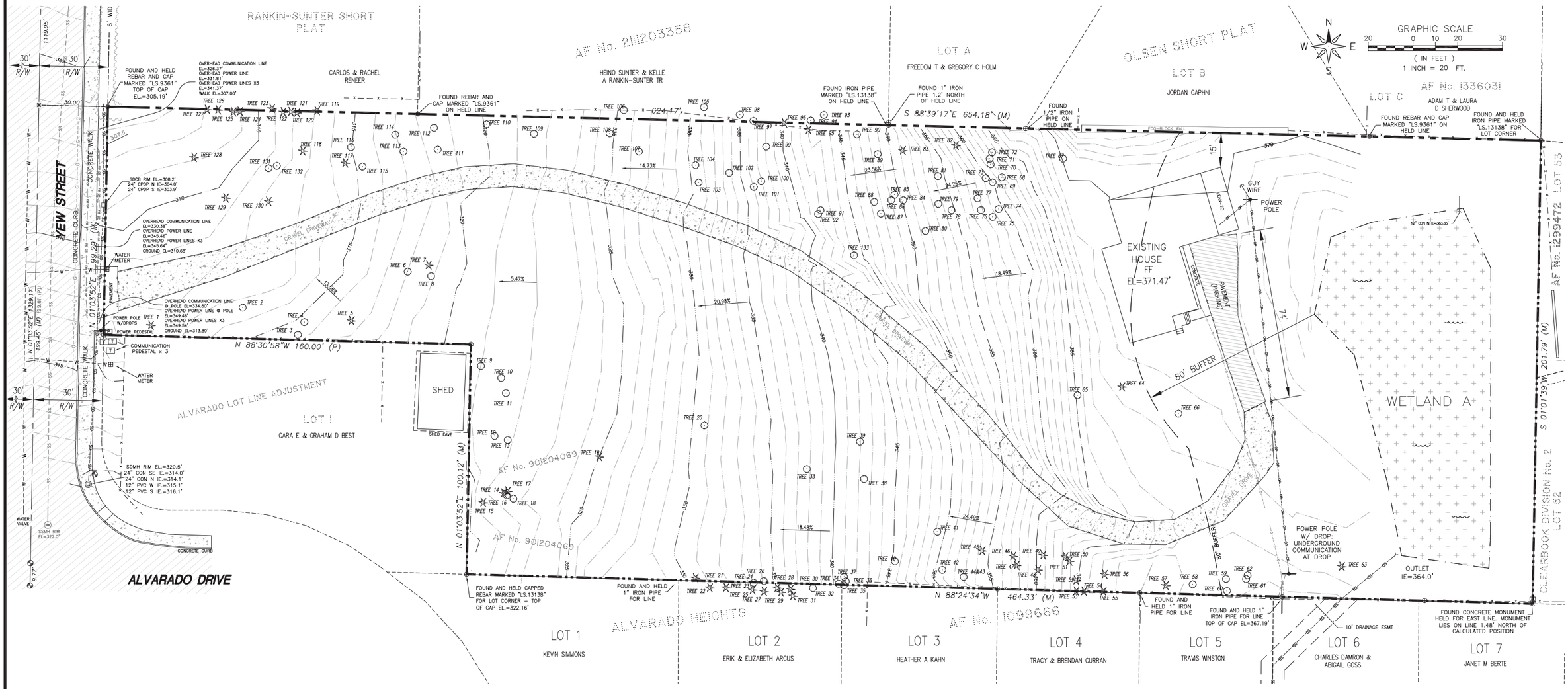
As noted in the Critical Areas Assessment and Mitigation Plan by Northwest Ecological Services, there is an existing wetland on the east side of the property. This area is drained by a culvert that conveys runoff south to the Alvarado Drive stormwater system. There are no proposed improvements in this wetland area. A conservation easement will be established to protect the wetland and wetland buffer "Open Space Area" as shown on Figure 2, according to the mitigation plan.

5.9 Minimum Requirement 9 – Operation and Maintenance

A Stormwater Facilities Operation and Maintenance Manual will be submitted with the final design documents. The stormwater water quality treatment and flow control facilities are anticipated to be turned over to the city with the city performing the necessary operation and maintenance.

End of report.

FIGURES



VICINITY MAP

LEGEND

- EXISTING GROUND CONTOUR
- EDGE OF PAVEMENT OR CURB LINE
- RIGHT OF WAY
- SECTION SUBDIVISION
- PROJECT/BOUNDARY
- LOT LINE
- CENTERLINE
- EASEMENT
- OTHER PROPERTY
- PARCEL B — LOT NUMBER
- EXISTING MANHOLE
- EXISTING CLEANOUT
- WETLAND
- 80' BUFFER
- EXISTING SEWER SERVICE
- EXISTING CATCHBASIN
- EXISTING STORM DRAIN
- EXISTING WATERMAIN
- EXISTING SINGLE WATER SERVICE
- EXISTING FIRE HYDRANT
- EXISTING FIRE HYDRANT
- EXIST. COMMUNICATION PEDESTAL
- EXISTING WATER METER
- EXIST. TREES
- GRAVEL DRIVEWAY

EXISTING CONDITIONS

REVISION

NO	DATE	BY	NOTE
1.			
2.			
3.			
4.			

EXISTING EASEMENT NOTE:
NOT PLOTTED ON PLAN

Recorded: February 6, 1890
Recorded in: Vol. 11 of Deeds, Page 60
Records of: Whatcom County, Washington
In favor of: BELLINGHAM BAY WATER COMPANY

Recorded: June 30, 1988
Recording No. 1606486
Records of: Whatcom County, Washington
In favor of: PACIFIC NORTHWEST BELL TELEPHONE

DRAWN BY_____ DATE_____
CHECKED BY____ DATE_____

JOB# 22001

WELLINGTON PRELIMINARY PLAT

FOR: BRADLEY & KRISTINA WIDMAN

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THIS DOCUMENT, CONSISTING OF PLANS, DESIGNS, AND SPECIFICATIONS, WAS PREPARED UNDER MY PERSONAL SUPERVISION AND MEETS CITY OF BELLINGHAM CODES AND STANDARDS AND FURTHER THAT SAID PLANS MEET THE GENERALLY ACCEPTED STANDARDS OF PRACTICE WITHIN THE STATE OF WASHINGTON.

RYAN A. LONG, P.E. DATE

PRELIMINARY

JONES ENGINEERS
phone 360-733-8888, www.jonesengineers.us
4164 Meridian Street · Suite 304 · Bellingham, Wa. 98226

1204 YEW STREET

EXISTING CONDITIONS

FIGURE 1

EX. SDMH
RIM EL=295.52'
24" CPDP S I.E.=291.71
24" CPDP W I.E.=291.63
6" CMP NW I.E.=292.50

SD-OUTFALL 0+48.38, 0.00
INSTALL: CB MANHOLE
THRU CURB FRAME & GRATE
W/ WATER QUALITY
FILTER PER CONTECH
MAKE CONNECTION TO
EXIST. 24" CDPE SD PIPE
I.E. IN=OUT= 302.90

RANKIN-SUNTER SHORT PLAT
LOT 1
CARLOS & RACHEL RENEER

AF No. 2111203358
LOT 2
HEINO SUNTER & KELLE A RANKIN-SUNTER TR

LOT A
FREEDOM T & GREGORY C HOLM

OLSEN SHORT PLAT
LOT B
JORDAN GAPHNI

AF No. 1336031
LOT C
ADAM T & LAURA D SHERWOOD

NOTE:
MINIMUM 18"SOIL COVER.

YEW STREET

S 88°39'17"E 654.18' (M)
624.17'

C/L INTERSECTION
STREET 0+00.00,
=YEW STEET C/L

SD INLET
RIM EL.=311.20
I.E. OUT= 308.20

STREET 0+29.13, 24.73' RT
EX. SDCB RIM EL.=308.2'
24" CPDP N IE=304.0'
24" CPDP S IE=303.9'
RESET / CB RIM
INSTALL: THRU CURB
GRAVE & GRATE
W/ WATER QUALITY
STORMFILTER PER CONTECH

SD-OUTFALL 0+04.50, 0.00
INSTALL: WATER QUALITY
CONTECH STORMFILTER
(SFMH48)
I.E. IN= 304.15
I.E. OUT= 303.15

SD CB
RIM EL= 311.20
I.E. IN=OUT=308.10

SD OUTFALL 0+00
12" FLOW CONTROL
RESTRICTER
I.E. OUT=304.15

12" DIA. INFLOW TO
CONC. SD VAULT
I.E. IN=307.00

DETENTION TRACT "A"
4,250 SF
VAULT: (L)68' x (W)32' x (D)8.0'

N 01°03'52"E 99.29' (M)
N 01°03'52"E 199.45' (M) 99.81' (P)
N 01°03'52"E 1329.17'

N 88°30'58"W 160.00' (P)

EX. POWER PEDESTAL
EX. COMMUNICATION PEDESTAL x 3
EX. POWER POLE W/ DROPS
EX. WATER METER
EX. UTIL. ESMT.

ALVARADO LOT LINE ADJUSTMENT
LOT 1
CARA E & GRAHAM D BEST

EXIST. SHED

LOT 8
6,492 SF
PAD 18.00 -

PAD 20.0

LOT 7
6,481 SF
PAD 26.0

PAD 28.0

AF No. 9012040669

N 01°03'52"E 100.12' (M)

SDMH RIM EL.=320.5'
24" CON SE IE.=314.0'
24" CON N IE.=314.1'
12" PVC W IE.=315.1'
12" PVC S IE.=316.1'

CDS C/L TO C/L ALVARADO DR
LENGTH= 180'

WATER VALVE
STORM RIM EL.=322.0'
CONCRETE CURB
ALVARADO DR.

N
W E
S

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

5' SIDEWALK
F/C
R/W
R/W-P/L
CONC. CURB
CONC. WALK
CURB RAMP
30.00'
S/B
10' UTIL. ESMT.

207.53'
N88°39'17"W 258.14'
79.27'
85.50'
85.26'
74.73'
68.00'
49.50'
49.29'
32.00'
57.90'
23.52'
20.34'
78.79'
85.39'
155.47'
120.10'
102.36'
126.78'
162.06'
34.89'
73.28'
53.33'
87.64'
48.93'
202.96'
98.70'
12.05'
15.29'
13.05'
26.90'
50.00'
22.0
20.0
31'
27.39'
27.67'
20.41'
16.44'
18.88'
13.8'
5.00'
6.75'
80.45'
74.13'
67.97'
144.47'
42.66'
34.91'
63.0
65.0
88.0'
18.76'
15.0'
11'
12'
3'
1.5:1
H= 2.0'
H= 2.0-8.0'
10' CON N IE=363.65'

6%
8%
12%
5%
2%
1.5%
15%

SD CPP SD PIPE

STREET 1 2+62.64
CENTER CDS

STREET 1 2+97.64
C/L @ F/C

STREET LIGHT

108 LF 20' WIDE FIRE ACCESS ROAD

FH

WTR. STUB
SWR. STUB
LOT DRAIN STUB
WTR. STUB(S)
SWR. STUB(S)

LOT 1
6,480 SF
GARAGE FLR. 33.00
FIN. MAIN FLR. EL. 37.0
PAD 34.0

LOT 2
6,483 SF
GARAGE FLR. 48.00
FIN. MAIN FLR. EL. 54.0

LOT 3
10,130 SF
EXISTING HOUSE
FF EL=371.47'
BUILDING SETBACK

STREET 1 4+03.87, 0.00
END 20' FIRE LANE
BEGIN 12' DRIVEWAY

30' PUBLIC SEWER & WATER ESMT.
16' PRIVATE ACCESS & UTIL. ESMT.

N04°40'54"W

OPEN SPACE AREA
23,091 SF
(21.60% OF OVERALL SITE)

BUFFER MITIGATION AREA

WETLAND

MATCH EXIST. DRIVEWAY
L=20.41'
R=30.00'
L=36.25'
R=30.00'

STREET 1 4+77.89, 0.00
C/L @ LOTLINE

LOT DRN STUB
WTR. STUB
SWR. STUB
SWR. C.O.
WTR. B.O.

LOT 5A
3,770 SF
PAD 34.0
PAD 33.0

LOT 5B
3,944 SF
PAD 40.0

LOT 5C
4,737 SF
PAD 45.0

4' PATH

MEDIUM LANE:
11 FT TRAVEL
4' PED. PATH

5' WALKWAY

LOT 6
8,783 SF
PAD 35.0
PAD 37.0
PAD 3.0

LOT 4
8,081 SF
PAD 65.00

POWER POLE W/ DROP: UNDERGROUND COMMUNICATION AT DROP

EX. OUTLET
IE= 364.0'

N 88°24'34"W 464.33' (M)

ALVARADO HEIGHTS

AF No. 1099666

10' DRAINAGE ESMT

LOT 1
KEVIN SIMMONS

LOT 2
ERIK & ELIZABETH ARCUS

LOT 3
HEATHER A KAHN

LOT 4
TRACY & BRENDAN CURRAN

LOT 5
TRAVIS WINSTON

LOT 6
CHARLES DAMRON & ABIGAIL GOSS

LOT 7
JANET M BERTE

CLEARBROOK DIVISION No. 2
LOT 52

AF No. 1295472

S 01°01'39"W 201.79' (M)

DETENTION VAULT / SD RISER DETAIL

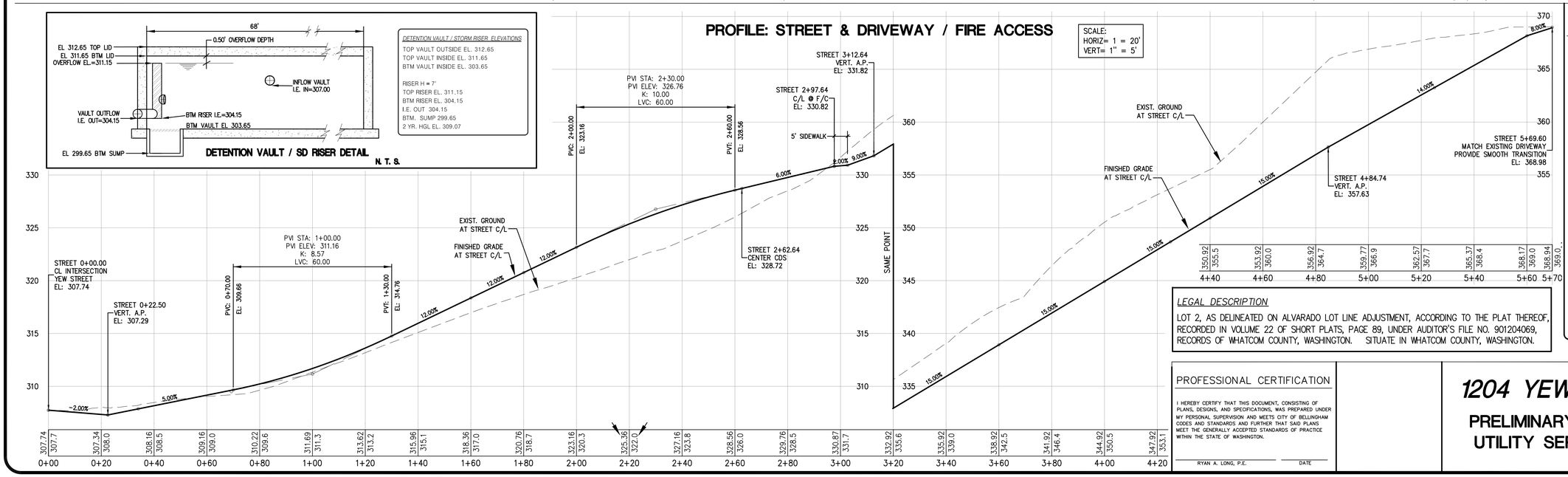
N. T. S.

DETENTION VAULT / STORM RISER ELEVATIONS
TOP VAULT OUTSIDE EL. 312.65
TOP VAULT INSIDE EL. 311.65
BTM VAULT INSIDE EL. 303.65

RISER H = 7'
TOP RISER EL. 311.15
BTM RISER EL. 304.15
I.E. OUT 304.15
BTM. SUMP 299.65
2 YR. HGL EL. 309.07

PROFILE: STREET & DRIVEWAY / FIRE ACCESS

SCALE:
HORIZ= 1 = 20'
VERT= 1" = 5'

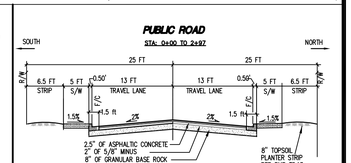


0+00	0+20	0+40	0+60	0+80	1+00	1+20	1+40	1+60	1+80	2+00	2+20	2+40	2+60	2+80	3+00	3+20	3+40	3+60	3+80	4+00	4+20
307.74	307.34	308.16	308.16	309.16	310.22	311.69	313.62	315.96	318.36	320.76	323.16	325.36	327.16	328.56	330.87	332.92	335.92	338.92	341.92	344.92	347.92
307.7	308.0	308.5	309.0	309.6	311.3	313.2	315.1	317.0	318.7	320.3	322.0	323.8	326.0	328.5	331.7	335.6	339.0	342.5	346.4	350.5	353.1

4+40	4+60	4+80	5+00	5+20	5+40	5+60	5+70
350.92	353.92	356.92	359.77	362.57	365.37	368.17	368.84
355.5	360.0	364.7	366.9	367.7	368.4	369.0	369.0

PUBLIC ROAD

STA: 0+00 TO 2+97

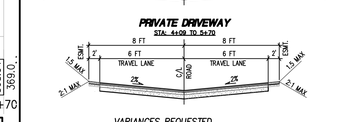


20' FIRE ACCESS ROAD

STA: 2+97 TO 4+09

PRIVATE DRIVEWAY

STA: 4+09 TO 5+70



VARIANCES REQUESTED

A) PUBLIC UTILITY EASEMENT WITHIN R/W
B) SEPERATON INT. DISTANCE TO ALVADADO

LEGAL DESCRIPTION

LOT 2, AS DELINEATED ON ALVARADO LOT LINE ADJUSTMENT, ACCORDING TO THE PLAT THEREOF, RECORDED IN VOLUME 22 OF SHORT PLATS, PAGE 89, UNDER AUDITOR'S FILE NO. 901204069, RECORDS OF WHATCOM COUNTY, WASHINGTON. SITUATE IN WHATCOM COUNTY, WASHINGTON.

PROFESSIONAL CERTIFICATION

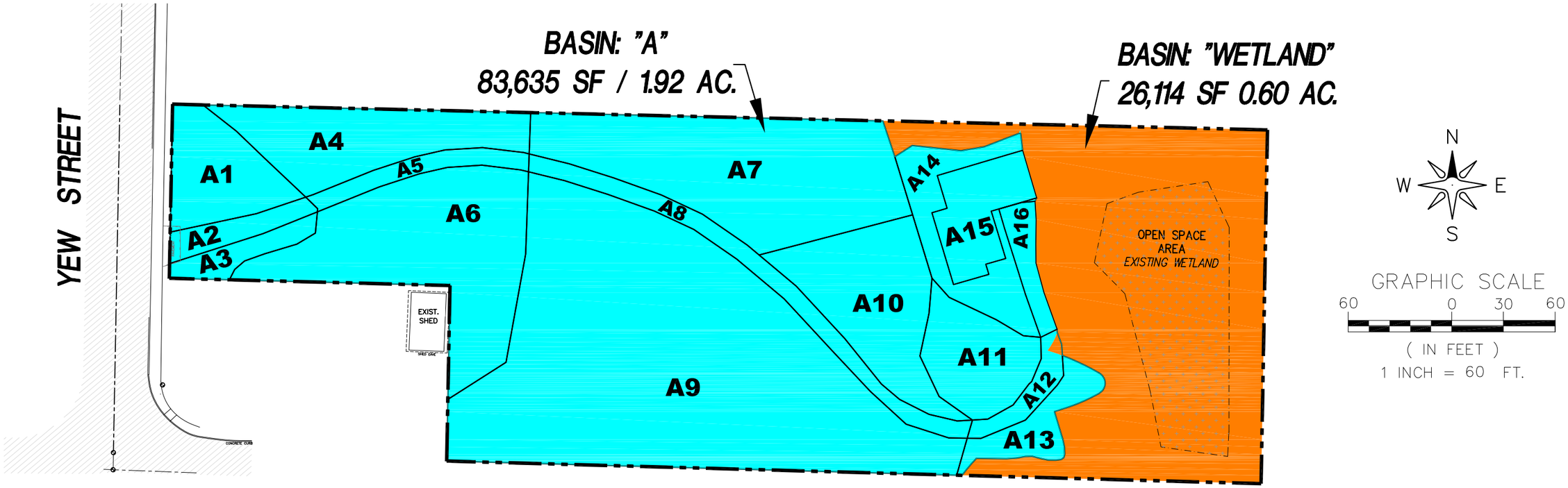
I HEREBY CERTIFY THAT THIS DOCUMENT, CONSISTING OF PLANS, DESIGNS, AND SPECIFICATIONS, WAS PREPARED UNDER MY PERSONAL SUPERVISION AND MEETS CITY OF BELLINGHAM CODES AND STANDARDS AND FURTHER THAT SAID PLANS MEET THE GENERALLY ACCEPTED STANDARDS OF PRACTICE WITHIN THE STATE OF WASHINGTON.

RYAN A. LONG, P.E. — DATE

1204 YEW STREET

PRELIMINARY STREET & UTILITY SERVICE PLAN

FIGURE 2



YEW STREET PRE DEVELOPMENT LAND COVER AREAS

ID	Class	Slope	SF	AC	Notes
A1	FOREST	MODERATE	3391	0.08	
A2, A	DRIVEWAY	MODERATE	565	0.01	Half D/W treated as Forest
A2, B	FOREST	MODERATE	566	0.01	Per BMC 15.42.060E
A3	FOREST	MODERATE	1132	0.03	
A4	FOREST	MODERATE	5318	0.12	
A5, A	DRIVEWAY	MODERATE	640	0.01	Half D/W treated as Forest
A5, B	FOREST	MODERATE	640	0.01	Per BMC 15.42.060E
A6	FOREST	MODERATE	9875	0.23	
A7	FOREST	STEEP	11600	0.27	
A8, A	DRIVEWAY	STEEP	1469	0.03	Half D/W treated as Forest
A8, B	FOREST	STEEP	1470	0.03	Per BMC 15.42.060E
A9	FOREST	STEEP	28314	0.65	
A10, A	PASTURE	STEEP	2921	0.07	Half Pasture treated as Forest
A10, B	FOREST	STEEP	2922	0.07	Per BMC 15.42.060E
A11, A	PASTURE	MODERATE	1662	0.04	Half Pasture treated as Forest
A11, B	FOREST	MODERATE	1663	0.04	Per BMC 15.42.060E

YEW STREET PRE DEVELOPMENT LAND COVER AREAS

ID	Class	Slope	SF	AC	Notes
A12, A	DRIVEWAY	MODERATE	466	0.01	Half Driveway treated as Forest
A12, B	FOREST	MODERATE	467	0.01	Per BMC 15.42.060E
A13, A	PASTURE	MODERATE	875	0.02	Half Pasture treated as Forest
A13, B	FOREST	MODERATE	876	0.02	Per BMC 15.42.060E
A14, A	PASTURE	FLAT	1542	0.04	Half Pasture treated as Forest
A14, B	FOREST	FLAT	1543	0.04	Per BMC 15.42.060E
A15, A	ROOF	FLAT	1276	0.03	Half Roof treated as Forest
A15, B	FOREST	FLAT	1277	0.03	Per BMC 15.42.060E
A16, A	DRIVEWAY	FLAT	502	0.01	Half Driveway treated as Forest
A16, B	FOREST	FLAT	503	0.01	Per BMC 15.42.060E
TOTAL SF			**83475**		
TOTAL ACRES			**1.92**		

JOB# 22001

JONES ENGINEERS
phone 360-733-8888, www.jonesengineers.us
4164 Meridian Street • Suite 304 • Bellingham, Wa. 98226

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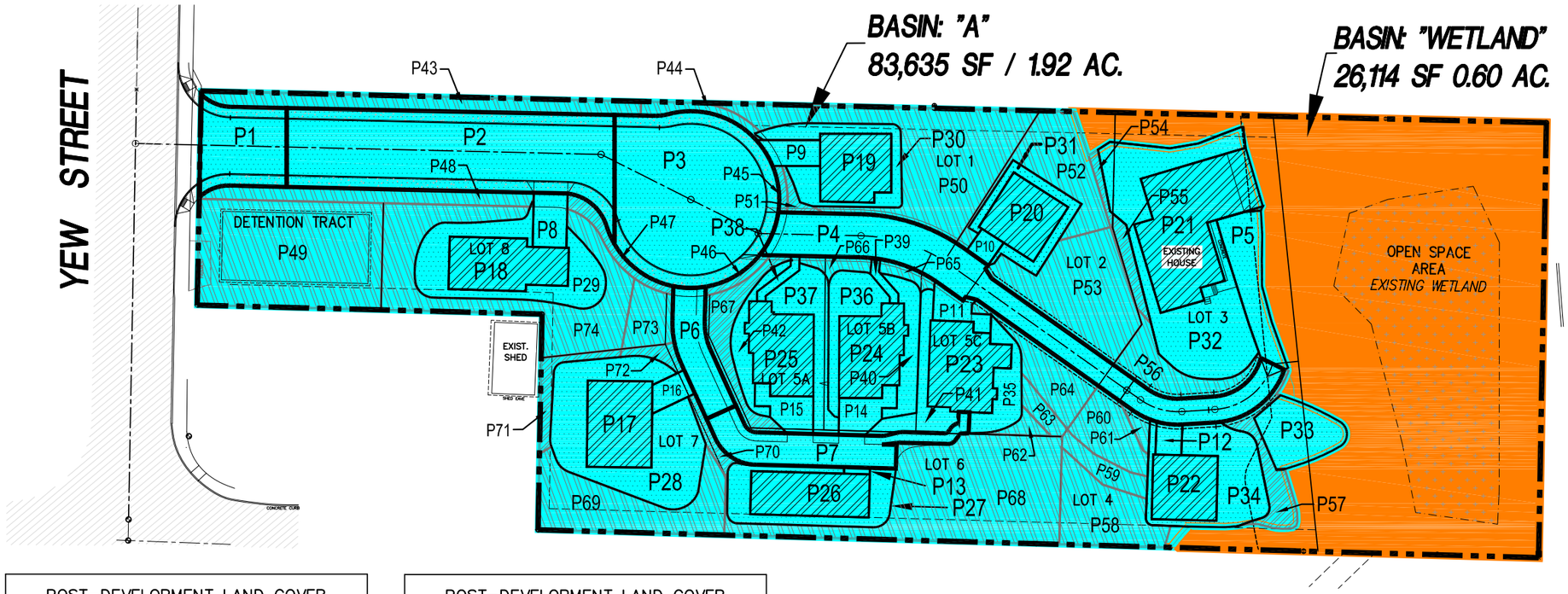
PRELIMINARY

1204 YEW STREET

PRE-DEVELOPMENT CONDITIONS

FIGURE 3

POST–DEVELOPMENT LAND COVER				
AREA ID	CLASS	SLOPE	SF	AC.
P1	ROAD	FLAT	1515	0.04
P2	ROAD	MOD	5738	0.13
P3	ROAD	MOD	5284	0.12
P4	ROAD	MOD	4004	0.09
P5	DRIVEWAY	FLAT	960	0.03
P6	DRIVEWAY	MODERATE	913	0.02
P7	DRIVEWAY	MOD	1555	0.04
P8	DRIVEWAY	FLAT	395	0.01
P9	DRIVEWAY	FLAT	304	0.01
P10	DRIVEWAY	MOD	150	0.01
P11	DRIVEWAY	FLAT	315	0.01
P12	DRIVEWAY	FLAT	173	0.01
P13	DRIVEWAY	FLAT	36	0.004
P14	DRIVEWAY	FLAT	385	0.01
P15	DRIVEWAY	FLAT	390	0.01
P16	DRIVEWAY	FLAT	230	0.01
P17	ROOF	FLAT	1536	0.04
P18	ROOF	FLAT	1536	0.04
P19	ROOF	FLAT	1010	0.02
P20	ROOF	FLAT	900	0.02
P21	ROOF	FLAT	2553	0.06
P22	ROOF	FLAT	1536	0.04
P23	ROOF	FLAT	1277	0.03
P24	ROOF	FLAT	1125	0.03
P25	ROOF	FLAT	1125	0.03
P26	ROOF	FLAT	1536	0.04
P27	LAWN	FLAT	506	0.01
P28	LAWN	FLAT	2164	0.05
P29	LAWN	FLAT	1114	0.03
P30	LAWN	FLAT	848	0.02
P31	LAWN	FLAT	551	0.01
P32	LAWN	FLAT	3050	0.07
P33	LAWN	FLAT	933	0.02
P34	LAWN	FLAT	949	0.02
P35	LAWN	FLAT	594	0.01
P36	LAWN	FLAT	727	0.02
P37	LAWN	FLAT	927	0.02
P38	DRIVEWAY	FLAT	115	0.003
P39	DRIVEWAY	FLAT	94	0.002
P40	LAWN	FLAT	575	0.01
P41	LAWN	FLAT	660	0.02
P42	LAWN	FLAT	454	0.01
BASIN A TOTAL DEVELOPMENT AREA:			=1.20 AC	



POST–DEVELOPMENT LAND COVER				
AREA ID	CLASS	SLOPE	SF	AC.
P43	LAWN	MODERATE	1358	0.03
P44	LAWN	MODERATE	269	0.01
P45	LAWN	FLAT	86	0.002
P46	LAWN	FLAT	132	0.003
P47	LAWN	MODERATE	325	0.01
P48	LAWN	MODERATE	980	0.02
P49	LAWN	FLAT	4217	0.09
P50	LAWN	STEEP	3223	0.07
P51	LAWN	FLAT	119	0.003
P52	LAWN	STEEP	1407	0.03
P53	LAWN	STEEP	2296	0.05
P54	LAWN	FLAT	133	0.003
P55	LAWN	FLAT	256	0.01
P56	LAWN	MODERATE	877	0.02

POST–DEVELOPMENT LAND COVER				
P57	LAWN	MODERATE	610	0.01
P58	LAWN	STEEP	1333	0.03
P59	LAWN	MODERATE	413	0.01
P60	LAWN	STEEP	813	0.02
P61	LAWN	MODERATE	131	0.003
P62	LAWN	STEEP	152	0.003
P63	LAWN	MODERATE	245	0.01
P64	LAWN	STEEP	854	0.02
P65	LAWN	MODERATE	168	0.003
P66	LAWN	MODERATE	218	0.01
P67	LAWN	FLAT	847	0.02
P68	LAWN	STEEP	4094	0.09
P69	LAWN	STEEP	1958	0.05
P70	LAWN	MODERATE	197	0.01
P71	LAWN	MODERATE	345	0.01
P72	LAWN	MODERATE	181	0.004
P73	LAWN	MODERATE	566	0.01
P74	LAWN	MODERATE	2750	0.06
BASIN A TOTAL NON–DEVELOP. AREA:			=0.72 AC	
BASIN A TOTAL:			=1.92 AC	

GRAPHIC SCALE

60 0 30 60

(IN FEET)

1 INCH = 60 FT.

JOB# 22001

JONES ENGINEERS

phone 360–733–8888, www.jonesengineers.us

4164 Meridian Street • Suite 304 • Bellingham, Wa. 98226

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1204 YEW STREET

POST-DEVELOPMENT CONDITIONS

FIGURE 4

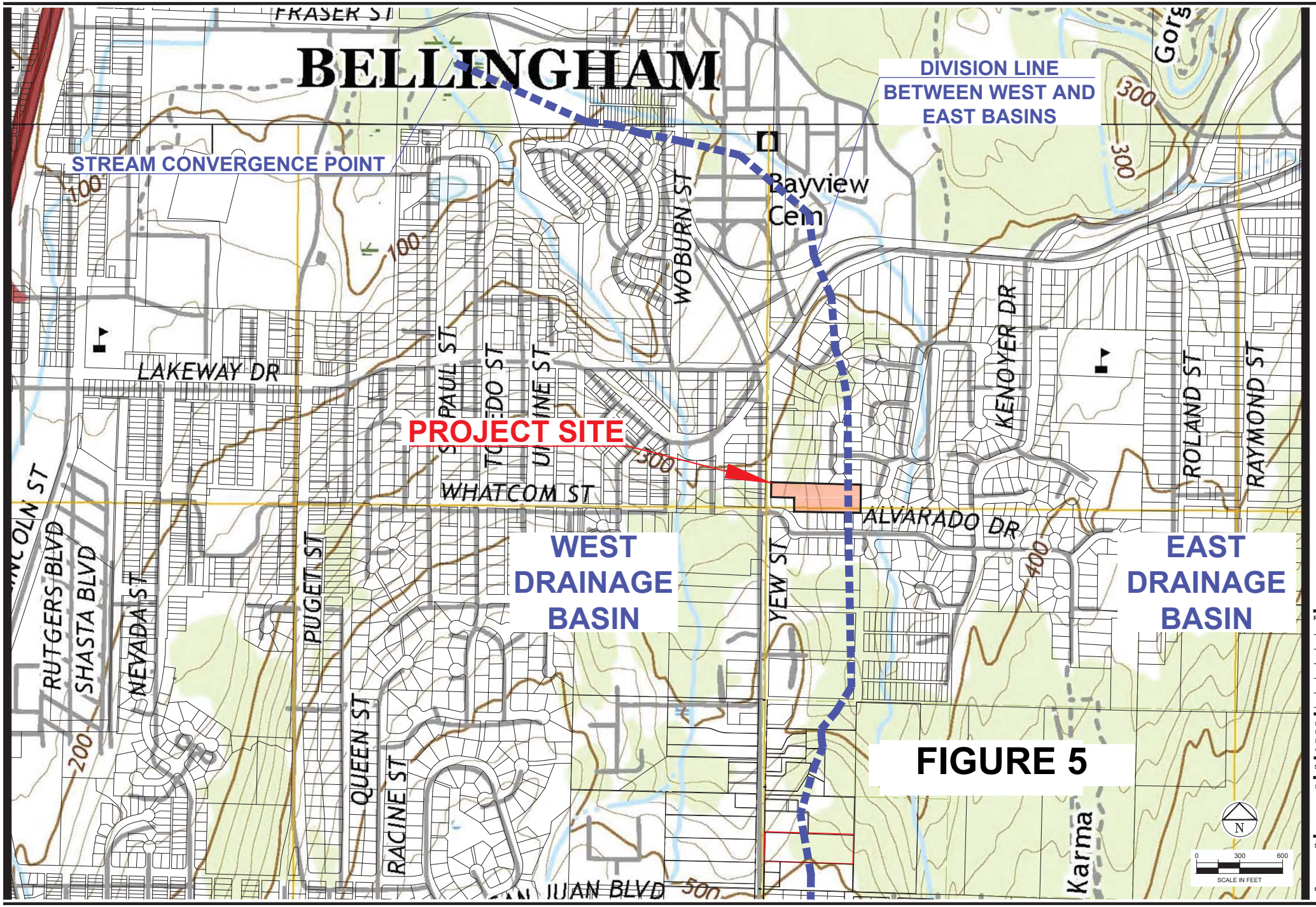
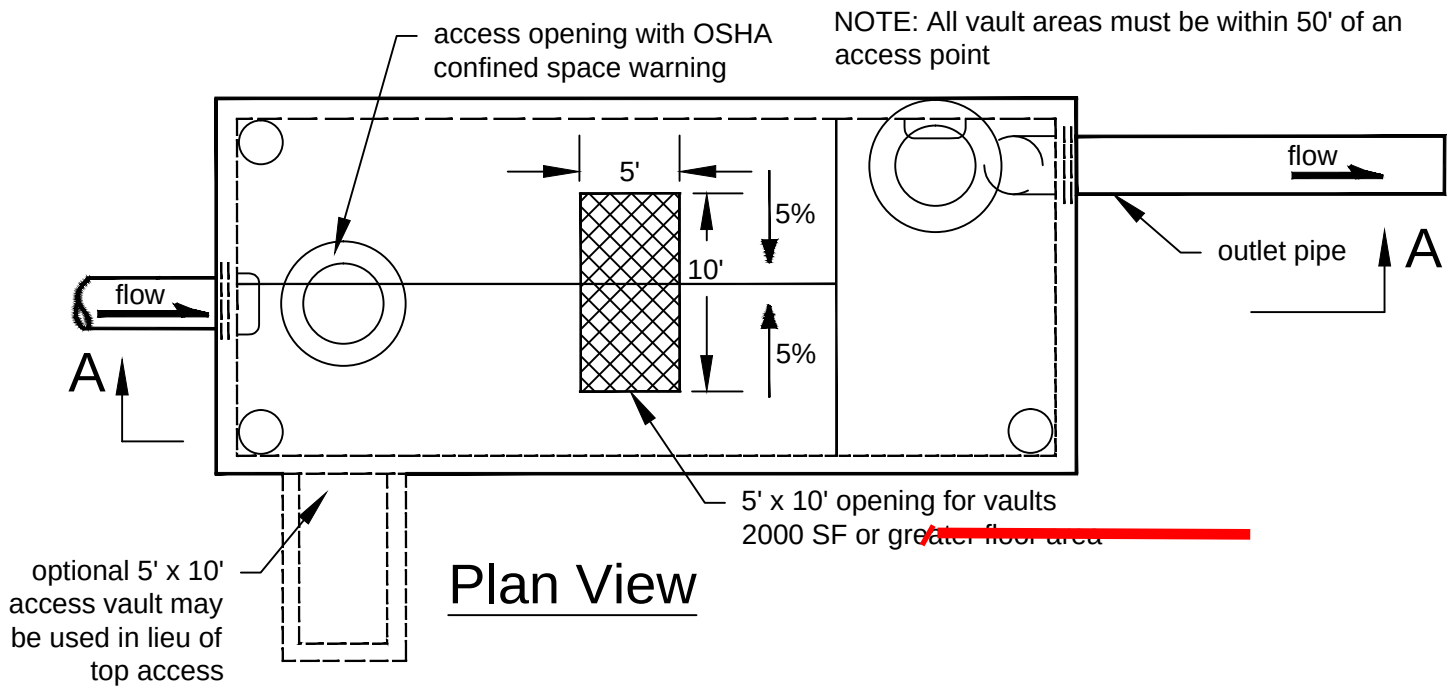
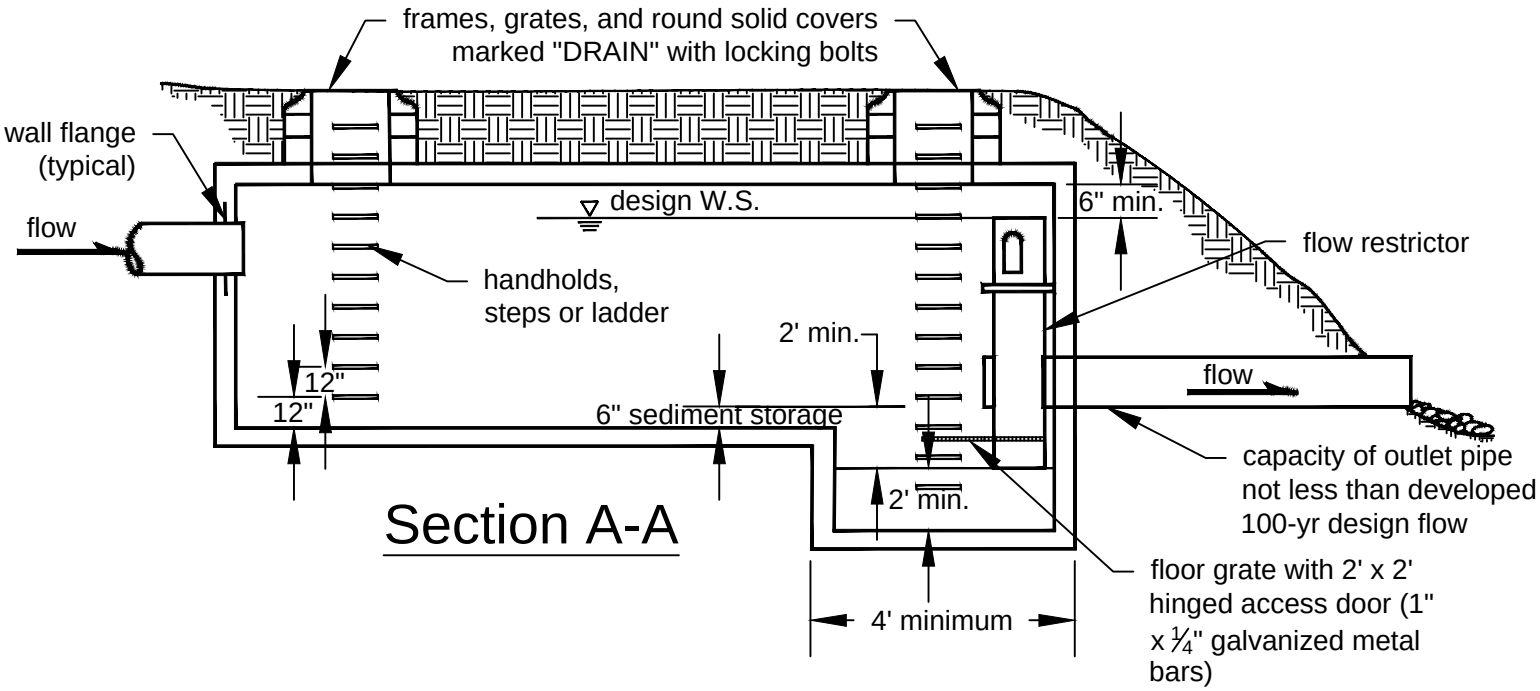


FIGURE 5



Plan View



Section A-A

Notes:

1. All metal parts must be corrosion resistant. Steel parts must be galvanized and asphalt coated (Treatment 1 or better).
2. Provide water stop at all cast-in-place construction joints. Precast vaults shall have approved rubber gasket system.
3. Vaults ≤ 10' wide must use removable lids.
4. Prefabricated vault sections may require structural modifications to support 5' x 10' opening over main vault. Alternatively, access can be provided via a side vestibule as shown.

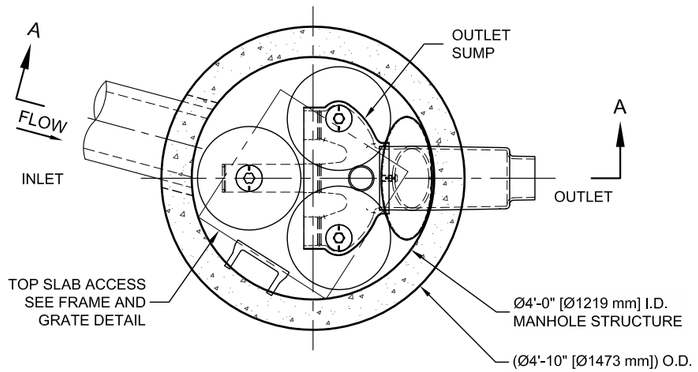
NOT TO SCALE

DEPARTMENT OF ECOLOGY
State of Washington

FIGURE 6

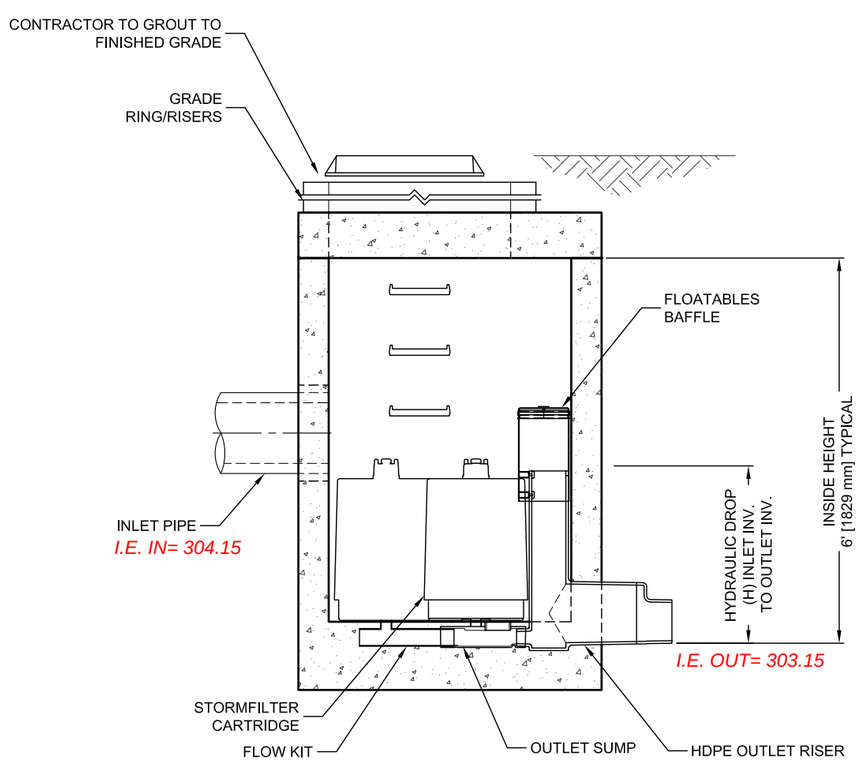
Typical Detention Vault

Revised June 2016



PLAN VIEW

STANDARD OUTLET RISER
FLOWKIT: 40A



SECTION A-A

The Stormwater Management StormFilter®

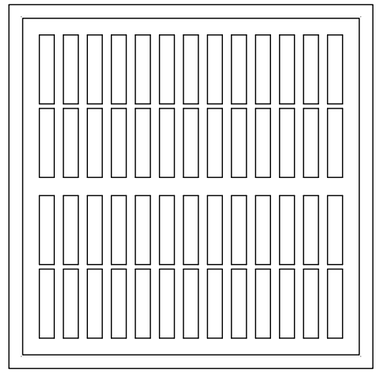
STORMFILTER DESIGN NOTES

STORMFILTER TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. THE STANDARD MANHOLE STYLE IS SHOWN WITH THE MAXIMUM NUMBER OF CARTRIDGES (3). VOLUME SYSTEM IS ALSO AVAILABLE WITH MAXIMUM 3 CARTRIDGES.
Ø4 [1219 mm] MANHOLE STORMFILTER PEAK HYDRAULIC CAPACITY IS 1.0 CFS [28.3 L/s] . IF THE SITE CONDITIONS EXCEED 1.0 CFS [28.3 L/s] AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

CARTRIDGE SELECTION

CARTRIDGE HEIGHT	27" [686 mm]			18" [458 mm]			LOW DROP		
RECOMMENDED HYDRAULIC DROP (H)	3.05' [930 mm]			2.3' [700 mm]			1.8' [550 mm]		
SPECIFIC FLOW RATE (gpm/sf) [L/s/m^2]	2 [1.30]	1.67* [1.08]	1 [0.65]	2 [1.30]	1.67* [1.08]	1 [0.65]	2 [1.30]	1.67* [1.08]	1 [0.65]
CARTRIDGE FLOW RATE (gpm) [L/s]	22.5 [1.42]	18.79 [1.19]	11.25 [0.71]	15 [0.95]	12.53 [0.79]	7.5 [0.44]	10 [0.63]	8.35 [0.54]	5 [0.32]

* 1.67 gpm/sf [1.08 L/s/m^2] SPECIFIC FLOW RATE IS APPROVED WITH PHOSPHOSORB® (PSORB) MEDIA ONLY



30" [762] SQ. FRAME AND GRATE

(ALSO AVAILABLE IN ROUND)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	*
WATER QUALITY FLOW RATE (cfs) [L/s]	*
PEAK FLOW RATE (cfs) [L/s]	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
CARTRIDGE HEIGHT (SEE TABLE ABOVE)	*
NUMBER OF CARTRIDGES REQUIRED	*
CARTRIDGE FLOW RATE	*
MEDIA TYPE (PERLITE, ZPG, PSORB)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE #1	*	*	*
INLET PIPE #2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR SITE SPECIFIC DRAWINGS WITH DETAILED VAULT DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS-20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5' [1524 mm] AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
6. FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES [178 mm]. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 38 SECONDS.
7. SPECIFIC FLOW RATE IS EQUAL TO THE FILTER TREATMENT CAPACITY (gpm) [L/s] DIVIDED BY THE FILTER CONTACT SURFACE AREA (sq ft)[m^2].
8. STORMFILTER STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET PIPE(S).
E. CONTRACTOR TO PROVIDE AND INSTALL CONNECTOR TO THE OUTLET RISER STUB. STORMFILTER EQUIPPED WITH A DUAL DIAMETER HDPE OUTLET STUB AND SAND COLLAR. IF OUTLET PIPE IS LARGER THAN 8 INCHES [200 mm], CONTRACTOR TO REMOVE THE 8 INCH [200 mm] OUTLET STUB AT MOLDED-IN CUT LINE. COUPLING BY FERNCO OR EQUAL AND PROVIDED BY CONTRACTOR.
F. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

CONTECH® ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

SFMH48
STORMFILTER
STANDARD DETAIL

FIGURE 7

APPENDIX A

WESTERN WASHINGTON HYDROLOGY MODEL INPUT

PRE-DEVELOPMENT BASIN COVERAGE CALCULATIONS

PRE-DEVELOPMENT WWHM BASIN INPUT

		Values	
Class	Slope	Sum of SF	Sum of AC
FOREST	FLAT	3323	0.08
FOREST	MODERATE	23928	0.55
FOREST	STEEP	44306	1.02
FOREST Total		**71557**	**1.64**
PASTURE	FLAT	1542	0.04
PASTURE	MODERATE	2537	0.06
PASTURE	STEEP	2921	0.07
PASTURE Total		**7000**	**0.16**
DRIVEWAY	FLAT	502	0.01
DRIVEWAY	MODERATE	1671	0.04
DRIVEWAY	STEEP	1469	0.03
DRIVEWAY Total		**3642**	**0.08**
ROOF	FLAT	1276	0.03
ROOF Total		**1276**	**0.03**
Grand Total		**83475**	**1.92**

Post-Development WWHM Basin Input

Class	Slope	S.F.	Acres
LAWN	FLAT	19,842	0.46
LAWN	MODERATE	9,288	0.21
LAWN	STEEP	17,631	0.40
LAWN Total		**46,761**	**1.07**
ROAD	FLAT	1,515	0.03
ROAD	MODERATE	15,026	0.34
ROAD Total		**16,541**	**0.38**
ROOF	FLAT	14,424	0.33
ROOF Total		**14,424**	**0.33**
DRIVEWAY	FLAT	3,401	0.08
DRIVEWAY	MODERATE	2,618	0.06
DRIVEWAY Total		**6,019**	**0.14**
Grand Total		**83,745**	**1.92**

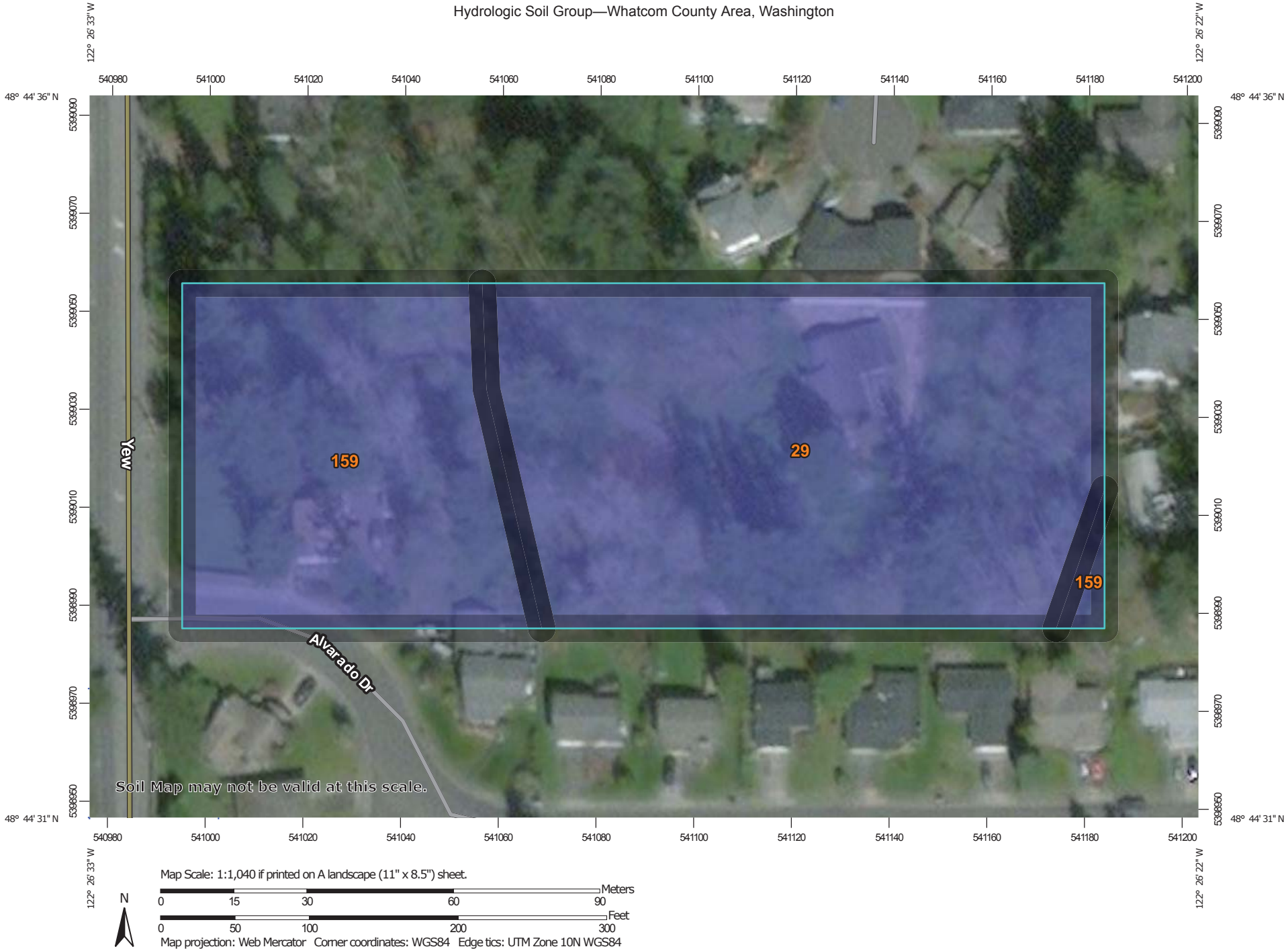
YEW STREET PRE DEVELOPMENT LAND COVER AREAS

ID	Class	Slope	SF	AC	Notes
A1	FOREST	MODERATE	3391	0.08	
A2, A	DRIVEWAY	MODERATE	565	0.01	Half D/W treated as Forest
A2, B	FOREST	MODERATE	566	0.01	Per BMC 15.42.060E
A3	FOREST	MODERATE	1132	0.03	
A4	FOREST	MODERATE	5318	0.12	
A5, A	DRIVEWAY	MODERATE	640	0.01	Half D/W treated as Forest
A5, B	FOREST	MODERATE	640	0.01	Per BMC 15.42.060E
A6	FOREST	MODERATE	9875	0.23	
A7	FOREST	STEEP	11600	0.27	
A8, A	DRIVEWAY	STEEP	1469	0.03	Half D/W treated as Forest
A8, B	FOREST	STEEP	1470	0.03	Per BMC 15.42.060E
A9	FOREST	STEEP	28314	0.65	
A10, A	PASTURE	STEEP	2921	0.07	Half Pasture treated as Forest
A10, B	FOREST	STEEP	2922	0.07	Per BMC 15.42.060E
A11, A	PASTURE	MODERATE	1662	0.04	Half Pasture treated as Forest
A11, B	FOREST	MODERATE	1663	0.04	Per BMC 15.42.060E
A12, A	DRIVEWAY	MODERATE	466	0.01	Half Driveway treated as Forest
A12, B	FOREST	MODERATE	467	0.01	Per BMC 15.42.060E
A13, A	PASTURE	MODERATE	875	0.02	Half Pasture treated as Forest
A13, B	FOREST	MODERATE	876	0.02	Per BMC 15.42.060E
A14, A	PASTURE	FLAT	1542	0.04	Half Pasture treated as Forest
A14, B	FOREST	FLAT	1543	0.04	Per BMC 15.42.060E
A15, A	ROOF	FLAT	1276	0.03	Half Roof treated as Forest
A15, B	FOREST	FLAT	1277	0.03	Per BMC 15.42.060E
A16, A	DRIVEWAY	FLAT	502	0.01	Half Driveway treated as Forest
A16, B	FOREST	FLAT	503	0.01	Per BMC 15.42.060E
TOTAL SF			83,475		
TOTAL ACRES			**1.92**		

Note: This sheet documents how non-forested, predeveloped areas are allowcated to Forest coverage in accordance with BMC 15.42.060 (E)

APPENDIX B

SOILS MAP & INFORMATION



Map Scale: 1:1,040 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Whatcom County Area, Washington
Survey Area Data: Version 15, Nov 22, 2017

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

Date(s) aerial images were photographed: Dec 31, 2009—Sep 29, 2016

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
29	Chuckanut-Urban land complex, 5 to 20 percent slopes	B	2.1	63.9%
159	Squalicum-Urban land complex, 5 to 20 percent slopes	B	1.2	36.1%
Totals for Area of Interest			**3.3**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX C

WESTERN WASHINGTON HYDROLOGY MODEL

PROJECT REPORT

WWHM2012

PROJECT REPORT

Appendix C
Western Washington Hydrology Model Analysis Results

General Model Information

Project Name:	FINAL YEW STREET
Site Name:	Yew Street
Site Address:	1204 Yew St
City:	Bellingham
Report Date:	7/22/2023
Gage:	Blaine
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	0.857
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

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

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Forest, Flat	0.08
C, Forest, Mod	0.55
C, Forest, Steep	1.01
C, Pasture, Flat	0.04
C, Pasture, Mod	0.06
C, Pasture, Steep	0.07
Pervious Total	1.81

Impervious Land Use	acre
ROOF TOPS FLAT	0.03
DRIVEWAYS FLAT	0.01
DRIVEWAYS MOD	0.04
DRIVEWAYS STEEP	0.03
Impervious Total	0.11
Basin Total	1.92

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	0.46
C, Lawn, Mod	0.21
C, Lawn, Steep	0.41
Pervious Total	1.08

Impervious Land Use	acre
ROADS FLAT	0.03
ROADS MOD	0.34
ROOF TOPS FLAT	0.33
DRIVEWAYS FLAT	0.08
DRIVEWAYS MOD	0.06
Impervious Total	0.84
Basin Total	1.92

Element Flows To:

Surface	Interflow	Groundwater
Vault 1	Vault 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Vault 1

Width: 32 ft.
Length: 68 ft.
Depth: 8 ft.
Discharge Structure
Riser Height: 7 ft.
Riser Diameter: 18 in.
Notch Type: Rectangular
Notch Width: 0.080 ft.
Notch Height: 0.500 ft.
Orifice 1 Diameter: 0.5 in. Elevation:0 ft.
Orifice 2 Diameter: 0.5 in. Elevation:2 ft.
Orifice 3 Diameter: 0.5 in. Elevation:4 ft.
Element Flows To:
Outlet 1 Outlet 2

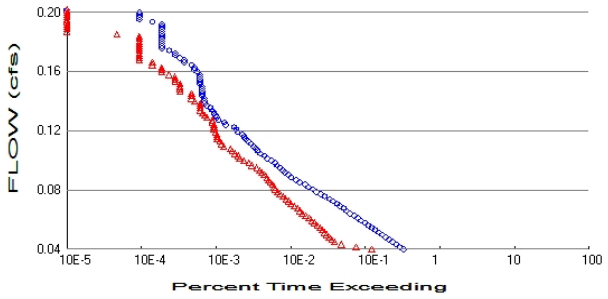
Vault Hydraulic Table

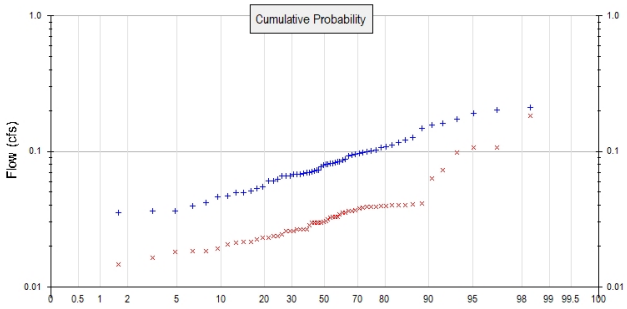
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.050	0.000	0.000	0.000
0.0889	0.050	0.004	0.002	0.000
0.1778	0.050	0.008	0.002	0.000
0.2667	0.050	0.013	0.003	0.000
0.3556	0.050	0.017	0.004	0.000
0.4444	0.050	0.022	0.004	0.000
0.5333	0.050	0.026	0.005	0.000
0.6222	0.050	0.031	0.005	0.000
0.7111	0.050	0.035	0.005	0.000
0.8000	0.050	0.040	0.006	0.000
0.8889	0.050	0.044	0.006	0.000
0.9778	0.050	0.048	0.006	0.000
1.0667	0.050	0.053	0.007	0.000
1.1556	0.050	0.057	0.007	0.000
1.2444	0.050	0.062	0.007	0.000
1.3333	0.050	0.066	0.007	0.000
1.4222	0.050	0.071	0.008	0.000
1.5111	0.050	0.075	0.008	0.000
1.6000	0.050	0.079	0.008	0.000
1.6889	0.050	0.084	0.008	0.000
1.7778	0.050	0.088	0.009	0.000
1.8667	0.050	0.093	0.009	0.000
1.9556	0.050	0.097	0.009	0.000
2.0444	0.050	0.102	0.011	0.000
2.1333	0.050	0.106	0.012	0.000
2.2222	0.050	0.111	0.013	0.000
2.3111	0.050	0.115	0.014	0.000
2.4000	0.050	0.119	0.014	0.000
2.4889	0.050	0.124	0.015	0.000
2.5778	0.050	0.128	0.016	0.000
2.6667	0.050	0.133	0.016	0.000
2.7556	0.050	0.137	0.017	0.000
2.8444	0.050	0.142	0.017	0.000
2.9333	0.050	0.146	0.018	0.000
3.0222	0.050	0.151	0.018	0.000

3.1111	0.050	0.155	0.019	0.000
3.2000	0.050	0.159	0.019	0.000
3.2889	0.050	0.164	0.020	0.000
3.3778	0.050	0.168	0.020	0.000
3.4667	0.050	0.173	0.020	0.000
3.5556	0.050	0.177	0.021	0.000
3.6444	0.050	0.182	0.021	0.000
3.7333	0.050	0.186	0.022	0.000
3.8222	0.050	0.190	0.022	0.000
3.9111	0.050	0.195	0.022	0.000
4.0000	0.050	0.199	0.023	0.000
4.0889	0.050	0.204	0.025	0.000
4.1778	0.050	0.208	0.026	0.000
4.2667	0.050	0.213	0.027	0.000
4.3556	0.050	0.217	0.028	0.000
4.4444	0.050	0.222	0.029	0.000
4.5333	0.050	0.226	0.030	0.000
4.6222	0.050	0.230	0.030	0.000
4.7111	0.050	0.235	0.031	0.000
4.8000	0.050	0.239	0.032	0.000
4.8889	0.050	0.244	0.032	0.000
4.9778	0.050	0.248	0.033	0.000
5.0667	0.050	0.253	0.034	0.000
5.1556	0.050	0.257	0.034	0.000
5.2444	0.050	0.262	0.035	0.000
5.3333	0.050	0.266	0.035	0.000
5.4222	0.050	0.270	0.036	0.000
5.5111	0.050	0.275	0.037	0.000
5.6000	0.050	0.279	0.037	0.000
5.6889	0.050	0.284	0.038	0.000
5.7778	0.050	0.288	0.038	0.000
5.8667	0.050	0.293	0.039	0.000
5.9556	0.050	0.297	0.039	0.000
6.0444	0.050	0.301	0.040	0.000
6.1333	0.050	0.306	0.040	0.000
6.2222	0.050	0.310	0.041	0.000
6.3111	0.050	0.315	0.041	0.000
6.4000	0.050	0.319	0.041	0.000
6.4889	0.050	0.324	0.042	0.000
6.5778	0.050	0.328	0.048	0.000
6.6667	0.050	0.333	0.060	0.000
6.7556	0.050	0.337	0.076	0.000
6.8444	0.050	0.341	0.094	0.000
6.9333	0.050	0.346	0.114	0.000
7.0222	0.050	0.350	0.182	0.000
7.1111	0.050	0.355	0.718	0.000
7.2000	0.050	0.359	1.535	0.000
7.2889	0.050	0.364	2.505	0.000
7.3778	0.050	0.368	3.517	0.000
7.4667	0.050	0.373	4.457	0.000
7.5556	0.050	0.377	5.229	0.000
7.6444	0.050	0.381	5.782	0.000
7.7333	0.050	0.386	6.147	0.000
7.8222	0.050	0.390	6.559	0.000
7.9111	0.050	0.395	6.898	0.000
8.0000	0.050	0.399	7.220	0.000
8.0889	0.050	0.404	7.529	0.000
8.1778	0.000	0.000	7.825	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.81
Total Impervious Area: 0.11

Mitigated Landuse Totals for POC #1
Total Pervious Area: 1.08
Total Impervious Area: 0.84

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.077769
5 year	0.112929
10 year	0.137813
25 year	0.170957
50 year	0.196837
100 year	0.223709

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.030004
5 year	0.046806
10 year	0.061103
25 year	0.083401
50 year	0.103517
100 year	0.127028

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	0.080	0.026
1950	0.072	0.030
1951	0.084	0.063
1952	0.035	0.019
1953	0.039	0.024
1954	0.083	0.027
1955	0.076	0.039
1956	0.082	0.072
1957	0.156	0.023
1958	0.051	0.021

1959	0.047	0.030
1960	0.065	0.026
1961	0.050	0.030
1962	0.069	0.022
1963	0.060	0.024
1964	0.172	0.040
1965	0.202	0.039
1966	0.161	0.021
1967	0.101	0.040
1968	0.079	0.040
1969	0.073	0.026
1970	0.036	0.015
1971	0.087	0.033
1972	0.108	0.039
1973	0.062	0.039
1974	0.053	0.030
1975	0.067	0.027
1976	0.126	0.041
1977	0.097	0.024
1978	0.102	0.031
1979	0.093	0.022
1980	0.095	0.098
1981	0.086	0.030
1982	0.116	0.041
1983	0.070	0.033
1984	0.212	0.107
1985	0.106	0.028
1986	0.192	0.039
1987	0.068	0.035
1988	0.055	0.027
1989	0.098	0.023
1990	0.092	0.038
1991	0.066	0.036
1992	0.070	0.034
1993	0.073	0.026
1994	0.030	0.016
1995	0.071	0.037
1996	0.111	0.032
1997	0.122	0.184
1998	0.036	0.018
1999	0.149	0.107
2000	0.046	0.021
2001	0.068	0.009
2002	0.060	0.030
2003	0.050	0.018
2004	0.081	0.036
2005	0.081	0.035
2006	0.080	0.032
2007	0.099	0.033
2008	0.042	0.018
2009	0.065	0.038

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.2116	0.1836
2	0.2017	0.1069
3	0.1919	0.1065

4	0.1721	0.0981
5	0.1609	0.0724
6	0.1564	0.0628
7	0.1485	0.0415
8	0.1262	0.0406
9	0.1218	0.0400
10	0.1161	0.0400
11	0.1111	0.0399
12	0.1077	0.0395
13	0.1062	0.0392
14	0.1025	0.0392
15	0.1007	0.0390
16	0.0994	0.0387
17	0.0981	0.0382
18	0.0970	0.0376
19	0.0952	0.0369
20	0.0933	0.0361
21	0.0921	0.0361
22	0.0873	0.0352
23	0.0858	0.0351
24	0.0838	0.0341
25	0.0833	0.0331
26	0.0824	0.0331
27	0.0811	0.0329
28	0.0809	0.0324
29	0.0800	0.0316
30	0.0800	0.0305
31	0.0786	0.0301
32	0.0764	0.0299
33	0.0731	0.0298
34	0.0730	0.0298
35	0.0717	0.0296
36	0.0709	0.0296
37	0.0700	0.0284
38	0.0696	0.0267
39	0.0691	0.0266
40	0.0677	0.0265
41	0.0676	0.0265
42	0.0673	0.0258
43	0.0662	0.0257
44	0.0654	0.0257
45	0.0654	0.0244
46	0.0619	0.0239
47	0.0604	0.0237
48	0.0604	0.0231
49	0.0551	0.0229
50	0.0530	0.0223
51	0.0511	0.0215
52	0.0497	0.0215
53	0.0496	0.0211
54	0.0468	0.0207
55	0.0464	0.0191
56	0.0419	0.0185
57	0.0393	0.0184
58	0.0364	0.0180
59	0.0363	0.0164
60	0.0350	0.0147
61	0.0299	0.0088

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0389	6896	2609	37	Pass
0.0405	6171	1603	25	Pass
0.0421	5538	1024	18	Pass
0.0437	4954	821	16	Pass
0.0453	4451	757	17	Pass
0.0469	3991	701	17	Pass
0.0485	3600	647	17	Pass
0.0501	3247	602	18	Pass
0.0516	2887	564	19	Pass
0.0532	2590	526	20	Pass
0.0548	2336	485	20	Pass
0.0564	2111	443	20	Pass
0.0580	1885	407	21	Pass
0.0596	1685	376	22	Pass
0.0612	1511	338	22	Pass
0.0628	1338	307	22	Pass
0.0644	1200	286	23	Pass
0.0660	1099	263	23	Pass
0.0676	980	238	24	Pass
0.0692	888	214	24	Pass
0.0708	797	200	25	Pass
0.0724	713	184	25	Pass
0.0740	612	168	27	Pass
0.0756	542	154	28	Pass
0.0772	474	142	29	Pass
0.0788	427	132	30	Pass
0.0804	372	128	34	Pass
0.0820	333	121	36	Pass
0.0836	283	114	40	Pass
0.0852	251	107	42	Pass
0.0867	217	102	47	Pass
0.0883	199	94	47	Pass
0.0899	180	87	48	Pass
0.0915	167	81	48	Pass
0.0931	153	75	49	Pass
0.0947	140	64	45	Pass
0.0963	131	59	45	Pass
0.0979	117	50	42	Pass
0.0995	104	44	42	Pass
0.1011	95	42	44	Pass
0.1027	83	38	45	Pass
0.1043	77	35	45	Pass
0.1059	73	33	45	Pass
0.1075	68	27	39	Pass
0.1091	63	25	39	Pass
0.1107	57	24	42	Pass
0.1123	53	22	41	Pass
0.1139	51	22	43	Pass
0.1155	48	22	45	Pass
0.1171	41	21	51	Pass
0.1187	40	20	50	Pass
0.1203	37	20	54	Pass
0.1218	29	20	68	Pass

0.1234	28	19	67	Pass
0.1250	23	19	82	Pass
0.1266	22	16	72	Pass
0.1282	21	15	71	Pass
0.1298	20	14	70	Pass
0.1314	19	13	68	Pass
0.1330	18	13	72	Pass
0.1346	16	13	81	Pass
0.1362	15	13	86	Pass
0.1378	15	11	73	Pass
0.1394	15	10	66	Pass
0.1410	14	10	71	Pass
0.1426	14	10	71	Pass
0.1442	14	7	50	Pass
0.1458	14	7	50	Pass
0.1474	14	7	50	Pass
0.1490	13	7	53	Pass
0.1506	13	6	46	Pass
0.1522	13	6	46	Pass
0.1538	13	6	46	Pass
0.1554	13	5	38	Pass
0.1570	12	4	33	Pass
0.1585	11	4	36	Pass
0.1601	11	4	36	Pass
0.1617	10	3	30	Pass
0.1633	8	3	37	Pass
0.1649	8	2	25	Pass
0.1665	7	2	28	Pass
0.1681	6	2	33	Pass
0.1697	6	2	33	Pass
0.1713	5	2	40	Pass
0.1729	4	2	50	Pass
0.1745	4	2	50	Pass
0.1761	4	2	50	Pass
0.1777	4	2	50	Pass
0.1793	4	2	50	Pass
0.1809	4	2	50	Pass
0.1825	4	1	25	Pass
0.1841	4	0	0	Pass
0.1857	4	0	0	Pass
0.1873	4	0	0	Pass
0.1889	4	0	0	Pass
0.1905	3	0	0	Pass
0.1921	2	0	0	Pass
0.1936	2	0	0	Pass
0.1952	2	0	0	Pass
0.1968	2	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
Total Volume Infiltrated		0.00	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

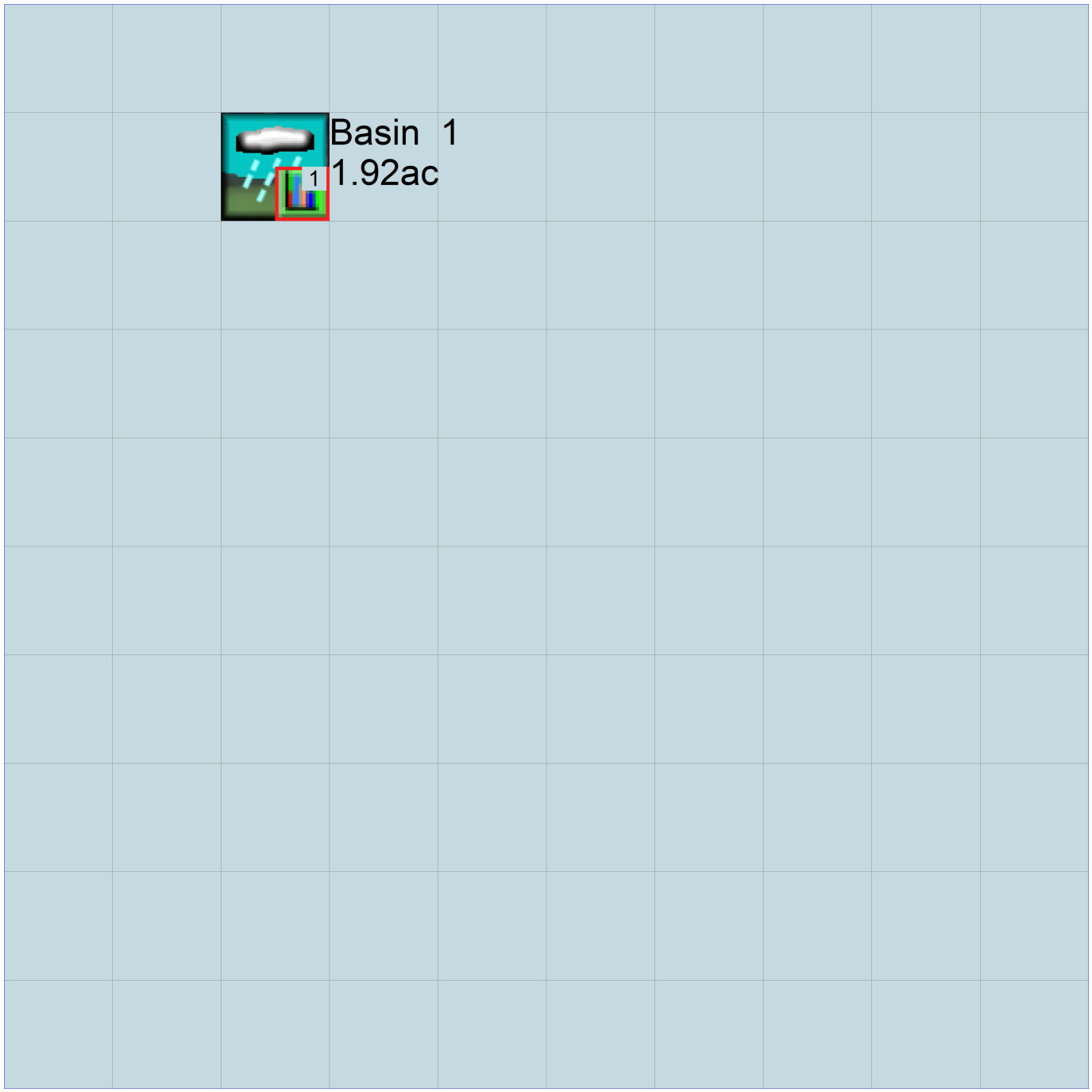
PERLND Changes

No PERLND changes have been made.

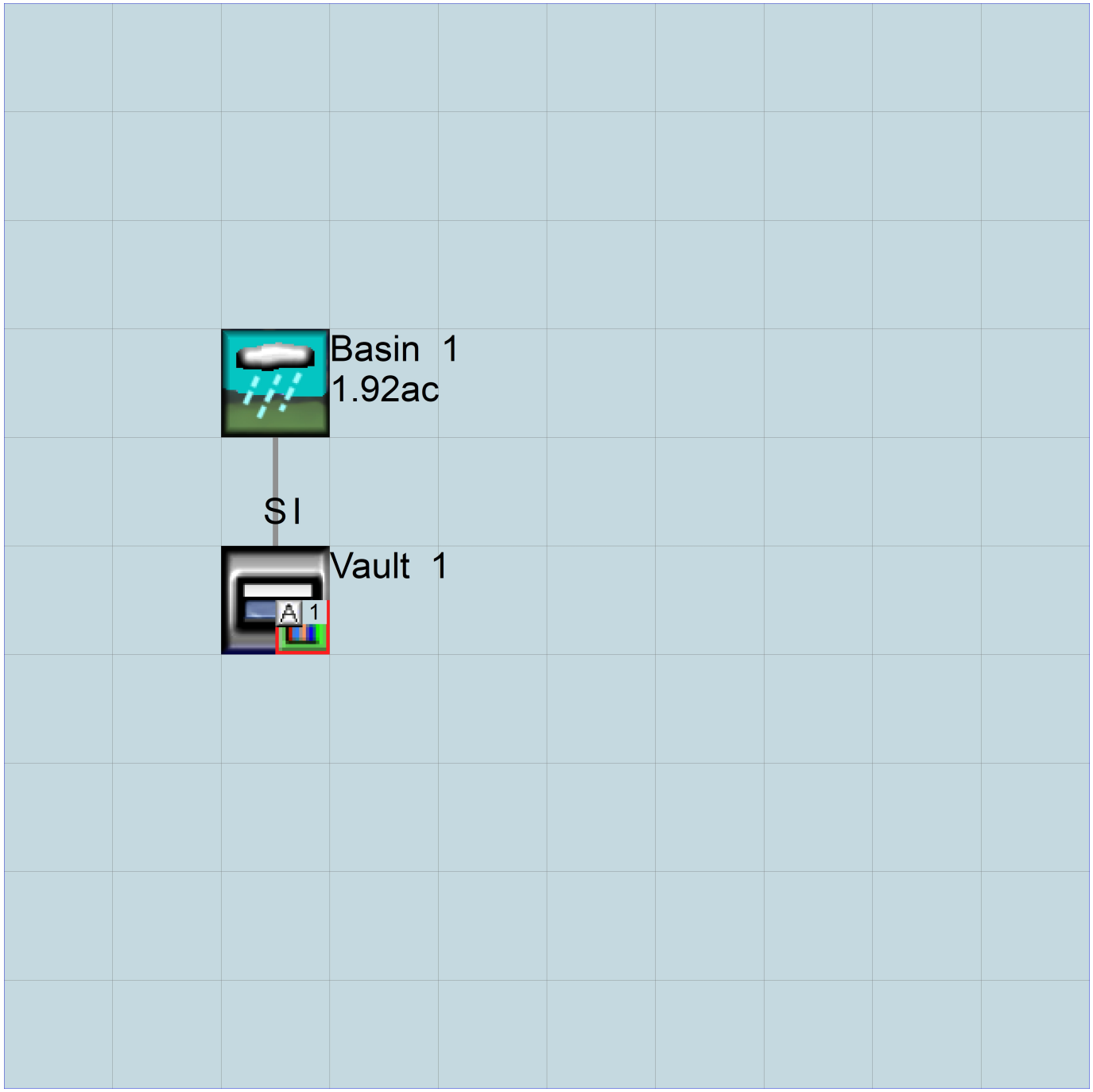
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

Mitigated UCI File

Predeveloped HSPF Message File

Mitigated HSPF Message File

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