TECHNICAL INFORMATION REPORT

for

FALL CITY II

PRELIMINARY PLAT

4135 332nd Ave SE, Fall City, Washington

02/25/2022

DRS Project No. 19081

Owner/Applicant

Slalom Construction, LLC
3038 198th Ave SE
Sammamish, WA 98075

Report Prepared by

D. R. STRONG Consulting Engineers, Inc.
620 7th Avenue
Kirkland, WA 98033
(425) 827-3063

Report Issue Date

February 24, 2022

TECHNICAL INFORMATION REPORT

FALL CITY II PRELIMINARY PLAT

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SECTION I

PROJECT OVERVIEW

The Project is the proposed subdivision of one parcel into 13 single-family residential lots, per the King County (County) subdivision process. The Project is located at 4135 332nd Ave SE, Fall City, Washington (Site) also known as Tax Parcel Number 0943100220. The Project will meet the drainage requirements of the 2016 King County Surface Water Design Manual (KCWDM).

PREDEVELOPED SITE CONDITIONS

The total existing Site area is approximately 145,490.4 s.f. (3.34 acres). The Site is currently developed with one single-family residence, attached garage and a gravel driveway. The remainder of the Site is lawn, brush, pasture, dense vegetation and scattered trees.

Site runoff is contained within a single Threshold Discharge Area (TDA). The TDA contains one Natural Discharge Areas (NDA) that discharges stormwater runoff at one Natural Discharge Location (NDL). Runoff from the NDA leaves the Site as sheet flow over the northeast property corner. Runoff continues as sheet flow over pasture vegetation until it is collected by a roadside drainage ditch on the south side of Redmond-Fall City RD SE. Runoff continues to flow west for a short ways in the dranage ditch before reaching a burried culvert. Runoff then passes through the culvert to the north. Runoff then colects in the depresion to the north where it infiltrates or overflows the depression north to the Snoqualmie River.

For the purpose of hydrologic calculations, the entire predeveloped Site is modeled as outwash forest per the geotechnical report recommendations.

DEVELOPED SITE CONDITIONS

The applicant is seeking approval to subdivide 3.34 acres into 13 singleï family residential lots (Project), with lot sizes ranging from approximately 5,366 s.f. to 6,363 s.f. All existing improvements located on the Site will be demolished or removed during plat construction.

The Project will develop the Site to convey water from south to north towards the drainage tract and then west via 12ò pipe to a wet bio-swale for Water Quality treatment and an infiltration facility to meet Flow Control requirements. The wet bio-swale will be approximately 13 feet wide by 131 feet long; the infiltration pond is 164 feet long by 41 feet wide and is suported by vertical walls along the southern and western limits of the facility. The proposed Project will generate approximately 70,727 s.f. of target impervious area (1.62 acres) comprised of: frontage improvements along 332nd Ave SE, Tract A (storm drainage), Tract C (private access street), and the 13 new single-family residences and their driveways. The remaining 82,027 s.f. (1.88 acres) of targeted developed Site will be considered pervious landscaping and Tract B (L.O.S.S. septic/recreation) modeled as till grass. The pervious landscaping includes yards from the 13 new single-family residences, some of the frontage improvements along 332nd Ave SE, and a part of Tract A (storm drainage).

The project is located within a Critical Aquifer Recharge Area Class 2 per King County iMap and will therefore provide groundwater protection set forth by Chapter 1 of the KCWDM. The Project will be providing water quality treatment prior to infiltration as specified in Core Requirement #8 and additionally fulfills Special Requirement #5.

FIGURE 1
TIR WORKSHEET

TECHNICAL INFORMATION REPORT (TIR) WORKSHEET

Part 1 PROJECT OWNER AND PROJECT ENGINEER

Project Owner:	**Cory Brandt**
Phone:	**(206) 419-2679**
Address:	**3038 198th Ave SE** **Sammamish, WA 98075**
Project Engineer:	**Maher A. Joudi, P.E.**
Company:	**D. R. STRONG Consulting Engineers Inc.**
Phone:	**(425) 827-3063**

Part 2 PROJECT LOCATION AND DESCRIPTION

Project Name:	**Fall City II**
City Permit#:	**PREA19-0275**
Location:	
Township:	**24 North**
Range:	**07 East**
Section:	**15**
Site Address:	**4135 332nd Ave SE** **Fall City, WA 98024**

Part 3 TYPE OF PERMIT APPLICATION

- ☒ **Landuse Services**
  Subdivision / Short Subdivision / UPD
- ☐ Building Services: M/F / Commercial / SFR
- ☒ **Clearing and Grading**
- ☐ Right-of-Way
- ☐ Other:

Part 4 OTHER REVIEWS AND PERMITS

- ☐ DFW HPA
- ☐ COE 404
- ☐ DOE Dam Safety
- ☐ FEMA Floodplain
- ☐ COE Wetlands
- ☐ Other: _____
- ☐ Shoreline Mngmt
- ☐ Structural Rockery/Vault
- ☐ ESA Section 7

Part 5 PLAN AND REPORT INFORMATION

Technical Information Report

Type of Drainage Review (check one):

- ☒ **Full**
- ☐ Targeted
- ☐ Simplified
- ☐ Large Project
- ☐ Directed

Date (include revision dates): February 24, 2022

Date of Final: _____

Site Improvement Plan (Engr. Plans)

Type (circle one):

- ☒ **Full**
- ☐ Modified
- ☐ Simplified

Date (include revision dates): _____

Date of Final: _____

Part 6 ADJUSTMENT APPROVALS

Type (circle one): Standard / Experimental / Blanket

Description: (include conditions in TIR Section 2)

_____

_____

_____

Approved Adjustment No. _____ Date of Approval: _____

Part 7 MONITORING REQUIREMENTS

Monitoring Required: Yes / No	Describe:
Start Date: TBD	Re: KCSWDM Adjustment No. _____
Completion Date _____	

Part 8 SITE COMMUNITY AND DRAINAGE BASIN

Community Plan: Snoqualmie

Special District Overlays: Snoqualmie Valley #410

Drainage Basin: Snoqualmie River

Stormwater Requirements: Conservation Flow Control Area (Level 2 flow control)

Part 9 ONSITE AND ADJACENT SENSITIVE AREAS

☐ River/ Stream _____	☐ Steep Slope _____
☐ Lake _____	☐ Erosion Hazard _____
☐ Wetlands _____	☐ Landslide Hazard _____
☐ Closed Depression _____	☐ Coal Mine Hazard _____
☐ Floodplain _____	☐ Seismic Hazard _____
☐ Other _____	☐ Habitat Protection _____

Part 10 SOILS

Soil Type	Slopes	Erosion Potential
EvB	0-8%	Slight

☐ High Groundwater Table	☐ Sole Source Aquifer
☐ other _____	☐ Seeps/Springs
☐ Additional Sheets Attached	

Part 11 DRAINAGE DESIGN LIMITATIONS	
REFERENCE ☒ **Core 2 – Offsite Analysis** ☐ Sensitive/Critical Areas ☒ **SEPA** ☐ LID Infeasibility ☐ Other Additional Sheet Attached	LIMITATION / SITE CONSTRAINT

Part 12 TIR SUMMARY SHEET	
Threshold Discharge Area: **The Site is comprised of one TDA** (name or description)	
Core Requirements (all 8 apply)	
Discharge of Natural Location **yes**	Number of Natural Discharge Locations: 1
Offsite Analysis	Level: **1** / 2 / 3 dated:
Flow Control (incl. facility summary sheet	Level: 1 / **2** / 3 or Exemption Number Small Site BMPS
Conveyance System	Spill containment located at: **TBD**
Erosion and Sediment Control	ESC Site Supervisor: **T/B/D** Contact Phone: **T/B/D** After Hours Phone: **T/B/D**
Maintenance and Operation	Responsibility: **Private** / Public If Private, Maintenance Log Required: Yes / No
Financial Guarantees and Liability	Provided: **Yes** / No
Water Quality (include facility summary sheet)	Type: **Basic** / Sens Lake / Enhanced Basic / Bog or exemption No. Landscape Management Plan: Yes / **No**
Special Requirements (as applicable)	
Area Specific Drainage Requirements	Type: CDA / SDO / MDP / BP / LMP / Shared / **None** Name:
Floodplain/Floodway Delineation	Type: Major / Minor / Exemption / **None** 100-year Base Flood Elevation (or range): Datum:
Flood Protection Facilities	Describe: **N/A**
Source Control (comm. / industrial land use)	Describe Land use: Describe any structural controls:

Oil Control	High-use Site: Yes / **No** Treatment BMP: _____ Maintenance Agreement: Yes / **No** with whom? _____

Other Drainage Structures

Describe: **Runoff will be collected and conveyed to the stormwater detention facility located in Tract A.**

Part 13 EROSION AND SEDIMENT CONTROL REQUIREMENTS

MINIMUM ESC REQUIREMENTS DURING CONSTRUCTION	MINIMUM ESC REQUIREMENTS AFTER CONSTRUCTION
☒ **Clearing Limits**	☒ **Stabilize Exposed Surfaces**
☒ **Cover Measures**	☒ **Remove and Restore Temporary ESC Facilities**
☒ **Perimeter Protection**	☒ **Clean and Remove All Silt and Debris, Ensure Operations of Permanent Facilities**
☒ **Traffic Area Stabilization**	☐ Flag Limits of SAO and open space Preservation areas
☒ **Sediment Retention**	☐ Other _____
☒ **Surface Water Collection**	
☐ Dewatering Control	
☒ **Dust control**	
☒ **Flow Control**	
☒ Protection of Flow Control BMP Facilities (existing and proposed)	
☐ Maintain BMPs/ Manage Project	

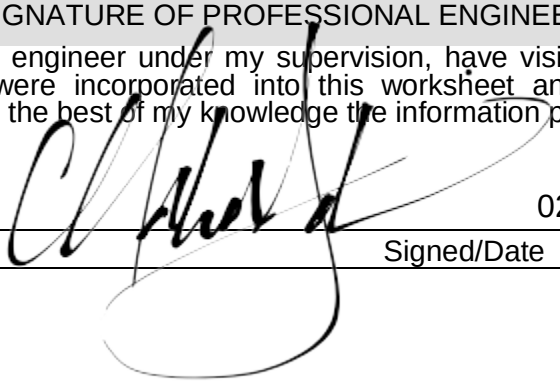
Part 14 STORMWATER FACILITY DESCRIPTIONS (Note: Include Facility Summary and Sketch

Flow Control	Type/Description	Water Quality	Type/Description
☐ Detention	_____	☐ Vegetated Flowpath	_____
☒ Infiltration	**Pond**	☒ Wetpool	Bioswale
☐ Regional Facility	_____	☐ Filtration	_____
☐ Shared Facility	_____	☐ Oil Control	_____
☐ Flow Control BMPs	_____	☐ Spill Control	_____
☐ Other		☐ Flow Control BMPs ☐ Other	_____

Part 15 EASEMENTS/TRACTS	Part 16 STRUCTURAL ANALYSIS
☐ Drainage Easement ☐ Covenant ☐ Native Growth Protection Covenant ☒ **Tract** ☐ Other:	☐ Cast in Place Vault ☐ Retaining Wall ☐ Rockery > 4ôHigh ☐ Structural on Steep Slope ☐ Other:

Part 17 SIGNATURE OF PROFESSIONAL ENGINEER

I, or a civil engineer under my supervision, have visited the site. Actual site conditions as observed were incorporated into this worksheet and the attached Technical Information Report. To the best of my knowledge the information provided here is accurate.



02/25/2022

Signed/Date

FIGURE 2
VICINITY MAP

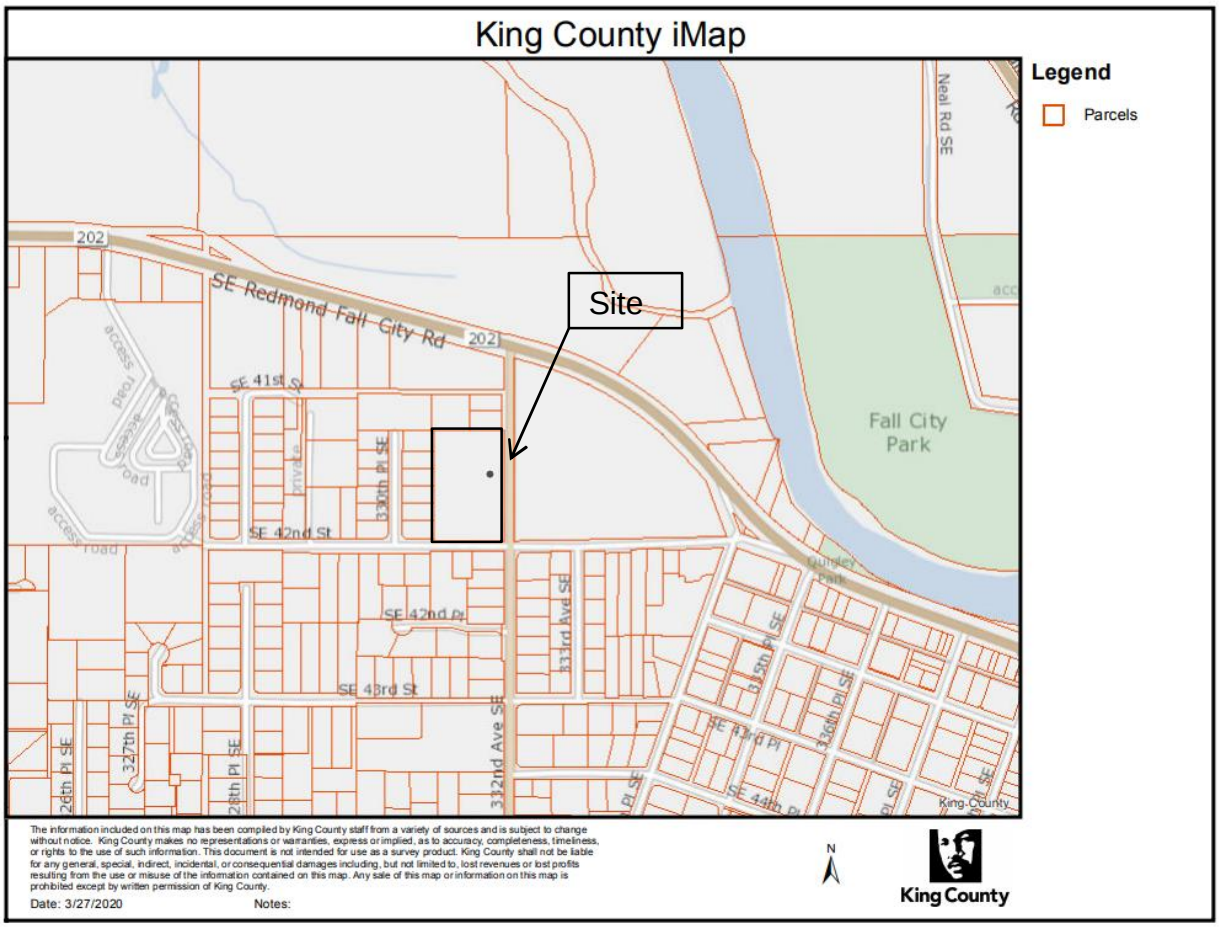


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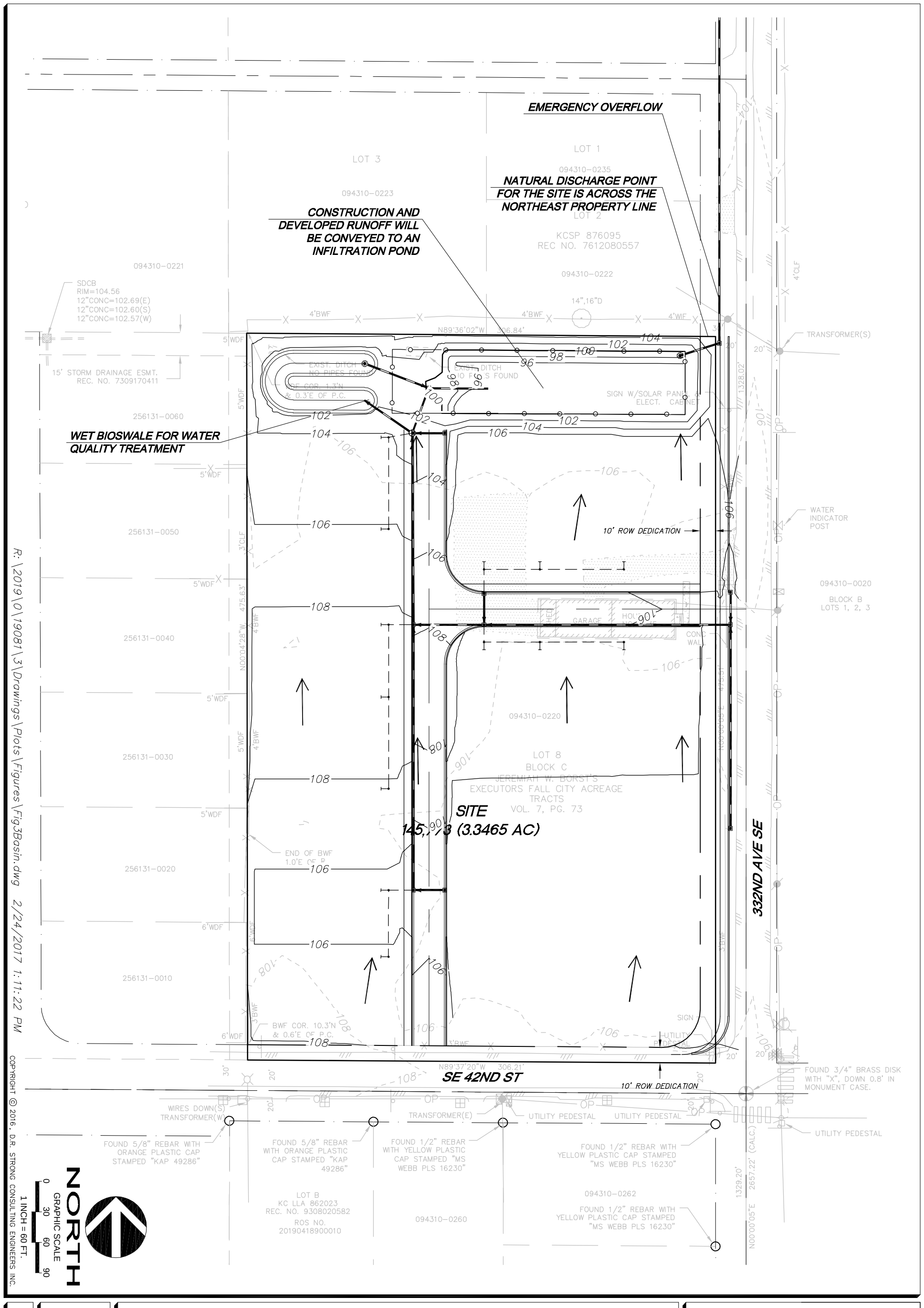
FIGURE 3
DRAINAGE BASINS, SUBBASINS, AND SITE CHARACTERISTICS



R:\2019\0\19081\3\Drawings\Plots\Figures\Fig3Basin.dwg 2/24/2017 1:11:22 PM

FIGURE: 3

DRAFTED BY: MES
DESIGNED BY: YLP
PROJECT ENGINEER: MAJ
DATE: 02.24.2017
PROJECT NO.: 15093

DRAINAGE BASIN, SUBBASINS, AND SITE CHARACTERISTICS

FALL CITY
32413 SE REDMOND-FALL CITY RD
FALL CITY, WASHINGTON

D.R. STRONG CONSULTING ENGINEERS
ENGINEERS PLANNERS SURVEYORS
620 - 7th AVENUE KIRKLAND, WA 98033
O 425.827.3063 F 425.827.2423

FIGURE 4
SOIL

King County Area, Washington

EvB—Everett gravelly sandy loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t629
Elevation: 30 to 900 feet
Mean annual precipitation: 35 to 91 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 180 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Everett and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Everett

Setting

Landform: Eskers, moraines, kames
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glacial outwash

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: very gravelly sandy loam
Bw - 3 to 24 inches: very gravelly sandy loam
C1 - 24 to 35 inches: very gravelly loamy sand
C2 - 35 to 60 inches: extremely cobbly coarse sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Forage suitability group: Droughty Soils (G002XN402WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XS401WA)
Hydric soil rating: No

Minor Components

Alderwood

Percent of map unit: 10 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Indianola

Percent of map unit: 10 percent
Landform: Eskers, kames, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

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

SECTION II

CONDITIONS AND REQUIREMENTS SUMMARY

The Project must comply with the following Core and Special Requirements:

- **C.R. #1 – Discharge at the Natural Location**: Existing Site is contained within one TDA with one NDA and one NDL. Runoff from the NDA leaves the Site as sheet flow over the northeast property corner. Runoff continues as sheet flow over pasture vegetation until it is collected by a roadside drainage ditch on the south side of Redmond-Fall City RD SE. The Project will collect runoff and convey runoff north to an infiltration pond located in Tract A. The infiltration pond is designed to infiltrate 100% of the Site's runoff. The infiltration pond will contain an overflow that discharges to the existing drainage ditch located on the south side of Redmond-Fall City RD SE. Stormwater runoff will leave the Site at the natural drainage locations and not produce any adverse impact to downhill properties or drainage systems.
- **C.R. #2 – Offsite Analysis:** Analysis is included in Section III. The Analysis describes the Site's runoff patterns in detail.
- **C.R. #3 – Flow Control:** The Project is required to adhere to Level 2 Flow Control Standards. The Site is required to "match developed discharge durations to predeveloped durations for the range of predeveloped discharge rates from 50% of the two-year peak flow up to the full 50-year peak flow. Also match developed peak discharge rates to predeveloped peak discharge rates for the 2 and the 10 year return periods," (KCSWDM, Sec. 1.2). One infiltration pond will provide flow control as required for 13 lots, associated rights of way, and Tracts. The infiltration facility is designed to fully infiltrate Site runoff.
- **C.R. #4 – Conveyance System:** New pipe systems are required to be designed with sufficient capacity to convey and contain (at minimum) the 25-year peak flow, assuming developed conditions for onsite tributary areas and existing conditions for any offsite tributary areas. Pipe system structures may overtop for runoff events that exceed the 25-year design capacity, provided the overflow from a 100-year runoff event does not create or aggravate a "severe flooding problem" or "severe erosion problem" as defined in C.R. #2. Any overflow occurring onsite for runoff events up to and including the 100-year event must discharge at the natural location for the project site. In residential subdivisions, such overflow must be contained within an onsite drainage easement, tract, covenant or public right-of-way. This analysis will be performed at time of construction plan preparation.
- **C.R. #5 – Erosion and Sediment Control:** The Project will provide the thirteen minimum ESC measures. A temporary erosion and sedimentation control plan will be prepared at the time construction plan preparation.
- **C.R. #6 – Maintenance and Operations:** Maintenance of the proposed storm drainage facilities will be the responsibility of the City. An Operation and Maintenance Manual will be included in Section X at the time of construction plan preparation.

- **C.R. #7 – Financial Guarantees:** Prior to commencing construction, the Applicant must post a drainage facilities restoration and site stabilization financial guarantee. For any constructed or modified drainage facilities to be maintained and operated by the City, the Applicant must: 1) Post a drainage defect and maintenance financial guarantee for a period of two years, and 2) Maintain the drainage facilities during the two-year period following posting of the drainage defect and maintenance financial guarantee.
- **C.R. #8 – Water Quality:** The Project is required to provide Basic Water Quality Treatment with the goal of 80% removal of total suspended solids (TSS) for flows or volumes up to and including the WQ design flow or volume for a typical rainfall year, assuming typical pollutant concentrations in urban runoff. The Basic WQ menu provided will consist of a wet bio-swale preceding the infiltration pond.
- **C.R. #9 – Flow Control BMPs:** The Project must provide onsite flow control BMPs to mitigate the impacts of storm and surface water runoff generated by new impervious surface, new pervious surface, existing impervious surfaces, and replaced impervious surface targeted for mitigation as specified in the following sections. However, any impervious surface served by an infiltration facility designed in accordance with the flow control facility requirement (Section 1.2.3.1), the facility implementation requirements (Section 1.2.3.2), and the design criteria for infiltration facilities (Section 5.2) is exempt from the flow control BMPs requirement.

- **S.R. #1 – Other Adopted Area-Specific Requirements:** Not applicable for this Project.
- **S.R. #2 – Floodplain/Floodway Delineation:** Not applicable for this Project.
- **S.R. #3 – Flood Protection Facilities:** Not applicable for this Project.
- **S.R. #4 – Source Control:** Not applicable for this Project.
- **S.R. #5 – Oil Control:** Not applicable to this project. From the 2019 AADT traffic counts along 332nd Ave SE, just north of se 44th ST, 1535 were regestered coresponding with a relatively low volume. Per 1.3.5 of the KCSWDM, only high use sites are required to provide oil control respectively.

CONDITIONS OF APPROVAL

Fall City PREA19-0275

TBD

SECTION III

OFF-SITE ANALYSIS

An offsite Level One Downstream Analysis was prepared by D.R. STRONG Consulting Engineers Inc. and is included in this section.

LEVEL ONE DOWNSTREAM ANALYSIS

DISCLAIMER:

This report was prepared at the request of Slalom Construction, LLC for the 3.34-acre parcel known as a portion of the northwest Quarter of Section 15, Township 24 North, Range 7 East, W.M., in King County, Tax Parcel Numbers 0943100220 (Site). D. R. STRONG Consulting Engineers Inc. (DRS) has prepared this report for the exclusive use of DRS, the owner, and their agents, for specific application to the development project as described herein. Use or reliance on this report, or any of its contents for any revisions of this project, or any other project, or by others not described above, is forbidden without the expressed permission by DRS.

TASK 1: DEFINE AND MAP STUDY AREA

This Offsite Analysis was prepared in accordance with Core Requirement #2, Section 1.2.2 of the 2016 King County Surface Water Design Manual. The Site is located at 4135 332nd Ave SE, Fall City, Washington. The Project is the subdivision of one parcel into 13 single-family lots.

See Figures 1, 2, 3, and 5 for maps of the study area.

TASK 2: RESOURCE REVIEW

- Adopted Basin Plans: Snohomish Basin Protection Plan issued December 2013, prepared by Snohomish County Surface Water Management, King County Snoqualmie Watershed Forum Staff, and Tulalip Tribes Natural Resources Department. Snoqualmie Watershed King County does not currently have a basin plan for Snoqualmie-Skykomish Watershed. The most relevant plan is the ***Patterson Creek Rural Reconnaissance Report (RRR)*** that King County issued in 2001. The County has not adopted another document that includes the Patterson Creek basin. Much of the 2001 plan recommendations are implemented through more stringent stormwater standards, critical areas regulations, and zoning updates. The plan does not list any specific conditions relevant to the Project study area.
- Basin Reconnaissance Summary Reports: Patterson Creek Rapid Rural Reconnaissance Report by the King County Department of Natural Resources and Parks Water and Land Resource Division dated February 2004. An Atlas of The Watersheds of King County, Washington issued July 20, 1995.
- Comprehensive Plans: 2012 King County Comprehensive Plan adopted December 2012.
- Floodplain/Floodway (FEMA) Map: No floodplains exist on site, See Figure 12.
- Sensitive Areas Map Folios: See Figures 6-11.
- DNRP Drainage Complaints and Studies: Per King County Water and Land Resources Division, there are complaints within approximately one mile the downstream path of the developed Site within the last 10 years. See figure 13.
- USDA King County Soils Survey: See Figure 4
- Wetlands Inventory: No wetlands exist on site; however, King County iMap indicates wetlands are present north of the site. See Figure 7.

- Migrating River Studies: The Site is not located within the channel migration zones of Cedar River, Tolt River, Raging River, Three Forks of the Snoqualmie River, or Green River. The Raging River hazard areas end approximately at 328th Way SE, approximately a mile south of Fall City. The Three Forks of the Snoqualmie River migration hazard ends near the northern edge of Snoqualmie.
- King County Designated Water Quality Problems: Per the Washington State Water Quality Assessment 303(d)/305(b) Integrated Report current as of 2012, there are no water quality problems within 1 mile downstream of the Site.

FIGURE 5
KING COUNTY TOPOGRAPHY IMAP

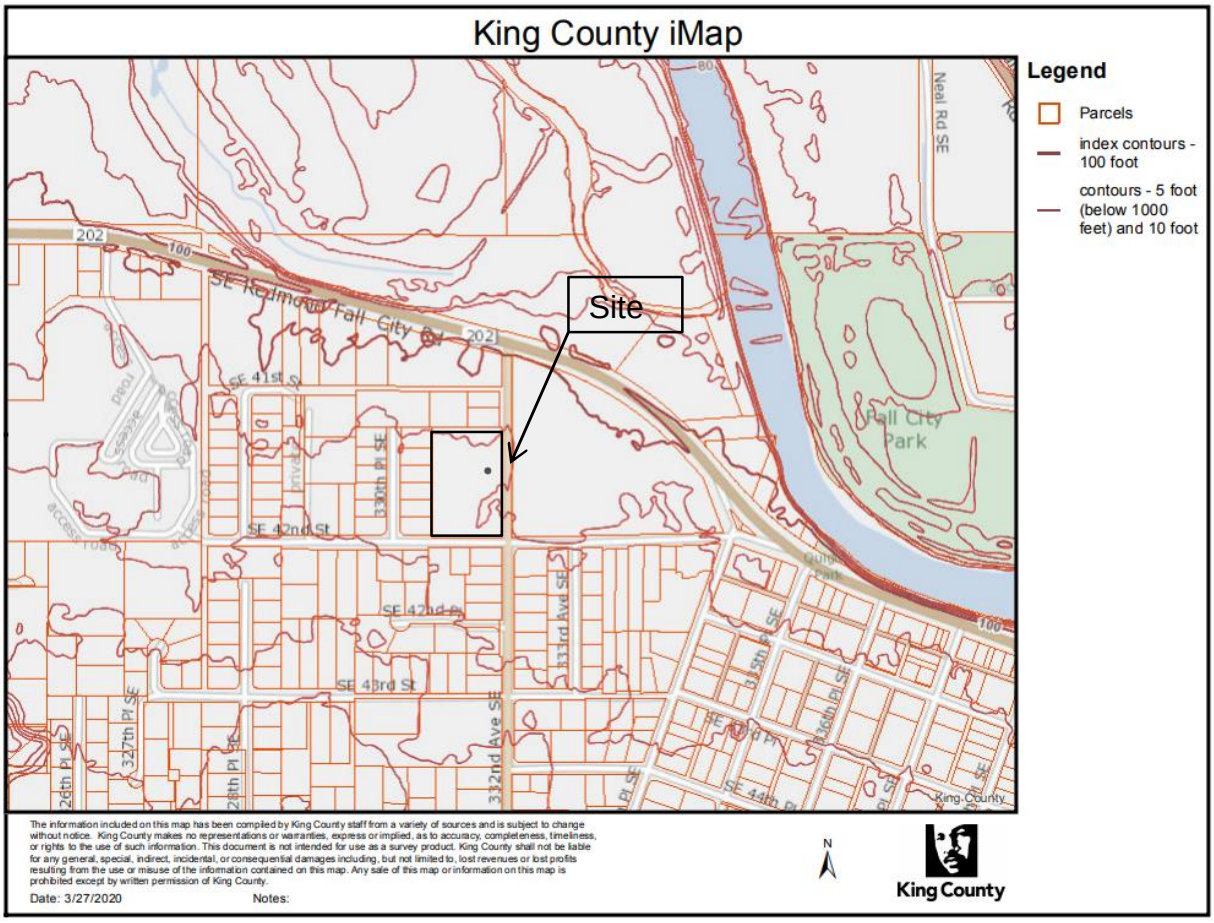


FIGURE 6
KING COUNTY 100 YEAR FLOOD HAZARD AREAS IMAP

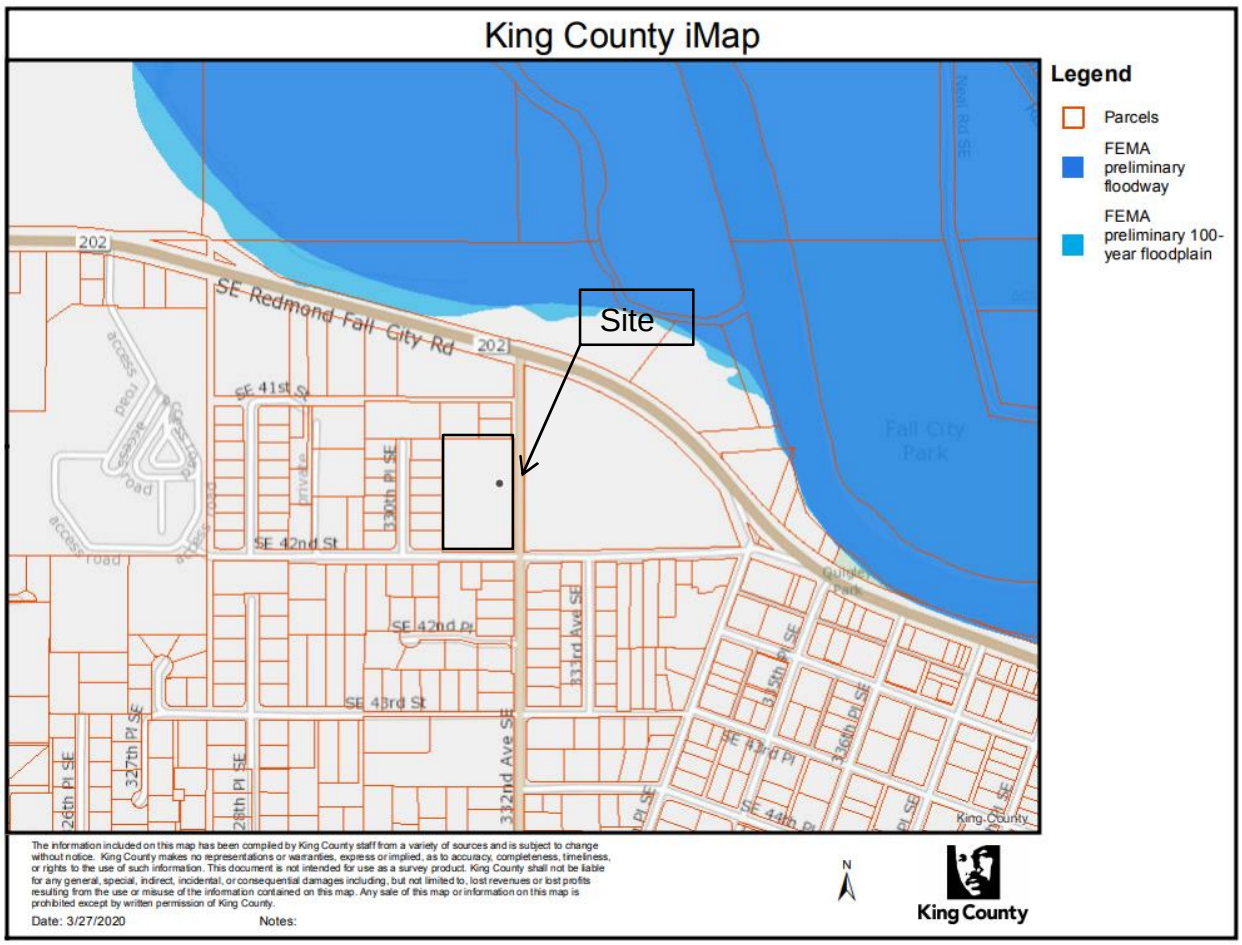


FIGURE 7
KING COUNTY WETLANDS AND STREAMS IMAP

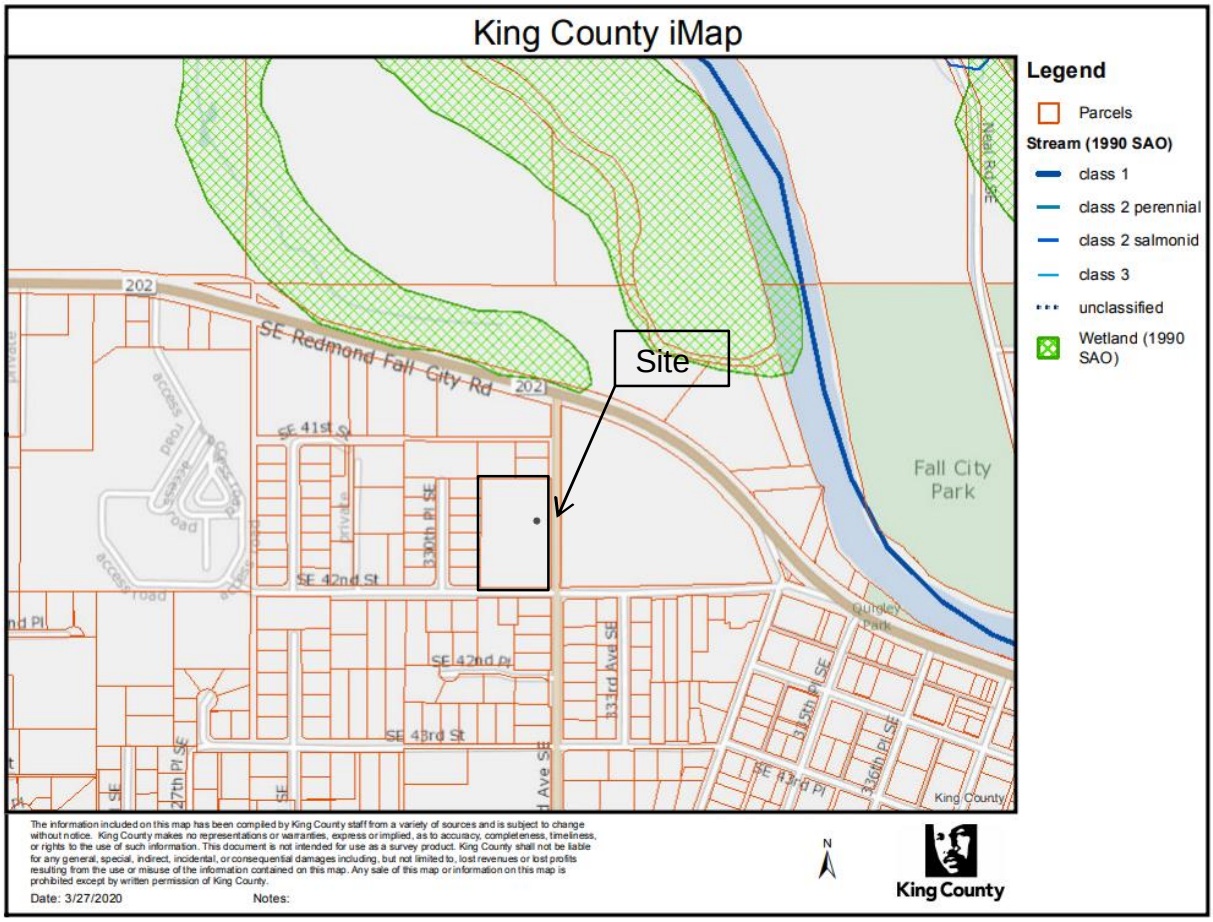


FIGURE 8
KING COUNTY CRITICAL AQUIFER RECHARGE AREAS IMAP

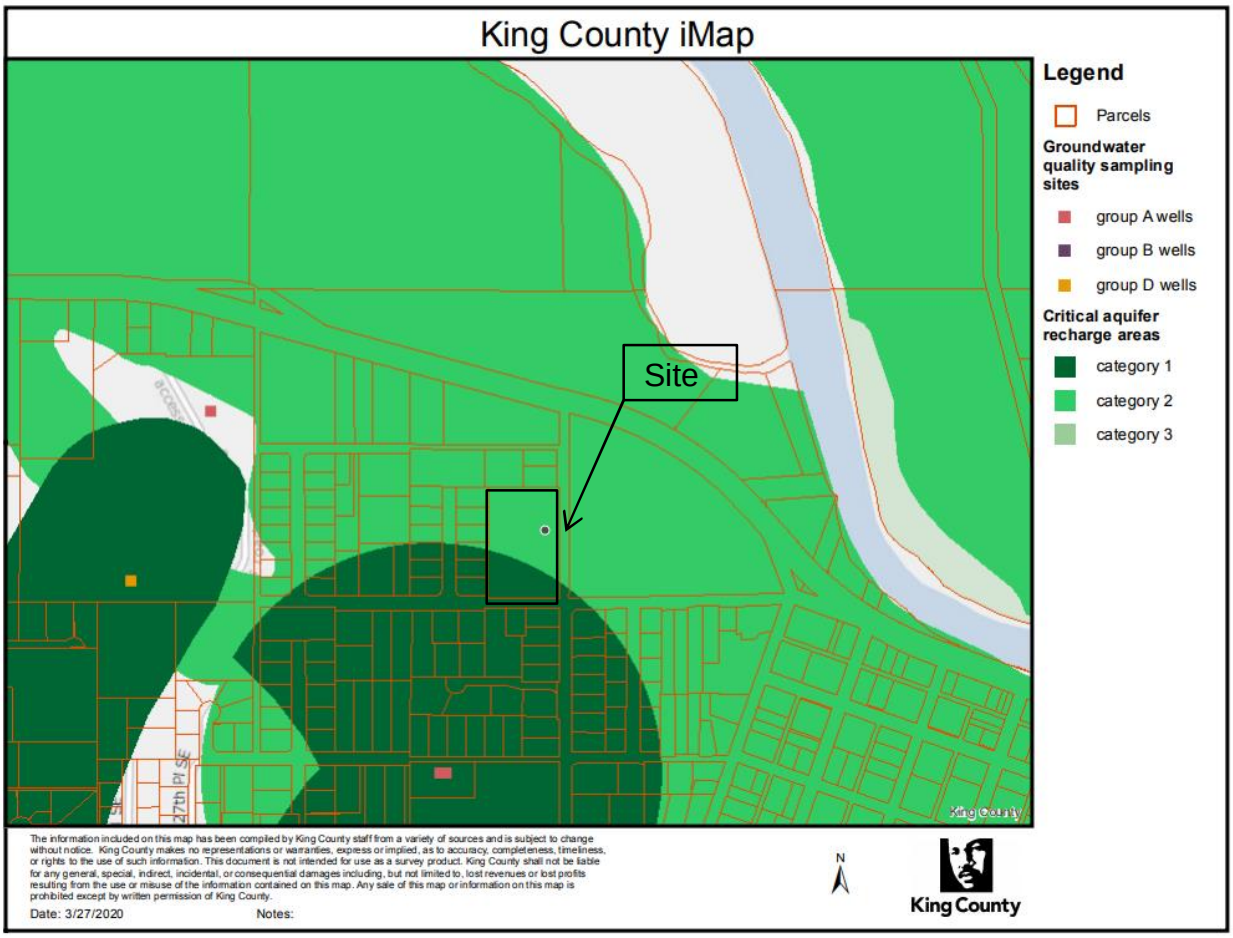


FIGURE 9
KING COUNTY EROSION HAZARD AREAS IMAP

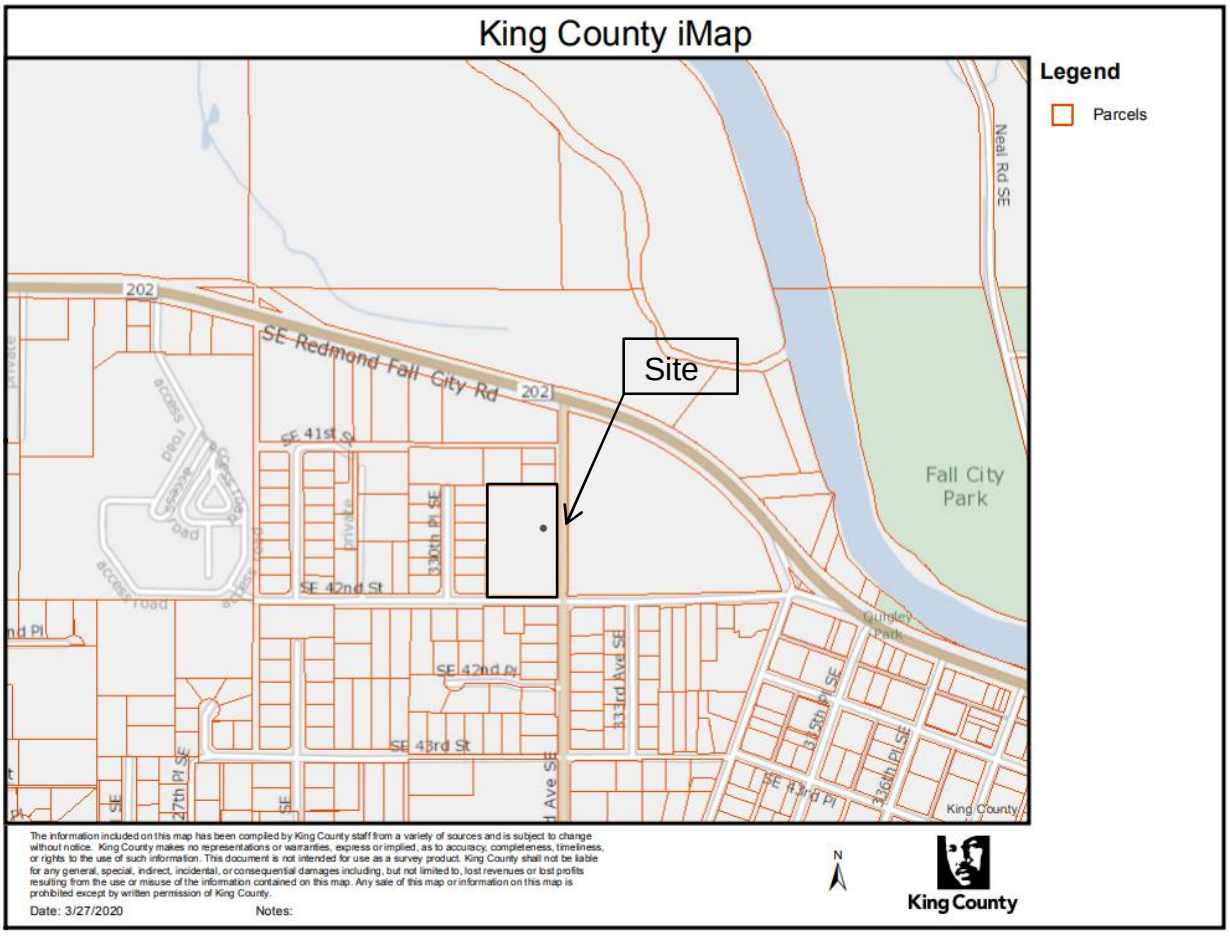


FIGURE 10
KING COUNTY LANDSLIDE HAZARD AREAS IMAP

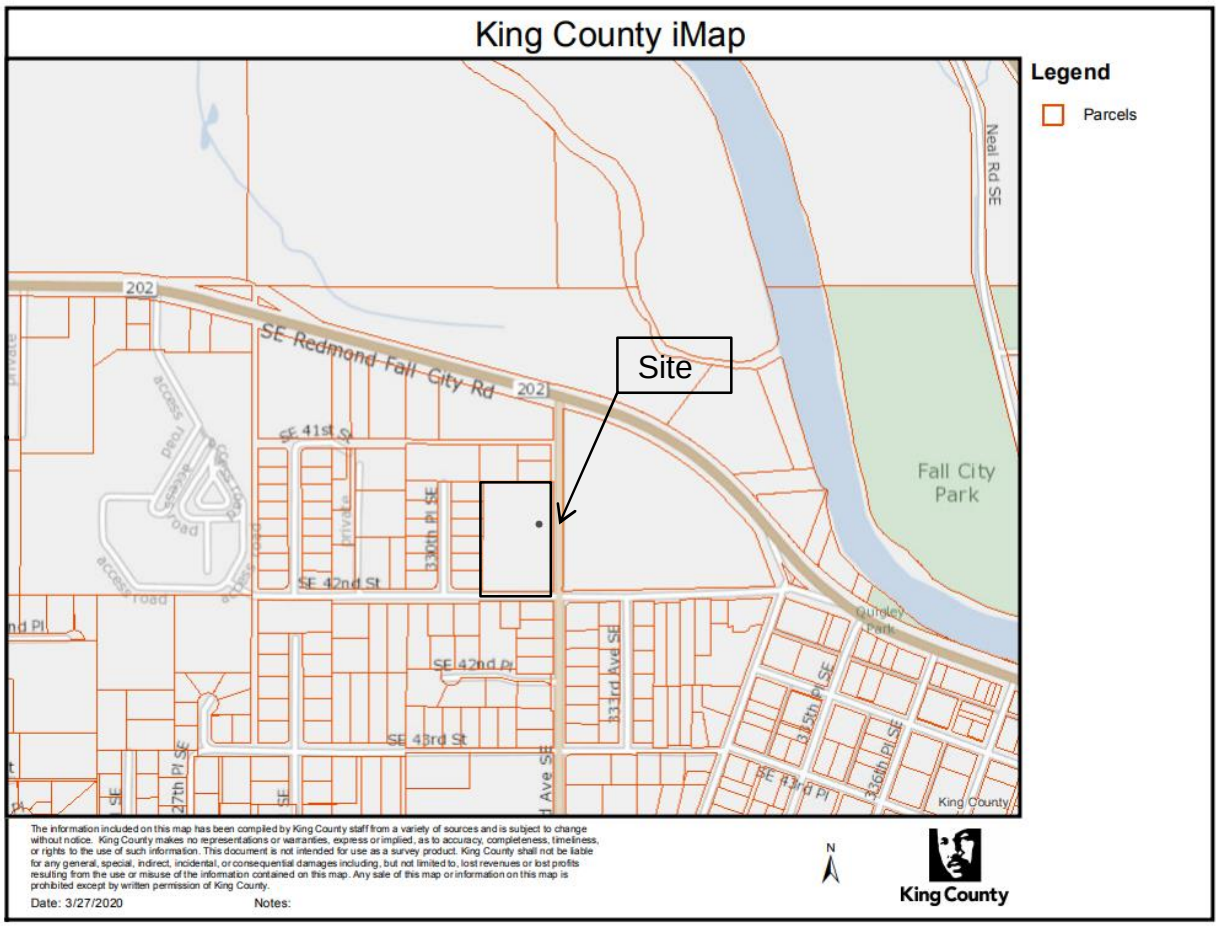


FIGURE 11
KING COUNTY SEISMIC HAZARD AREAS IMAP

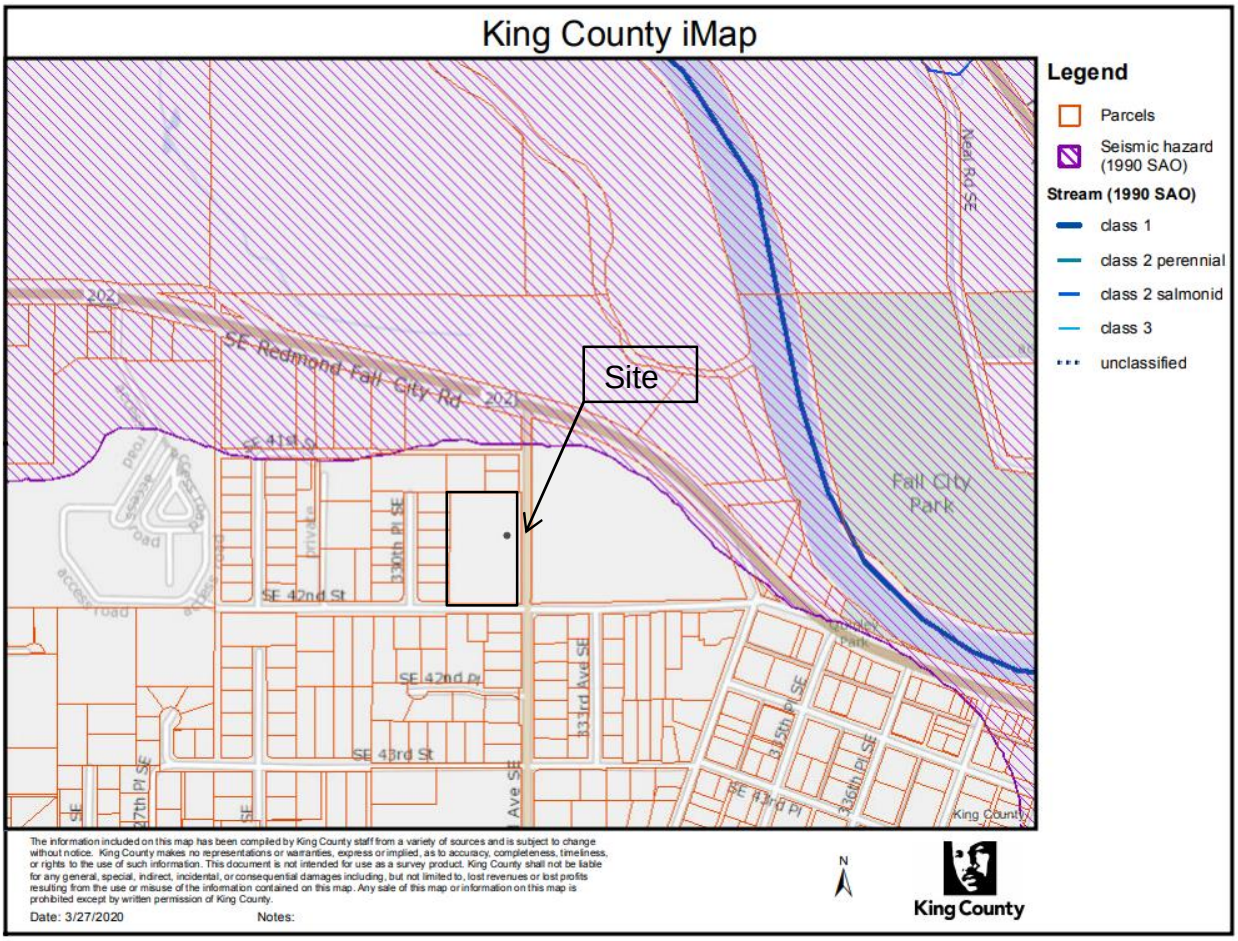


FIGURE 12
FEMA MAP

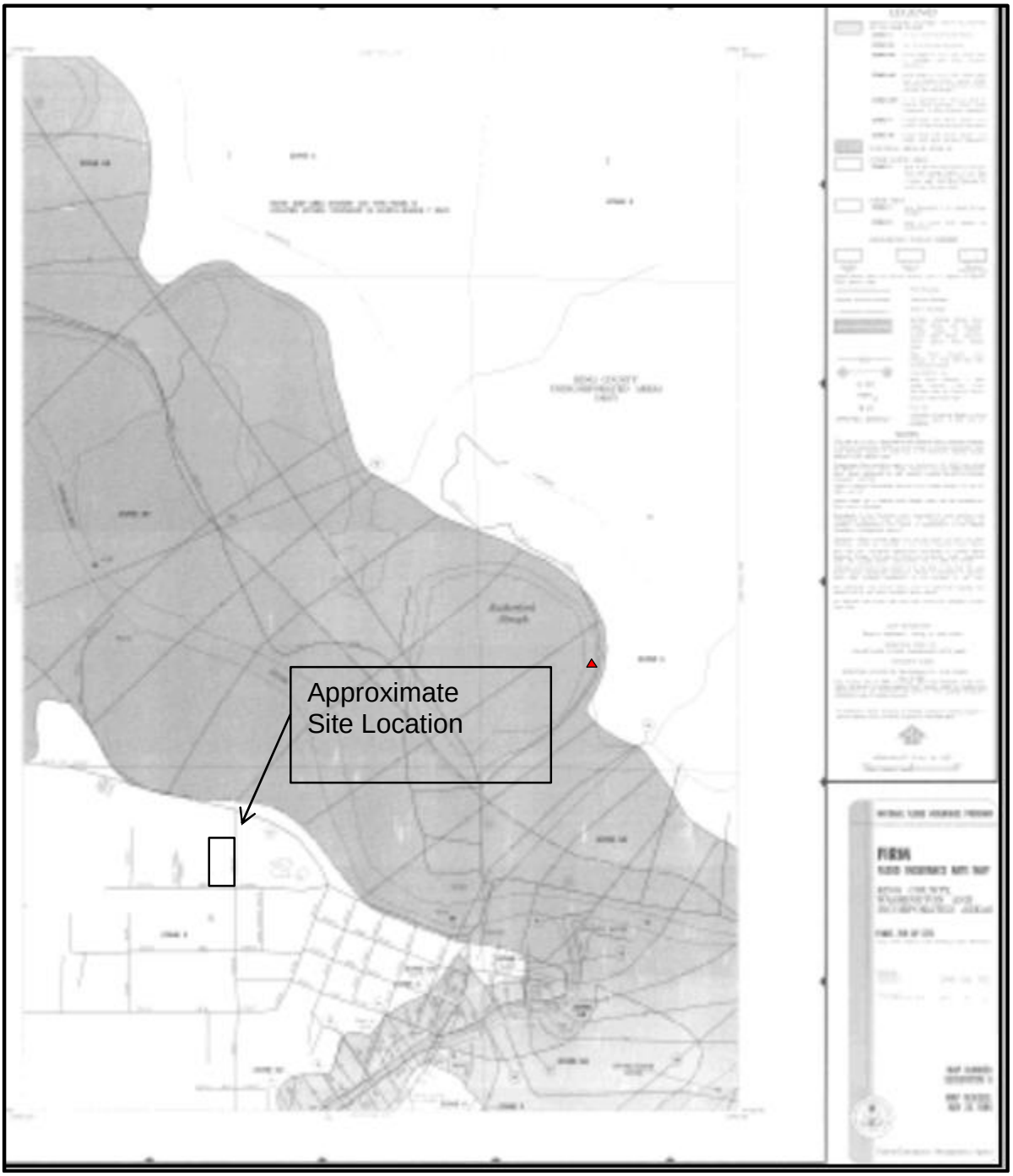
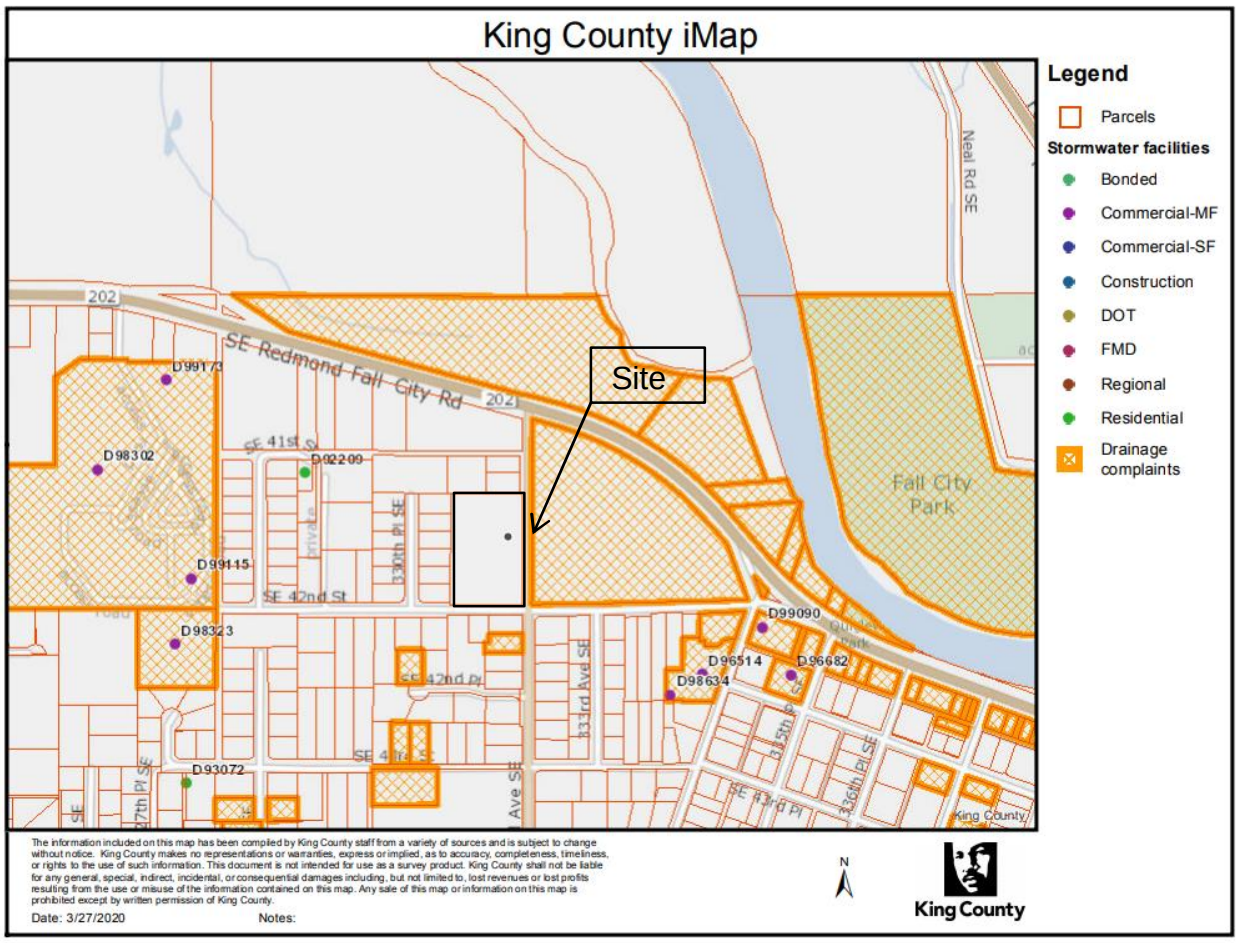


FIGURE 13
KING COUNTY DRAINAGE COMPLAINTS IMAP



TASK 3: FIELD INSPECTION

UPSTREAM TRIBUTARY AREA

Upon evaluation of the upstream area through examining King County topographic map (see Figure 5) and by conducting field reconnaissance on June 3rd of 2020, the upstream tributary area for the Site is considered negligible.

Runoff from the areas west of the Site is conveyed to the north via sheet flow and roadside ditches where it is then collected in a catch basin; the direction of the flow from this point was indeterminate as the outfall to the west could not be located. It is believed that this system was abandoned and that runoff sheet flows to the north away from the Site. Runoff from the areas east of the Site is captured by a roadside ditch located on the east side of 332nd AVE SE and is conveyed north away from the Site. Runoff from the areas north of the Site is captured by the drainage ditch located on the south side of SE Redmond-Fall City Rd and conveyed north, away from the Site. Runoff from the areas south of the Site sheet flows east to the existing roadside ditch located along the south side of SE 42nd ST. Minimal runoff from the south enters the Site due to topography; however, for calculation purposes it is considered negligible.

GENERAL ONSITE AND OFFSITE DRAINAGE DESCRIPTIONS

The Site is contained within one Threshold Discharge Area (TDA). The Site is predomently flat where the highpoint of the site exists latitudinally along the southern property line. The Site then slopes generally to the northeast corner at a very shallow grade. Site runoff generated by the TDA sheetflows over the northeast property corner and is captured by the roadside ditch along SE Redmond-Fall City RD. Runoff flowing west enters a culvert along the south side of SE Redmond-Fall City RD. From here runoff is conveyed north under SE Redmond-Fall City RD to a depression that will disperse or infiltrate runoff to the Snoqualmie River (see figure 3).

TASK 4: DRAINAGE SYSTEM DESCRIPTION AND PROBLEM DESCRIPTIONS

DRAINAGE SYSTEM DESCRIPTION

The downstream analysis is further illustrated and detailed in the Downstream Map Figure 13 and Downstream Table Figure 14. The drainage area is located within the Patterson Creek drainage basin, more specifically the Laughing Jacobs Creek sub-basin. The drainage area was evaluated by reviewing available resources described in task 2, and by conducting a field reconnaissance on June 3rd, 2020 under cloudy conditions.

DOWNSTREAM PATH

Point ñAò is Natural Discharge Location (NDL) of the NDA West. It is located along the northeast property corner (±0).

From Point ñAò to Point ñBò, runoff continues to the north as sheet flow over vegetated pasture to the roadside drainage ditch located on the south side of SE Redmond-Fall City Rd. No flow was observed (±0ô335ô).

Point ñBò, sheet flow runoff is collected by the heavily vegetated roadside drainage ditch (±335ô).

From Point ñBò to Point ñCò, runoff flows west as channel flow through a vegetated roadside ditch located on the south side of SE Redmond-Fall City Rd. No flow was observed (±335ô425ô).

Point ñCò, runoff should enter a 12ò diameter concrete pipe (±425ô). The pipe was filled with sediment restricting flow at the time of the analysis.

From Point ñCò to Point ñDò, runoff flows north as pipe flow via a 12ò concrete pipe under SE Redmond-Fall City Rd. No flow was observed (±425ô470ô).

Point ñDò, runoff discharges from the 12ò concrete pipe and re-enters the roadside ditch located on the north side of SE Redmond-Fall City Rd (±470ô).

From Point ñDò to Point ñRò, runoff disperses to the north to a natural depression that will overtop or infiltrate runoff to the Snoqualmie River No flow was observed (±470ô1940ô).

Point ñRò, runoff enters the Snoqualmie River (±1940ô).

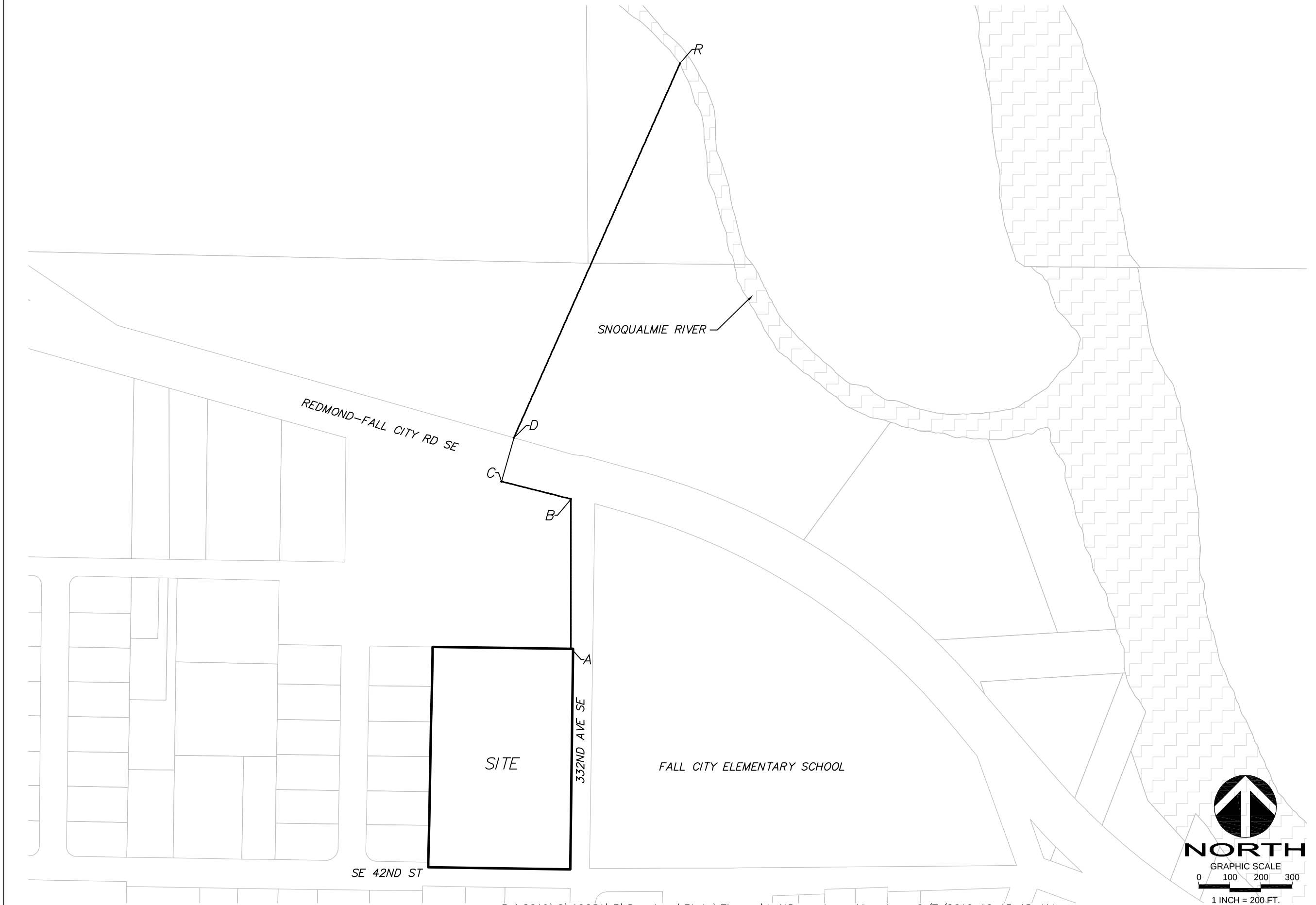
TASK 5: MITIGATION OF EXISTING OR POTENTIAL PROBLEMS

A review of the King County Water and Land Resources Division ï Drainage Services Section *Documented Drainage Complaints* within one mile of the downstream flow paths revealed no relevant complaints within the last ten years.

The project should not create any problems as specified in Section 1.2.2.1 of the Manual and therefore is not required to provide Drainage Problem Impact Mitigation subject to the requirements of Section 1.2.2.2.

An infiltration pond will provide flow control and basic water quality treatment for the entire Site. During construction, standard sediment and erosion control methods will be utilized. This will include the use of a stabilized construction entrance, perimeter silt fencing, and other necessary measures to minimize soil erosion during construction.

FIGURE 14
OFFSITE ANALYSIS DOWNSTREAM MAP



D.R. STRONG
CONSULTING ENGINEERS
DRS
ENGINEERS PLANNERS SURVEYORS
620 - 7th AVENUE KIRKLAND, WA 98033
O 425.827.3063 F 425.827.2423

DOWNSTREAM MAP

FALL CITY II
4135 332ND AVE SE
FALL CITY, WASHINGTON

DRAFTED BY: MES
DESIGNED BY: YLP
PROJECT ENGINEER: MAJ
DATE: 09.07.16
PROJECT NO.: 15093

FIGURE: 14

R:\2019\0\19081\3\Drawings\Plots\Figures\Lvl1DownstreamMap.dwg 9/7/2016 10:45:48 AM

FIGURE 15
OFFSITE ANALYSIS DOWNSTREAM TABLE

Symbol	Drainage Component Type, Name, and Size	Drainage Component Description	Slope	Distance From site Discharge	Existing Problems	Potential Problems	Observations of field inspector resource reviewer, or resident
See map	Type: sheet flow, swale, Stream, channel, pipe, Pond; Size: diameter Surface area	drainage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 mile = 1,320 feet	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion		Tributary area, likelihood of problem, overflow pathways, potential impacts.
A	Natural discharge location	Runoff exits Site as sheet flow over the northeast property corner.		±0ô	None Observed	None Anticipated	No flow observed
A-B	Sheet flow	Vegetated pasture.			None Observed	None Anticipated	No flow observed
B	Roadside Ditch	Roadside drainage ditch (1ôbottom, 5ôtop, 2ôdeep)		±335ô	None Observed	None Anticipated	No flow observed
B-C	Westerly channel flow	Ditch (1ôbottom, 5ôtop, 2ôdeep)			None Observed	None Anticipated	No flow observed
C	Concrete pipe inlet	12òØ concrete pipe		±425ô	Pipe filled with sediment	Runoff ponding	No flow observed
C-D	Easterly pipe flow	12òØ concrete pipe			Clogged pipe	None Anticipated	No flow observed
D	Concrete pipe outlet	Ditch (2ôbottom, 5ôtop, 2ôdeep)		±470ô	Exit filled with sediment	None Anticipated	No flow observed
D-E	Northerly flow/Infiltration	Stormwater disperses from the roadside ditch to the north where it collects within the depression where it infiltrates the soils or overtops to the Snoqualmie River			None Observed	None Anticipated	No flow observed
E	Snoqualmie River	Stream Flow		±1940ô	None Observed	None Anticipated	No flow observed

SECTION IV

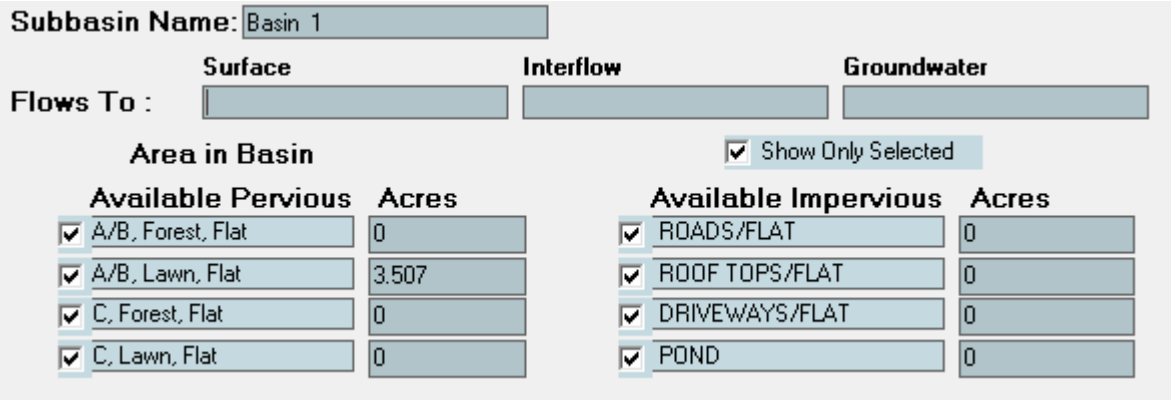
FLOW CONTROL ANALYSIS AND WATER QUALITY DESIGN

EXISTING SITE HYDROLOGY

WWHM2012 was used to model runoff from the Site. Per the Geotechnical Engineering Study the Site is consistant with the online Web Soil Survey (WSS). The Site was modeled primarily as Everett (EvB), outwash soils, with a small portion of Sammamish (SH), till soils. Forested existing conditions were used. Results of the WWHM2012 analysis are included in this section.

Modeling Input for the TDA

PREDEVELOPED LAND USE

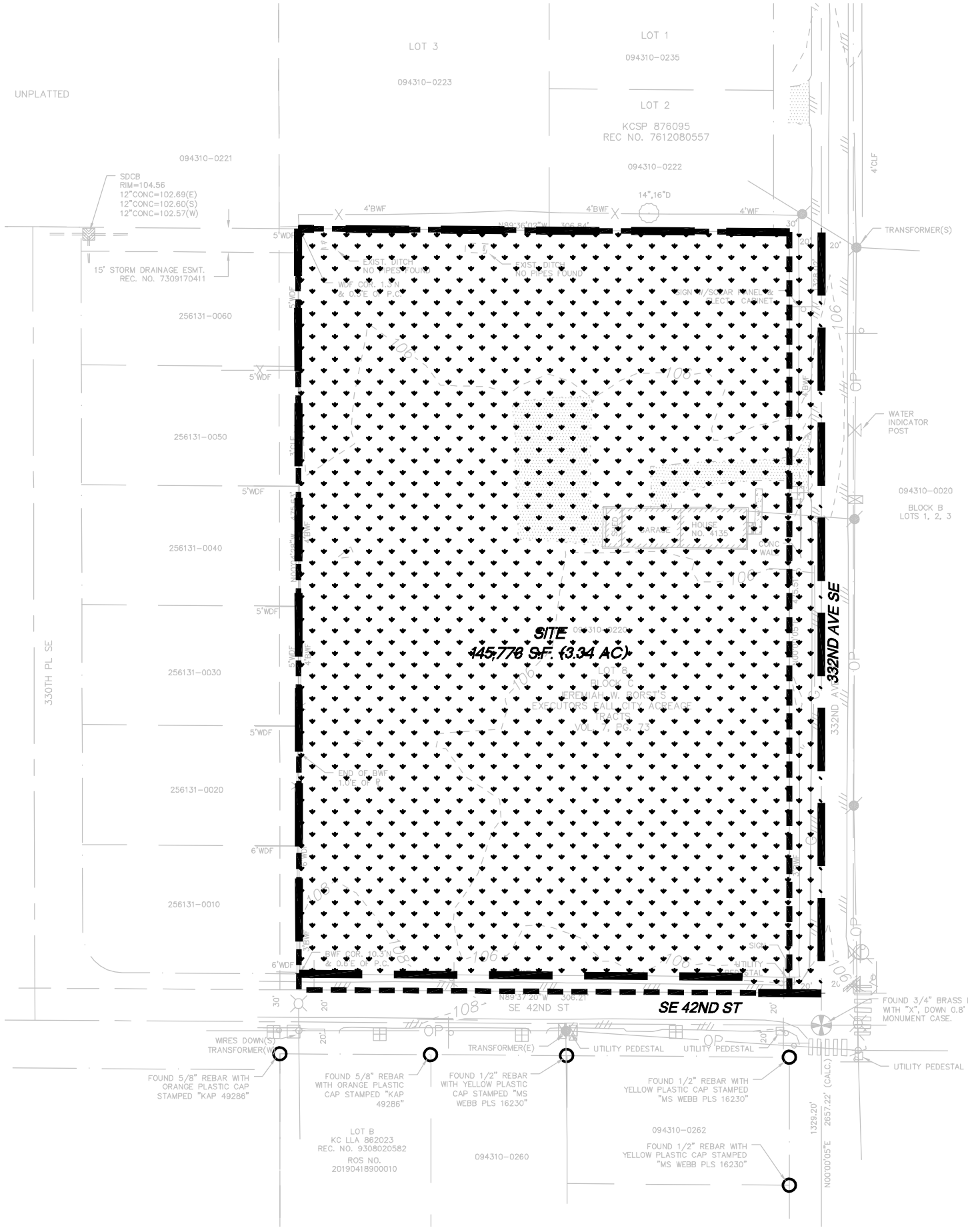


Modeling Results

Flow Frequency Return Periods for Predeveloped. POC #1

```
Flow Frequency
Flow(cfs)  0501 15m
2 Year   =    0.4838
5 Year   =    1.0564
10 Year  =    1.6028
25 Year  =    2.5166
50 Year  =    3.3806
100 Year =    4.4192
```

FIGURE 16
PREDEVELOPED AREA MAP



AREA BREAKDOWN

TOTAL SITE AREA:	145,773 S.F. (3.3465 AC)
TOTAL:	152,754 S.F. (3.507 AC)

LEGEND

- SITE BOUNDARY
- PROJECT BOUNDARY
- PREDEVELOPED PROJECT AREA

WWHM2012 INPUTS:

C, FORESTED, FLAT:	152,754 S.F. (3.507 AC)
TOTAL:	152,754 S.F. (3.507 AC)

NORTH

GRAPHIC SCALE

0 40 80 120

1 INCH = 80 FT.

D.R. STRONG
CONSULTING ENGINEERS
DRS
ENGINEERS PLANNERS SURVEYORS
620 - 7th AVENUE KIRKLAND, WA 98033
O 425.827.3063 F 425.827.2423

PREDEVELOPED AREA MAP

FALL CITY
32413 SE REDMOND-FALL CITY RD
FALL CITY, WASHINGTON

DRAFTED BY: MES
DESIGNED BY: MES
PROJECT ENGINEER: YLP
DATE: 09.07.2016
PROJECT NO.: 15093

FIGURE: 16

DEVELOPED SITE HYDROLOGY

Soil Type

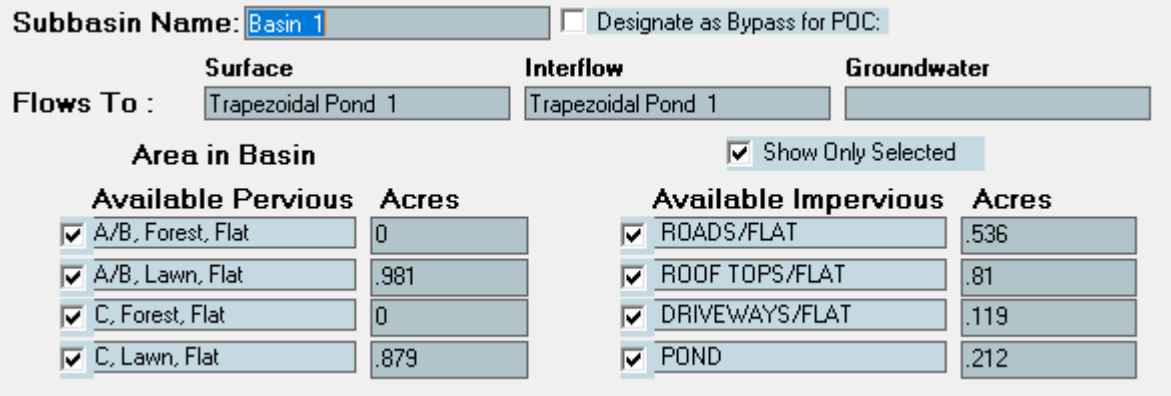
The soil types are unchanged from predeveloped conditions.

Land covers

WWHM2012 was used to model the developed peak runoff from the Site and size the infiltration pond. The portions of the Site within the developable area tributary to the proposed detention facility were modeled as ñTill Grassò and Impervious as appropriate. Results of the WWHM2012 analysis are included in this section.

Modeling Input for the TDA

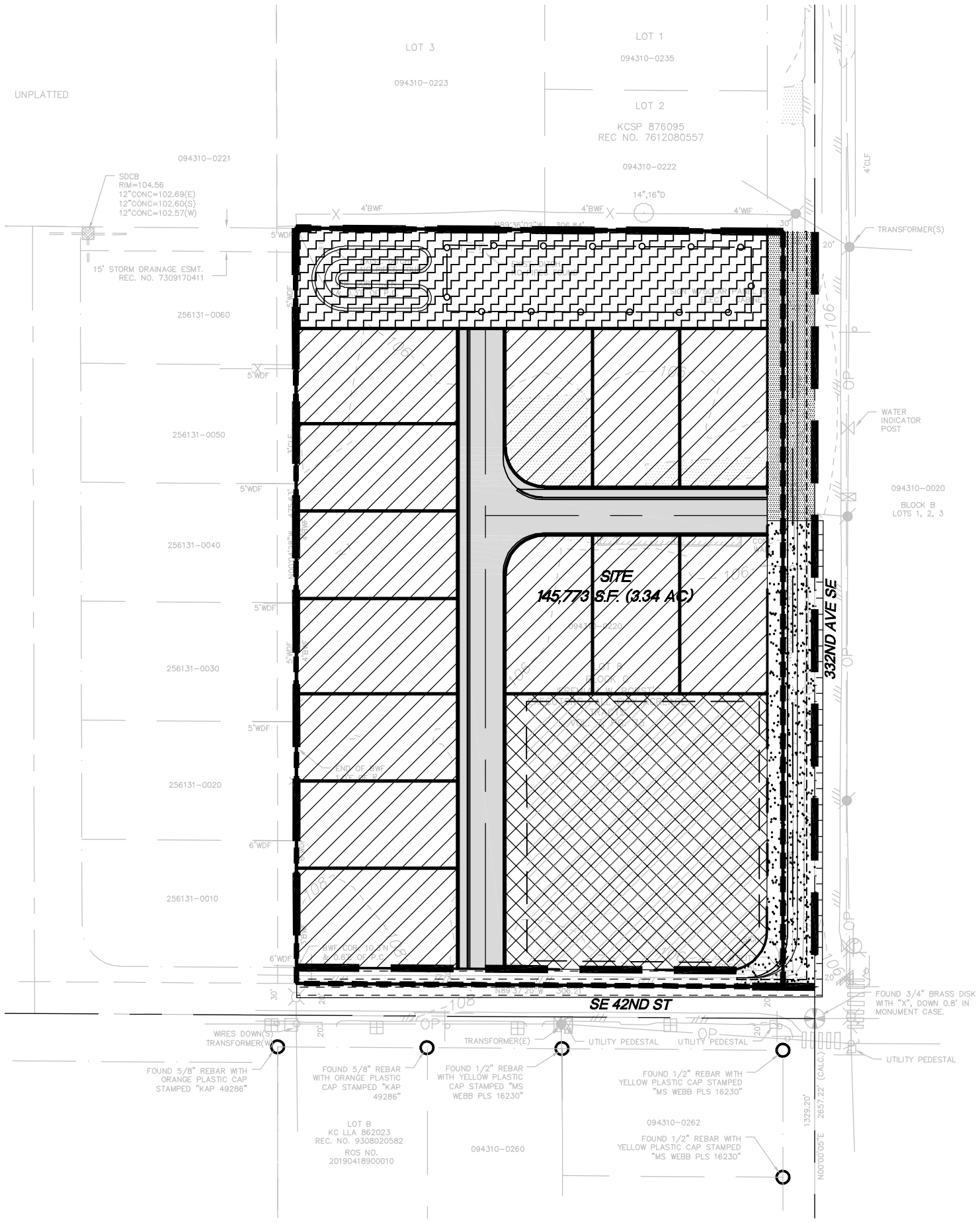
MITIGATED LAND USE



Modeling Results

The flow Frequency Return Periods for Mitigated. POC #1 provide 100% infiltration thus no flow is reported.

FIGURE 17
DEVELOPED AREA MAP



AREA BREAKDOWN

TOTAL SITE AREA:	145,773 S.F. (3.347 AC)
TOTAL PROJECT AREA:	152,754 S.F. (3.507 AC)
LOTS 1 THRU 13:	73,615 S.F. (1.689 AC)
55% MAX IMPERVIOUS:	40,488 S.F. (0.929 AC)
TILL GRASS:	33,127 S.F. (0.760 AC)
TRACT A (STORM DRAINAGE/RECREATION):	18,431 S.F. (0.424 AC)
50% MAX IMPERVIOUS:	9,216 S.F. (0.212 AC)
TILL GRASS:	9,216 S.F. (0.212 AC)
TRACT B (LOSS SEPTIC):	33,521 S.F. (0.769 AC)
IMPERVIOUS:	0 S.F. (0.000 AC)
TILL GRASS:	33,521 S.F. (0.769 AC)
TRACT C (PRIVATE ACCESS):	12,610 S.F. (0.289 AC)
IMPERVIOUS:	12,610 S.F. (0.289 AC)
TILL GRASS:	0 S.F. (0.000 AC)
R.O.W.:	9,131 S.F. (0.209 AC)
IMPERVIOUS:	5,321 S.F. (0.122 AC)
TILL GRASS:	3,810 S.F. (0.087 AC)
TARGETED, UNCOLLECTED ROW AREA:	5,466 S.F. (0.125 AC)
NON-TARGED, COLLECTED ROW AREA: (MITIGATION TRADE AREA)	6,771 S.F. (0.155 AC)

WWHM2012 INPUTS:

ROADS/FLAT (ROW, INCL. TRACTS):	23,358 S.F. (0.536 AC)
ROOF TOPS/FLAT (SUBTRACT DRIVEWAYS):	35,288 S.F. (0.810 AC)
DRIVEWAYS/FLAT:	5,200 S.F. (0.119 AC)
A/B. LAWN, FLAT:	42,737 S.F. (0.981 AC)
C. LAWN, FLAT:	38,281 S.F. (0.879 AC)
TOTAL:	15,4079 S.F. (3.537 AC)

NORTH

GRAPHIC SCALE

0 40 80 120

1 INCH = 80 FT.

D.R. STRONG
CONSULTING ENGINEERS
DRS
ENGINEERS PLANNERS SURVEYORS
620 - 7th AVENUE KIRKLAND, WA 98033
O 425.827.3063 F 425.827.2423

DEVELOPED AREA MAP

FALL CITY II
4135 332ND AVE SE
FALL CITY, WASHINGTON

DRAFTED BY: JSK
DESIGNED BY: JSK
PROJECT ENGINEER: MAJ
DATE: 05.31.2020
PROJECT NO.: 19081

FIGURE: 17

PERFORMANCE STANDARDS

The Site is required to adhere to Level 2 Flow Control Standards. The Project is required to ñmatch developed discharge durations to predeveloped durations for the range of predeveloped discharge rates from 50% of the two-year peak flow up to the full 50-year peak flow. The Project will also match developed peak discharge rates to predeveloped peak discharge rates for the 2 and the 10 year periods,ò(KCSWDM, Sec. 1.2). An infiltration pond has been designed to fully infiltrate up to the 100 year storm. No discharge is anticipated.

FLOW CONTROL SYSTEM

The Project will utilize an infiltration pond designed to infiltrate 100% of the Site runoff. WWHM2012 software was used to size the facility. The infiltration pond design information is included in this section; a detailed report of the WWHM model is included within the apendix of this report.

Infiltration Facility (preceded by wet bio-swale)

Name : Trapezoidal Pond 1
Bottom Length: 100.00 ft.
Bottom Width: 21.00 ft.
Depth: 5 ft.
Volume at riser head: 0.3934 acre-feet.
Infiltration On
Infiltration rate: 20
Infiltration safety factor: 1
Total Volume Infiltrated (ac-ft.): 621.115
Total Volume Through Riser (ac-ft.): 0
Total Volume Through Facility (ac-ft.): 621.115
Percent Infiltrated: 100
Total Precip Applied to Facility: 0
Total Evap From Facility: 0
Side slope 1: 2 To 1
Side slope 2: 2 To 1
Side slope 3: 6.7 To 1
Side slope 4: 2 To 1
Discharge Structure
Riser Height: 4 ft.
Riser Diameter: 18 in.

WATER QUALITY TREATMENT SYSTEM

The Project is required to adhere to the Basic Water Quality treatment criteria. A wet bioswale is proposed to accommodate this requirement.

Preliminary sizing for the wet bioswale was calculated using 2021 Surface Water Design Manual. A 13 ft wide, approximately 131 ft long, 0.005 ft/ft slope, and a design flow depth of 0.33 ft is proposed.

FIGURE 18
DETENTION & WATER QUALITY FACILITY DETAILS

(To be completed at time of final engineering)

SECTION V

CONVEYANCE SYSTEM ANALYSIS AND DESIGN

Per Core Requirement #4 of the KCSWDM, the conveyance system must be analyzed and designed for the existing tributary and developed onsite runoff. Pipe systems shall be designed to convey the 100-year design storm. The Rational Method will be used to calculate the Q-Ratio for each pipe node.

A conveyance system consisting primarily of pipes, roadside ditches and catch basins will be designed for the Project. Onsite runoff will be collected by the roadside ditches and catch basins. Pipes are typically eight-inch to twelve-inch diameter.

A backwater analysis will be provided at time of final engineering.

100-YEAR OVERFLOW CONVEYANCE

The overflow route must be able to safely convey the 100-year developed peak flow to the downstream conveyance system or to an acceptable discharge point in accordance with conveyance requirements in Section 1.2.4. An emergency overflow will be provided.

The overflow system is to be sized and analysed as a culvert to which detail will be provided at the time of final engineering.

SECTION VI

SPECIAL REPORTS AND STUDIES

The following report and studies have been provided with this submittal.

Geotechnical Engineering Study: Earth Solutions NW, LLC ï December 11th, 2019

SECTION VII

OTHER PERMITS, VARIANCES AND ADJUSTMENTS

Pending Private Access Street variance.

SECTION VIII

CSWPPP ANALYSIS AND DESIGN (PART A)

The Erosion and Sedimentation Control Design will meet the 13 minimum King County requirements:

1. **Clearing Limits:** Areas to remain undisturbed shall be delineated with a high visibility plastic fence prior to any site clearing or grading.
2. **Cover Measures:** Site disturbed areas shall be covered with mulch and seeded, as appropriate, for temporary or permanent measures.
3. **Perimeter Protection:** Silt fences will be provided downslope of all disturbed areas.
4. **Traffic Area Stabilization**: A stabilized construction entrance will be located at the point of ingress/egress (i.e. onsite access road).
5. **Sediment Retention:** The permanent detention facility (detention vault) will act as temporary sediment traps once bottom and walls are constructed.
6. **Surface Water Collection:** Surface water from disturbed areas will sheet flow to or be collected by interceptor swales and conveyed to the sediment trap.
7. **Dewatering Control:** Not applicable for this site.
8. **Dust Control:** Dust control shall be provided by spraying exposed soils with water until wet. This is required when exposed soils are dry to the point that wind transport is possible, which would impact roadways, drainage ways, surface waters, or neighboring residences.
9. **Flow Control:** Runoff collected in the sediment traps will discharge to the permanent outfall systems once the floors and walls have been constructed.
10. **Control Pollutants:** All pollutants, including waste materials and demolitions debris that occur on-site, shall be handled and disposed of in a manner that does not cause contamination of stormwater. Woody debris may be chopped and spread on site. Cover, containment, and protection from vandalism shall be provided for all chemicals, liquid products, and non-inert wastes present on the Site (see chapter 173-304 WAS for the definition of inert waste). On-site fueling tanks shall include secondary containment.
11. **Protect Existing and Proposed Flow Control BMPs:** All existing, temporary, and permanent flow control BMPs shall be protected from disturbance during construction. There are no existing BMPs to remain on site.
12. **Maintain BMPs:** All BMPs shall be inspected, maintained, and repaired as needed to assure continued performance of their intended function. The SWPPP shall be modified whenever there is a significant change in the 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
13. **Manage the Project:** The construction project is being phased to the maximum extent practicable to prevent soil erosion, and to the maximum extent possible, the transport of sediment from the site during construction. The SWPPP shall be retained on-site at all times. Make any changes or additions necessary per the city inspector or CSWPP supervisor to ensure accordance with all 13 King County requirements.

CSWPPP PLAN DESIGN (PART B)

Construction activities that could contribute pollutants to surface and storm water include the following, with applicable BMPs listed for each item:

1. **Storage and use of chemicals:** Utilize source control, and soil erosion and sedimentation control practices, such as using only recommended amounts of chemical materials applied in the proper manner; neutralizing concrete wash water, and disposing of excess concrete material only in areas prepared for concrete placement, or return to batch plant; disposing of wash-up waters from water-based paints in sanitary sewer; disposing of wastes from oil-based paints, solvents, thinners, and mineral spirits only through a licensed waste management firm, or treatment, storage, and disposal (TSD) facility.
2. **Material delivery and storage:** Locate temporary storage areas away from vehicular traffic, near the construction entrance, and away from storm drains. Material Safety Data Sheets (MSDS) should be supplied for all materials stored, and chemicals kept in their original labeled containers. Maintenance, fueling, and repair of heavy equipment and vehicles shall be conducted using spill prevention and control measures. Contaminated surfaces shall be cleaned immediately following any spill incident. Provide cover, containment, and protection from vandalism for all chemicals, liquid products, petroleum products, and other potentially hazardous materials.
3. **Sawcutting:** Slurry and cuttings shall be vacuumed during the activity to prevent migration offsite and must not remain on permanent concrete or asphalt paving overnight. Collected slurry and cuttings shall be disposed of in a manner that does not violate ground water or surface water quality standards.
4. **Demolition:** Protect stormwater drainage system from sediment-laden runoff and loose particles. To the extent possible, use dikes, berms, or other methods to protect overland discharge paths from runoff. Street gutter, sidewalks, driveways, and other paved surfaces in the immediate area of demolition must be swept daily to collect and properly dispose of loose debris and garbage. Spray the minimum amount of water to help control windblown fine particles such as concrete, dust, and paint chips. Avoid excessive spraying so that runoff from the site does not occur, yet dust control is achieved. Oils must never be used for dust control.

The complete CSWPPP will be completed and submitted at time of final of engineering.

SECTION IX

BOND QUANTITIES, FACILITY SUMMARIES, AND DECLARATION OF COVENANT

1. Bond Quantity Worksheet ï will be submitted at final engineering
2. The Stormwater Facility Summary Sheet is included in this section

STORMWATER FACILITY SUMMARY SHEET

Development **Fall City II** Date **February 24, 2022**

Location: **4135 332nd Ave SE, Fall City, Washington**

ENGINEER	DEVELOPER
Name **Maher A. Joudi, P.E.**	Name **Cory Brandt**
Firm **D. R. STRONG Consulting Engineers, Inc.**	Firm **Slalom Construction, LLC**
Address **620 7th Avenue**	Address **3038 198th Ave SE**
Kirkland, WA 98033	**Sammamish, WA 98075**
Phone **(425) 827-3063**	Phone **(206) 419-2679**

Developed Site: **3.34 acres**

Number of lots: **13**

Number of detention facilities on site:
_____ vaults
_____ pond
_____ tanks

Number of infiltration facilities on site:
_____ vaults
__1__ ponds
_____ tanks

Flow control provided in regional facility (give location)_____
No flow control required_____ Exemption number _____

Downstream Drainage Basins

		Immediate	Major Basin
	Basin	Patterson Creek	**Patterson Creek**

Number & type of water quality facilities on site:
__1__ biofiltration swale (regular/**wet**/ or continuous inflow?)
_____ sand filter (basic or large?)
_____ combined detention/WQ vault
_____ combined detention/wetpond
_____ compost filter
_____ filter strip
_____ flow dispersion
_____ farm management plan
_____ landscape management plan
_____ oil/water separator (baffle or coalescing plate?)
_____ catch basin inserts:
Manufacturer_____
_____ pre-settling structure:
Manufacturer_____
_____ sand filter, linear (basic or large?)
_____ CONTECH Stormfilter
_____ sand filter vault (basic or large?)
_____ stormwater wetland
_____ wetvault (basic or large?)
_____ Wetvault
_____ pre-settling pond
_____ flow-splitter catchbasin

SECTION X

OPERATIONS AND MAINTENANCE MANUAL

Excerpts from the 2016 KCSWDM will be provided at final engineering.

APPENDICES

APPENDIX “A” LEGAL DESCRIPTION

PARCEL NO.: 0943100220

LOT 8, BLOCK C, JEREMIAH W. BORST'S EXECUTORS FALL CITY ACREAGE TRACTS, ACCORDING TO THE PLAT THEREOF, RECORDED IN VOLUME 7 OF PLATS, PAGE 73, IN KING COUNTY, WASHINGTON;

EXCEPT THE NORTH HALF OF THE NORTH HALF THEREOF;
ALSO EXCEPT THAT PORTION CONVEYED BY DEED RECORDED UNDER RECORDING NUMBER 7302150228.

SITUATE IN THE COUNTY OF KING, STATE OF WASHINGTON.

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	19081
Site Name:	Fall City II
Site Address:	
City:	
Report Date:	2/24/2022
Gage:	Landsburg
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	1.143
Version Date:	2021/08/19
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
A B, Lawn, Flat	3.507
Pervious Total	3.507
Impervious Land Use	acre
Impervious Total	0
Basin Total	3.507

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
A B, Lawn, Flat	0.981
C, Lawn, Flat	0.879
Pervious Total	1.86

Impervious Land Use	acre
ROADS FLAT	0.536
ROOF TOPS FLAT	0.81
DRIVEWAYS FLAT	0.119
POND	0.212
Impervious Total	1.677
Basin Total	3.537

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	100.00 ft.	
Bottom Width:	21.00 ft.	
Depth:	5 ft.	
Volume at riser head:	0.3934 acre-feet.	
Infiltration On		
Infiltration rate:	20	
Infiltration safety factor:	1	
Total Volume Infiltrated (ac-ft.):		621.115
Total Volume Through Riser (ac-ft.):		0
Total Volume Through Facility (ac-ft.):		621.115
Percent Infiltrated:		100
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
Side slope 1:	2 To 1	
Side slope 2:	2 To 1	
Side slope 3:	6.7 To 1	
Side slope 4:	2 To 1	
Discharge Structure		
Riser Height:	4 ft.	
Riser Diameter:	18 in.	
Element Flows To:		
Outlet 1	Outlet 2	

Hydraulic Table

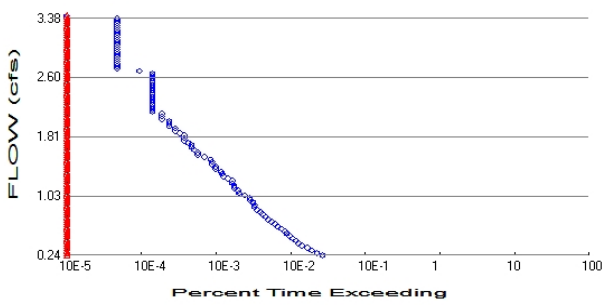
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.048	0.000	0.000	0.000
0.0556	0.049	0.002	0.000	0.972
0.1111	0.050	0.005	0.000	0.972
0.1667	0.051	0.008	0.000	0.972
0.2222	0.053	0.011	0.000	0.972
0.2778	0.054	0.014	0.000	0.972
0.3333	0.055	0.017	0.000	0.972
0.3889	0.056	0.020	0.000	0.972
0.4444	0.058	0.023	0.000	0.972
0.5000	0.059	0.026	0.000	0.972
0.5556	0.060	0.030	0.000	0.972
0.6111	0.061	0.033	0.000	0.972
0.6667	0.063	0.037	0.000	0.972
0.7222	0.064	0.040	0.000	0.972
0.7778	0.065	0.044	0.000	0.972
0.8333	0.067	0.047	0.000	0.972
0.8889	0.068	0.051	0.000	0.972
0.9444	0.069	0.055	0.000	0.972
1.0000	0.070	0.059	0.000	0.972
1.0556	0.072	0.063	0.000	0.972
1.1111	0.073	0.067	0.000	0.972
1.1667	0.074	0.071	0.000	0.972
1.2222	0.076	0.075	0.000	0.972
1.2778	0.077	0.080	0.000	0.972
1.3333	0.078	0.084	0.000	0.972
1.3889	0.080	0.088	0.000	0.972
1.4444	0.081	0.093	0.000	0.972

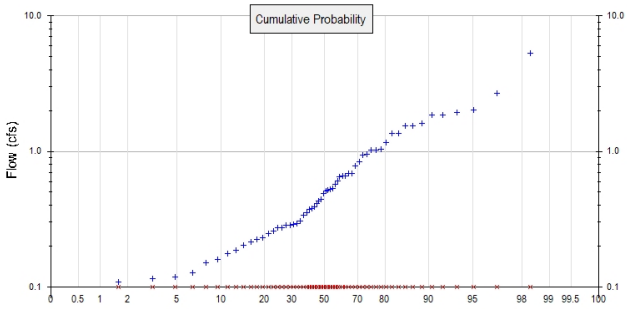
1.5000	0.082	0.097	0.000	0.972
1.5556	0.084	0.102	0.000	0.972
1.6111	0.085	0.107	0.000	0.972
1.6667	0.086	0.112	0.000	0.972
1.7222	0.088	0.116	0.000	0.972
1.7778	0.089	0.121	0.000	0.972
1.8333	0.091	0.126	0.000	0.972
1.8889	0.092	0.131	0.000	0.972
1.9444	0.093	0.137	0.000	0.972
2.0000	0.095	0.142	0.000	0.972
2.0556	0.096	0.147	0.000	0.972
2.1111	0.098	0.153	0.000	0.972
2.1667	0.099	0.158	0.000	0.972
2.2222	0.100	0.164	0.000	0.972
2.2778	0.102	0.169	0.000	0.972
2.3333	0.103	0.175	0.000	0.972
2.3889	0.105	0.181	0.000	0.972
2.4444	0.106	0.187	0.000	0.972
2.5000	0.108	0.193	0.000	0.972
2.5556	0.109	0.199	0.000	0.972
2.6111	0.110	0.205	0.000	0.972
2.6667	0.112	0.211	0.000	0.972
2.7222	0.113	0.217	0.000	0.972
2.7778	0.115	0.224	0.000	0.972
2.8333	0.116	0.230	0.000	0.972
2.8889	0.118	0.237	0.000	0.972
2.9444	0.119	0.243	0.000	0.972
3.0000	0.121	0.250	0.000	0.972
3.0556	0.122	0.257	0.000	0.972
3.1111	0.124	0.264	0.000	0.972
3.1667	0.125	0.270	0.000	0.972
3.2222	0.127	0.277	0.000	0.972
3.2778	0.128	0.285	0.000	0.972
3.3333	0.130	0.292	0.000	0.972
3.3889	0.131	0.299	0.000	0.972
3.4444	0.133	0.306	0.000	0.972
3.5000	0.134	0.314	0.000	0.972
3.5556	0.136	0.321	0.000	0.972
3.6111	0.137	0.329	0.000	0.972
3.6667	0.139	0.337	0.000	0.972
3.7222	0.140	0.344	0.000	0.972
3.7778	0.142	0.352	0.000	0.972
3.8333	0.143	0.360	0.000	0.972
3.8889	0.145	0.368	0.000	0.972
3.9444	0.147	0.376	0.000	0.972
4.0000	0.148	0.385	0.000	0.972
4.0556	0.150	0.393	0.208	0.972
4.1111	0.151	0.401	0.587	0.972
4.1667	0.153	0.410	1.074	0.972
4.2222	0.154	0.418	1.636	0.972
4.2778	0.156	0.427	2.248	0.972
4.3333	0.158	0.436	2.882	0.972
4.3889	0.159	0.445	3.509	0.972
4.4444	0.161	0.453	4.103	0.972
4.5000	0.162	0.463	4.639	0.972
4.5556	0.164	0.472	5.097	0.972
4.6111	0.166	0.481	5.468	0.972
4.6667	0.167	0.490	5.754	0.972

4.7222	0.169	0.499	5.974	0.972
4.7778	0.171	0.509	6.249	0.972
4.8333	0.172	0.518	6.469	0.972
4.8889	0.174	0.528	6.681	0.972
4.9444	0.176	0.538	6.887	0.972
5.0000	0.177	0.548	7.086	0.972
5.0556	0.179	0.558	7.280	0.972

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 3.507
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 1.86
Total Impervious Area: 1.677

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.483786
5 year	1.056351
10 year	1.602766
25 year	2.516646
50 year	3.380552
100 year	4.419169

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**
1949	0.686	0.000
1950	1.355	0.000
1951	1.018	0.000
1952	0.247	0.000
1953	0.339	0.000
1954	0.374	0.000
1955	0.274	0.000
1956	0.389	0.000
1957	0.571	0.000
1958	0.159	0.000

1959	0.230	0.000
1960	0.377	0.000
1961	0.293	0.000
1962	0.127	0.000
1963	0.649	0.000
1964	1.606	0.000
1965	0.519	0.000
1966	0.118	0.000
1967	0.524	0.000
1968	0.260	0.000
1969	0.601	0.000
1970	0.283	0.000
1971	0.486	0.000
1972	0.509	0.000
1973	0.203	0.000
1974	0.214	0.000
1975	0.691	0.000
1976	0.441	0.000
1977	0.053	0.000
1978	0.290	0.000
1979	0.115	0.000
1980	0.186	0.000
1981	0.954	0.000
1982	0.224	0.000
1983	0.427	0.000
1984	1.359	0.000
1985	0.177	0.000
1986	0.274	0.000
1987	1.847	0.000
1988	0.355	0.000
1989	0.412	0.000
1990	1.034	0.000
1991	1.928	0.000
1992	0.305	0.000
1993	0.286	0.000
1994	0.109	0.000
1995	0.534	0.000
1996	1.533	0.000
1997	5.328	0.000
1998	0.778	0.000
1999	1.863	0.000
2000	0.842	0.000
2001	0.150	0.000
2002	1.028	0.000
2003	0.934	0.000
2004	1.551	0.000
2005	0.661	0.000
2006	0.657	0.000
2007	2.666	0.000
2008	2.025	0.000
2009	1.163	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	5.3282	0.0000
2	2.6663	0.0000
3	2.0251	0.0000

4	1.9281	0.0000
5	1.8628	0.0000
6	1.8475	0.0000
7	1.6059	0.0000
8	1.5505	0.0000
9	1.5334	0.0000
10	1.3592	0.0000
11	1.3555	0.0000
12	1.1635	0.0000
13	1.0342	0.0000
14	1.0276	0.0000
15	1.0177	0.0000
16	0.9539	0.0000
17	0.9336	0.0000
18	0.8419	0.0000
19	0.7778	0.0000
20	0.6907	0.0000
21	0.6860	0.0000
22	0.6615	0.0000
23	0.6571	0.0000
24	0.6485	0.0000
25	0.6012	0.0000
26	0.5709	0.0000
27	0.5343	0.0000
28	0.5238	0.0000
29	0.5193	0.0000
30	0.5088	0.0000
31	0.4861	0.0000
32	0.4413	0.0000
33	0.4273	0.0000
34	0.4116	0.0000
35	0.3887	0.0000
36	0.3772	0.0000
37	0.3743	0.0000
38	0.3551	0.0000
39	0.3393	0.0000
40	0.3046	0.0000
41	0.2931	0.0000
42	0.2900	0.0000
43	0.2862	0.0000
44	0.2832	0.0000
45	0.2744	0.0000
46	0.2738	0.0000
47	0.2598	0.0000
48	0.2474	0.0000
49	0.2297	0.0000
50	0.2235	0.0000
51	0.2136	0.0000
52	0.2028	0.0000
53	0.1863	0.0000
54	0.1770	0.0000
55	0.1591	0.0000
56	0.1499	0.0000
57	0.1267	0.0000
58	0.1183	0.0000
59	0.1152	0.0000
60	0.1092	0.0000
61	0.0528	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2419	569	0	0	Pass
0.2736	479	0	0	Pass
0.3053	406	0	0	Pass
0.3370	360	0	0	Pass
0.3687	298	0	0	Pass
0.4004	268	0	0	Pass
0.4321	250	0	0	Pass
0.4638	226	0	0	Pass
0.4955	206	0	0	Pass
0.5272	189	0	0	Pass
0.5589	178	0	0	Pass
0.5906	163	0	0	Pass
0.6223	143	0	0	Pass
0.6540	132	0	0	Pass
0.6857	118	0	0	Pass
0.7174	107	0	0	Pass
0.7492	100	0	0	Pass
0.7809	89	0	0	Pass
0.8126	84	0	0	Pass
0.8443	76	0	0	Pass
0.8760	71	0	0	Pass
0.9077	70	0	0	Pass
0.9394	67	0	0	Pass
0.9711	62	0	0	Pass
1.0028	60	0	0	Pass
1.0345	52	0	0	Pass
1.0662	43	0	0	Pass
1.0979	42	0	0	Pass
1.1296	38	0	0	Pass
1.1613	37	0	0	Pass
1.1930	35	0	0	Pass
1.2247	35	0	0	Pass
1.2564	31	0	0	Pass
1.2881	27	0	0	Pass
1.3198	26	0	0	Pass
1.3515	25	0	0	Pass
1.3832	21	0	0	Pass
1.4149	21	0	0	Pass
1.4466	19	0	0	Pass
1.4783	19	0	0	Pass
1.5100	18	0	0	Pass
1.5417	15	0	0	Pass
1.5734	12	0	0	Pass
1.6051	12	0	0	Pass
1.6369	11	0	0	Pass
1.6686	10	0	0	Pass
1.7003	10	0	0	Pass
1.7320	9	0	0	Pass
1.7637	8	0	0	Pass
1.7954	8	0	0	Pass
1.8271	8	0	0	Pass
1.8588	7	0	0	Pass
1.8905	6	0	0	Pass

1.9222	6	0	0	Pass
1.9539	5	0	0	Pass
1.9856	5	0	0	Pass
2.0173	5	0	0	Pass
2.0490	4	0	0	Pass
2.0807	4	0	0	Pass
2.1124	4	0	0	Pass
2.1441	3	0	0	Pass
2.1758	3	0	0	Pass
2.2075	3	0	0	Pass
2.2392	3	0	0	Pass
2.2709	3	0	0	Pass
2.3026	3	0	0	Pass
2.3343	3	0	0	Pass
2.3660	3	0	0	Pass
2.3977	3	0	0	Pass
2.4294	3	0	0	Pass
2.4611	3	0	0	Pass
2.4929	3	0	0	Pass
2.5246	3	0	0	Pass
2.5563	3	0	0	Pass
2.5880	3	0	0	Pass
2.6197	3	0	0	Pass
2.6514	3	0	0	Pass
2.6831	2	0	0	Pass
2.7148	1	0	0	Pass
2.7465	1	0	0	Pass
2.7782	1	0	0	Pass
2.8099	1	0	0	Pass
2.8416	1	0	0	Pass
2.8733	1	0	0	Pass
2.9050	1	0	0	Pass
2.9367	1	0	0	Pass
2.9684	1	0	0	Pass
3.0001	1	0	0	Pass
3.0318	1	0	0	Pass
3.0635	1	0	0	Pass
3.0952	1	0	0	Pass
3.1269	1	0	0	Pass
3.1586	1	0	0	Pass
3.1903	1	0	0	Pass
3.2220	1	0	0	Pass
3.2537	1	0	0	Pass
3.2854	1	0	0	Pass
3.3171	1	0	0	Pass
3.3488	1	0	0	Pass
3.3806	1	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.3311 acre-feet
On-line facility target flow:	0.4064 cfs.
Adjusted for 15 min:	0.4064 cfs.
Off-line facility target flow:	0.2234 cfs.
Adjusted for 15 min:	0.2234 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	☐	565.21			☐	100.00			
Total Volume Infiltrated		565.21	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.

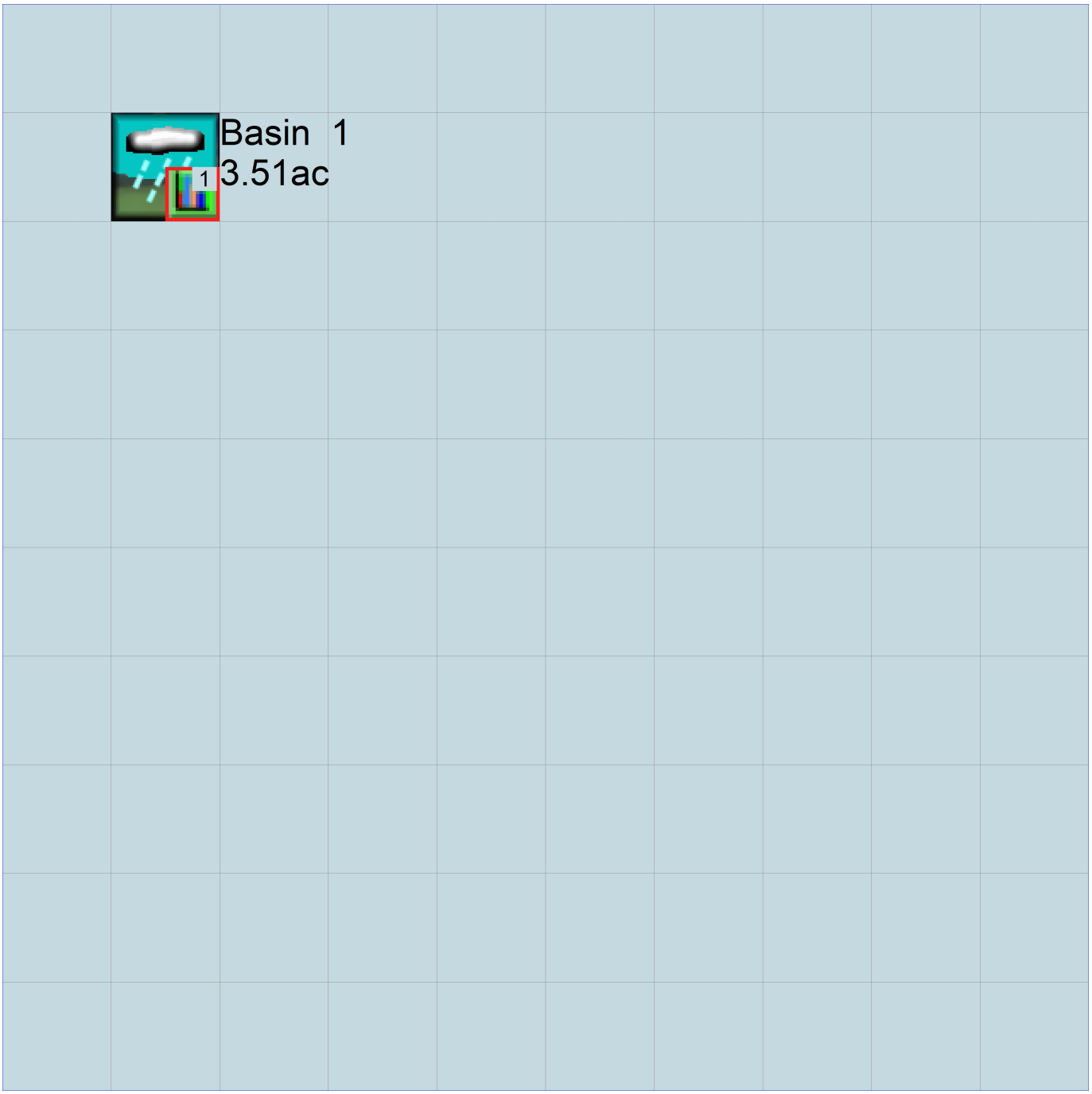
PERLND Changes

No PERLND changes have been made.

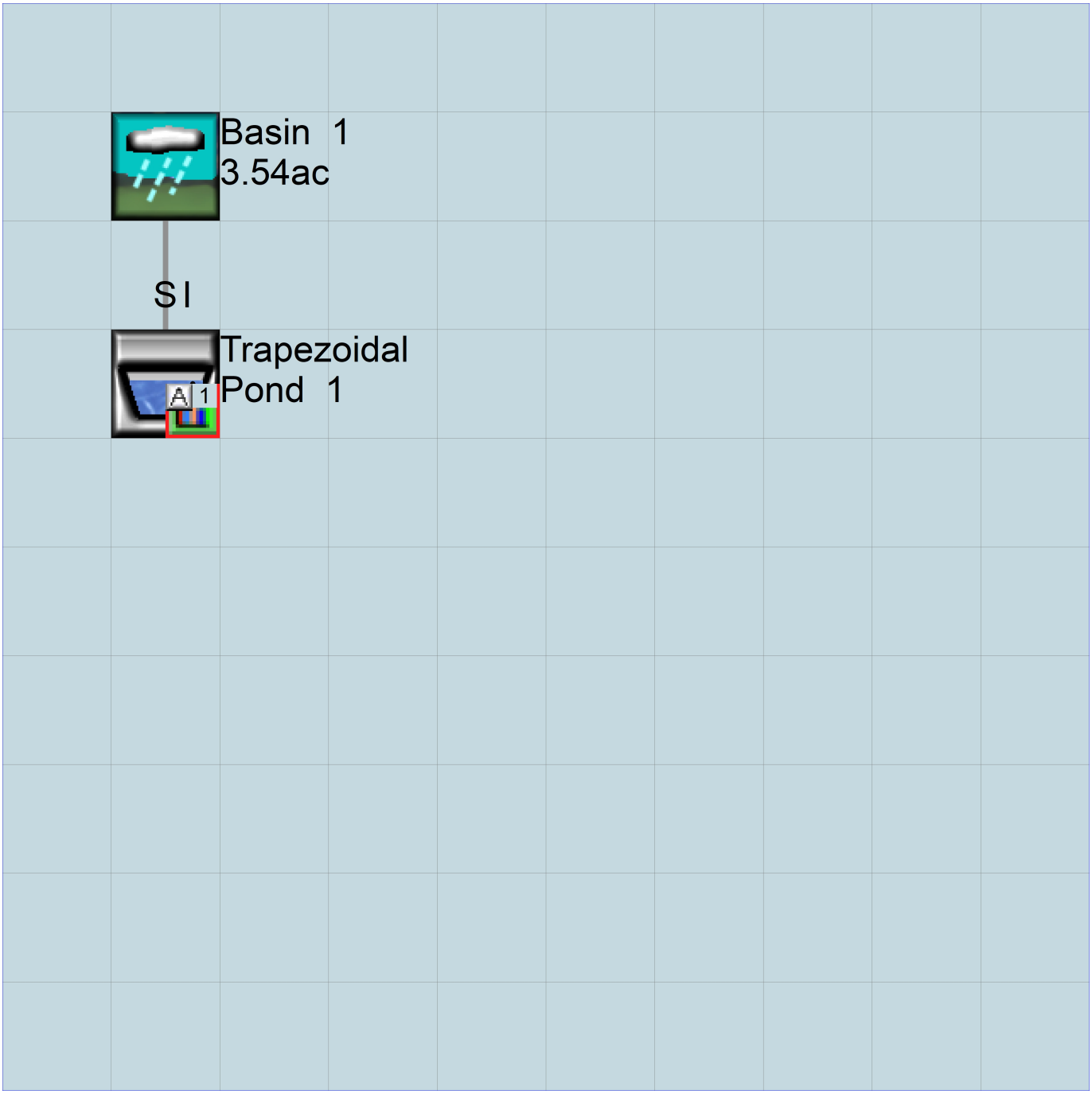
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

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

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   19081.wdm
MESSU       25   Pre19081.MES
            27   Pre19081.L61
            28   Pre19081.L62
            30   POC190811.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND       7
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                     1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                       in  out           ***
    7     A/B, 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 ***
    7         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  *********
    7         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 ***
    7         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
    7               0         5       0.8       400      0.05       0.3     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
    7              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
    7          0.1       0.5      0.25         0       0.7      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
    7              0         0         0         0         3         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   7                       3.507     COPY   501     12
PERLND   7                       3.507     COPY   501     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



<-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    1.143          PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.143          IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

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

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       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       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   19081.wdm
MESSU       25   Mit19081.MES
            27   Mit19081.L61
            28   Mit19081.L62
            30   POC190811.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND       7
      PERLND      16
      IMPLND       1
      IMPLND       4
      IMPLND       5
      IMPLND      14
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    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
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out            ***
    7     A/B, Lawn, Flat         1    1    1    1   27    0
   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 ***
    7         0    0    1    0    0    0    0    0    0    0    0    0
```

```
   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  *********
    7         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   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 ***
    7         0    0    0    0    0    0    0    0    0    0    0
   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
    7              0         5       0.8       400      0.05       0.3     0.996
   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
    7              0         0         2         2         0         0         0
   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 ***
    7          0.1       0.5      0.25         0       0.7      0.25
   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
    7              0         0         0         0         3         1         0
   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
    5      DRIVEWAYS/FLAT          1    1    1   27    0
   14      POND                    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
    5         0    0    1    0    0    0
   14         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
    5         0    0    4    0    0    0    1    9
   14         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
    5         0    0    0    0    0
   14         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
    5            400      0.01       0.1       0.1
   14            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
    5              0         0
   14              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
    4              0         0
    5              0         0
   14              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND   7                      0.981     RCHRES   1      2
PERLND   7                      0.981     RCHRES   1      3
PERLND  16                      0.879     RCHRES   1      2
PERLND  16                      0.879     RCHRES   1      3
IMPLND   1                      0.536     RCHRES   1      5
IMPLND   4                       0.81     RCHRES   1      5
IMPLND   5                      0.119     RCHRES   1      5
IMPLND  14                      0.212     RCHRES   1      5

******Routing******
PERLND   7                      0.981     COPY     1     12
PERLND  16                      0.879     COPY     1     12
IMPLND   1                      0.536     COPY     1     15
IMPLND   4                       0.81     COPY     1     15
IMPLND   5                      0.119     COPY     1     15
IMPLND  14                      0.212     COPY     1     15
PERLND   7                      0.981     COPY     1     13
PERLND  16                      0.879     COPY     1     13
RCHRES   1                          1     COPY   501     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



<-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-005    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
  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
  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
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.02       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
  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  0.048209  0.000000  0.000000  0.000000
  0.055556  0.049429  0.002712  0.000000  0.972222
  0.111111  0.050653  0.005492  0.000000  0.972222
  0.166667  0.051882  0.008340  0.000000  0.972222
  0.222222  0.053116  0.011257  0.000000  0.972222
  0.277778  0.054355  0.014242  0.000000  0.972222
  0.333333  0.055598  0.017297  0.000000  0.972222
  0.388889  0.056847  0.020420  0.000000  0.972222
  0.444444  0.058101  0.023613  0.000000  0.972222
```

0.500000	0.059360	0.026876	0.000000	0.972222
0.555556	0.060623	0.030209	0.000000	0.972222
0.611111	0.061892	0.033612	0.000000	0.972222
0.666667	0.063165	0.037086	0.000000	0.972222
0.722222	0.064443	0.040630	0.000000	0.972222
0.777778	0.065727	0.044246	0.000000	0.972222
0.833333	0.067015	0.047933	0.000000	0.972222
0.888889	0.068308	0.051692	0.000000	0.972222
0.944444	0.069606	0.055523	0.000000	0.972222
1.000000	0.070909	0.059426	0.000000	0.972222
1.055556	0.072217	0.063402	0.000000	0.972222
1.111111	0.073530	0.067451	0.000000	0.972222
1.166667	0.074848	0.071572	0.000000	0.972222
1.222222	0.076170	0.075767	0.000000	0.972222
1.277778	0.077498	0.080036	0.000000	0.972222
1.333333	0.078831	0.084378	0.000000	0.972222
1.388889	0.080168	0.088795	0.000000	0.972222
1.444444	0.081511	0.093286	0.000000	0.972222
1.500000	0.082858	0.097852	0.000000	0.972222
1.555556	0.084210	0.102493	0.000000	0.972222
1.611111	0.085568	0.107209	0.000000	0.972222
1.666667	0.086930	0.112000	0.000000	0.972222
1.722222	0.088297	0.116868	0.000000	0.972222
1.777778	0.089669	0.121811	0.000000	0.972222
1.833333	0.091046	0.126831	0.000000	0.972222
1.888889	0.092428	0.131928	0.000000	0.972222
1.944444	0.093815	0.137101	0.000000	0.972222
2.000000	0.095207	0.142352	0.000000	0.972222
2.055556	0.096603	0.147680	0.000000	0.972222
2.111111	0.098005	0.153085	0.000000	0.972222
2.166667	0.099412	0.158569	0.000000	0.972222
2.222222	0.100823	0.164131	0.000000	0.972222
2.277778	0.102239	0.169772	0.000000	0.972222
2.333333	0.103661	0.175491	0.000000	0.972222
2.388889	0.105087	0.181290	0.000000	0.972222
2.444444	0.106518	0.187168	0.000000	0.972222
2.500000	0.107955	0.193125	0.000000	0.972222
2.555556	0.109396	0.199163	0.000000	0.972222
2.611111	0.110842	0.205281	0.000000	0.972222
2.666667	0.112293	0.211479	0.000000	0.972222
2.722222	0.113749	0.217758	0.000000	0.972222
2.777778	0.115209	0.224118	0.000000	0.972222
2.833333	0.116675	0.230559	0.000000	0.972222
2.888889	0.118146	0.237082	0.000000	0.972222
2.944444	0.119621	0.243686	0.000000	0.972222
3.000000	0.121102	0.250373	0.000000	0.972222
3.055556	0.122587	0.257142	0.000000	0.972222
3.111111	0.124078	0.263994	0.000000	0.972222
3.166667	0.125573	0.270929	0.000000	0.972222
3.222222	0.127073	0.277947	0.000000	0.972222
3.277778	0.128579	0.285048	0.000000	0.972222
3.333333	0.130089	0.292233	0.000000	0.972222
3.388889	0.131604	0.299503	0.000000	0.972222
3.444444	0.133124	0.306856	0.000000	0.972222
3.500000	0.134649	0.314294	0.000000	0.972222
3.555556	0.136179	0.321817	0.000000	0.972222
3.611111	0.137713	0.329425	0.000000	0.972222
3.666667	0.139253	0.337119	0.000000	0.972222
3.722222	0.140798	0.344898	0.000000	0.972222
3.777778	0.142347	0.352763	0.000000	0.972222
3.833333	0.143902	0.360715	0.000000	0.972222
3.888889	0.145461	0.368753	0.000000	0.972222
3.944444	0.147026	0.376877	0.000000	0.972222
4.000000	0.148595	0.385089	0.000000	0.972222
4.055556	0.150169	0.393388	0.208271	0.972222
4.111111	0.151748	0.401774	0.587805	0.972222
4.166667	0.153333	0.410249	1.074270	0.972222
4.222222	0.154922	0.418812	1.636945	0.972222
4.277778	0.156516	0.427463	2.248837	0.972222
4.333333	0.158114	0.436202	2.882519	0.972222

```
  4.388889  0.159718  0.445031  3.509920  0.972222
  4.444444  0.161327  0.453949  4.103633  0.972222
  4.500000  0.162941  0.462956  4.639092  0.972222
  4.555556  0.164559  0.472054  5.097354  0.972222
  4.611111  0.166183  0.481241  5.468342  0.972222
  4.666667  0.167811  0.490519  5.754494  0.972222
  4.722222  0.169445  0.499887  5.974760  0.972222
  4.777778  0.171083  0.509346  6.249853  0.972222
  4.833333  0.172727  0.518896  6.469213  0.972222
  4.888889  0.174375  0.528538  6.681374  0.972222
  4.944444  0.176028  0.538271  6.887003  0.972222
  5.000000  0.177686  0.548097  7.086668  0.972222
  END FTABLE  1
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    1.143          PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.143          IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
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
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
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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

www.clearcreeksolutions.com