PRELIMINARY TECHNICAL INFORMATION REPORT (TIR)

For

Woody Short Plat

12420 NE 70th Ct., Kirkland, Washington

Parcel Number: 1241500-0022

WALTER J. SHOSTAK
STATE OF WASHINGTON
32231
REGISTERED
PROFESSIONAL ENGINEER

1-14-16

DRS Project No.15122
Kirkland File No. PRE15-02191

Owner/Applicant

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Report Prepared by

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Report Issue Date
January 14, 2016

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WOODY SHORT PLAT
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SECTION I
PROJECT OVERVIEW

GENERAL SITE INFORMATION:

This report has been prepared per the 2009 King County Surface Water Design Manual and the City of Kirkland Addendum (collectively, the Manual). The Project proposes the subdivision of one existing parcel known as Tax Parcel 1241500-0022 (Site) into two Lots. The project consists of constructing new frontage improvements along 124th Ave NE along with new utility connections (Project). The Site is located at 12420 NE 70th Ct., Kirkland, Washington 98033.

PREDEVELOPED SITE CONDITIONS:

The Site is currently developed with a single family home, deck, garage, driveway, and concrete parking pad. The existing residence is accessed via NE 70th Court. Currently, there are no existing frontage improvements along 124th Ave NE aside from the existing ditch. An existing paved road (NE 70th Court) and 30 foot access and utility easement are present along the southern property line. The road serves three residences east of the Site that are not associated with the Project. A 25 foot road and utility easement is present on the western side of Lot 1. A recorded 30 foot building setback line is present on the western side of Lot 1. The Site and all adjacent properties are zoned RSX 7.2 and the Site is within the South Rose Hill neighborhood.

The total Site area is approximately 29,154 s.f. (0.669 acres), however there is approximately 2,979 s.f. (0.068 acres) of the existing half right-of-way that will be developed with frontage improvements for a total Project area of 32,133 s.f. (0.737 acres). The Site slopes from south to north at a range of 8% to 15%.

The vegetation is primarily a mixture of trees, lawn and shrubs. The Site abuts single family parcels to the north, south, east and west. The natural discharge point is sheet flow along its northern property lines. The Project has one Threshold Discharge Area.

DEVELOPED SITE CONDITIONS:

New/ Replaced Impervious Areas						
Lot #	Area (sf)	Public Road & Easement Road	Sidewalk	New Private Drive	Building	Total New/ Replaced
1.00	14,356.00	0.00	0.00	497.00	1,815.00	2,312.00
2.00	14,799.00	0.00	0.00	0.00	0.00	0.00
Frontage	2,979.00	405.00	401.00	0.00	0.00	806.00
Total S.F.	32,134.00	405.00	401.00	497.00	1,815.00	3,118.00
Total Acres	0.738	0.009	0.009	0.011	0.042	0.07
Total New/ Replaced PGIS		405.00		497.00		902.00

The applicant seeks to subdivide the existing parcel into two Lots with gross areas of 14,356 s.f. (Lot 1) and 14,799 s.f. (Lot 2). . The net Lot areas are 9,904 s.f. (Lot 1) and 12,369 s.f. (Lot 2). The area of the access easement is not included in the proposed

net Lot areas since the access easement is serving more than one Lot that does not abut a public right-of-way.

One new driveway will be constructed to access Lot 1 along the access easement (NE 70th Ct). A modification to access standards is proposed since Lot 1 will not access from 124th Ave NE (see Section VII). All runoff created by the new and replaced areas on Lot 1 will be routed through a dry well with an overflow connection to the existing system in NE 70th Ct. Preliminary LID feasibility has been evaluated for Lot 1. In general, Full Infiltration and Full Dispersion are not feasible due to limited area available outside of existing easements and proposed development areas. Slopes exceeding 40% are present on the northern portion of both Lots. Flow paths of 50 feet are not achievable prior to reaching the area of steeper slopes. Partial infiltration is proposed as noted above.

All existing improvements are proposed to remain on Lot 2 with the exception of the existing septic system, which will be removed/ abandoned when a new sewer stub is provided to the Lot for connection. Runoff generated by existing roof drains on Lot 2 will continue to discharge to its present unknown location. Roof downspouts are connected to leaders leading underground. No connection to the existing drain running through the southern side of the Lot is apparent from the surface. Since there are no proposed changes to impervious areas on Lot 2, these impervious areas are not included in the storm drainage analysis.

The maximum impervious area is stipulated by City of Kirkland zoning code is 50% for these Lots. The area within the building setbacks on Lot 1 is 4,725 s.f., which is less than 50% of the proposed gross Lot area (7,178 s.f.). A reduced impervious surface covenant will be recorded against Lot 1. There are no proposed changes to Lot 2.

Frontage improvements will consist of increasing the pavement width on 124th Ave NE, adding a 4.5 foot landscape strip with street trees, a 5 foot concrete sidewalk and a new driveway approach. The existing ditch will be replaced with a pipe/ catch basin conveyance system serving the Project. Runoff from proposed frontage improvements will flow north and enter the existing conveyance system in 124th Ave NE.

NATURAL DRAINAGE SYSTEM FUNCTIONS:

A review of the SCS soils map for the area (see Figure 4 Soils) indicates Alderwood gravelly sandy loam 8 to 15 percent slopes (AgC). Per the Manual the AgC soil type is classified as ñTillò material. The SCS descriptions follow Figure 4.

By examining field topographic information, there appears to be one Threshold Discharge Area (TDA) and two Natural Discharge Areas (NDAs) for the Site. Runoff sheet flows north across the Site. The Level 1 Downstream Report is included in Section III.

In evaluating the upstream area, the Site receives negligible runoff from the more recently developed properties to the south since they collect and convey runoff to the existing system in their respective roadways.

Figure 1
TIR Worksheet

King County Department of Development and Environmental Services

TECHNICAL INFORMATION REPORT (TIR) WORKSHEET

Part 1 PROJECT OWNER AND PROJECT ENGINEER	Part 2 PROJECT LOCATION AND DESCRIPTION
Project Owner: **D.C. Granger Homes, Inc.** **Contact: Darin Granger** Address/Phone: **4014 Aurora Avenue North, Suite B** **Seattle, WA 98103** Project Engineer: **Walter J. Shostak, P.E.** **D.R. STRONG Consulting Engineers, Inc.** Address/Phone: **620 7th Avenue** **Kirkland WA 98033** **(425) 827-3063**	Project Name: **Woody Short Plat** Location: Township: **25 N** Range: **05 E** Section: **9**

Part 3 TYPE OF PERMIT APPLICATION	Part 4 OTHER REVIEWS AND PERMITS	
☐ Subdivision	☐ DFW HPA	☐ Shoreline Management
☒ **Short Subdivision**	☐ COE 404	☐ Rockery
☐ Clearing and Grading	☐ DOE Dam Safety	☐ Structural Vault
☐ Commercial	☐ FEMA Floodplain	☐ Other: Vertical Wall
☐ Other:	☐ COE Wetlands	
___		

Part 5 SITE COMMUNITY AND DRAINAGE BASIN
Community: **Eastside**
Drainage Basin **Forbes Creek**

Part 6 SITE CHARACTERISTICS	
☐ River: _____ ☐ Stream: ☐ Critical Stream Reach ☐ Depressions/Swales ☐ Lake: _____ ☐ Steep Slopes	☐ Floodplain ☐ Wetlands ☐ Seeps/Springs ☐ High Groundwater Table ☐ Groundwater Recharge ☒ **Other: None apply**

Part 7 SOILS			
Soil Type: **Alderwood gravelly sandy loam (AgC)**	Slopes: **8-15%**	Erosion Potential: **Moderate**	Erosive Velocities: **Slow to Medium**
☒ **Additional Sheets Attached:**		**SCS Map and Soil Description, Figure 4 Soils**	

Part 8 DEVELOPMENT LIMITATIONS	
REFERENCE ☒ **Level 1 Downstream Analysis** ☐ Geotechnical Engineering Study ☐ Environmentally Sensitive Areas ☐ Level 2 Off-Site Stormwater Analysis ☐ Level II Traffic Impact Analysis ☐ Structural Report ☐ Additional Sheets Attached	LIMITATION/SITE CONSTRAINT **None**_____ _____ _____ _____ _____

Part 9 ESC REQUIREMENTS	
MINIMUM ESC REQUIREMENTS DURING CONSTRUCTION ☐ Sedimentation Facilities ☒ **Stabilized Construction Entrance** ☒ **Perimeter Runoff Control** ☐ **Clearing and Grading Restrictions** ☒ **Cover Practices** ☒ **Construction Sequence** ☐ Other	MINIMUM ESC REQUIREMENTS AFTER CONSTRUCTION ☒ **Stabilize Exposed Surface** ☒ **Remove and Restore Temporary ESC Facilities** ☒ **Clean and Remove All Silt and Debris** ☐ Ensure Operation of Permanent Facilities ☐ Flag Limits of SAO and open space preservation areas ☐ Other

Part 10 SURFACE WATER SYSTEM			
☐ Grass Lined Channel ☒ **Pipe System** ☐ Open Channel ☐ Dry Pond ☐ Wet Pond	☐ Tank ☐ Vault ☐ Energy Dissipater ☐ Wetland ☐ Stream	☒ **Infiltration** ☐ Depression ☐ Flow Dispersal ☐ Waiver ☐ Regional Detention	Method of Analysis: **N/A** Compensation/ Mitigation of Eliminated Site Storage **N/A**

Brief Description of System Operation: **Lot 1 roof runoff will be discharged to a dry well with an overflow connection to the public conveyance system. Lot 2 roof runoff will continue to discharge to its present location.**

Part 11 STRUCTURAL ANALYSIS
☐ Cast in Place Vault ☐ Retaining Wall ☐ Rockery > 4' High ☐ Structural on Steep Slope ☐ Other:

Part 12 EASEMENTS/TRACTS
☒ **Drainage Easement** ☒ **Access Easement** ☐ Native Growth Protection Easement ☐ Tracts ☒ **Other: Sewer Easement**

Part 13 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 attachments. To the best of my knowledge the information provided here is accurate. Walter J. Shotot, P.E. 1/14/16 Signed/Date

Figure 2
Vicinity Map

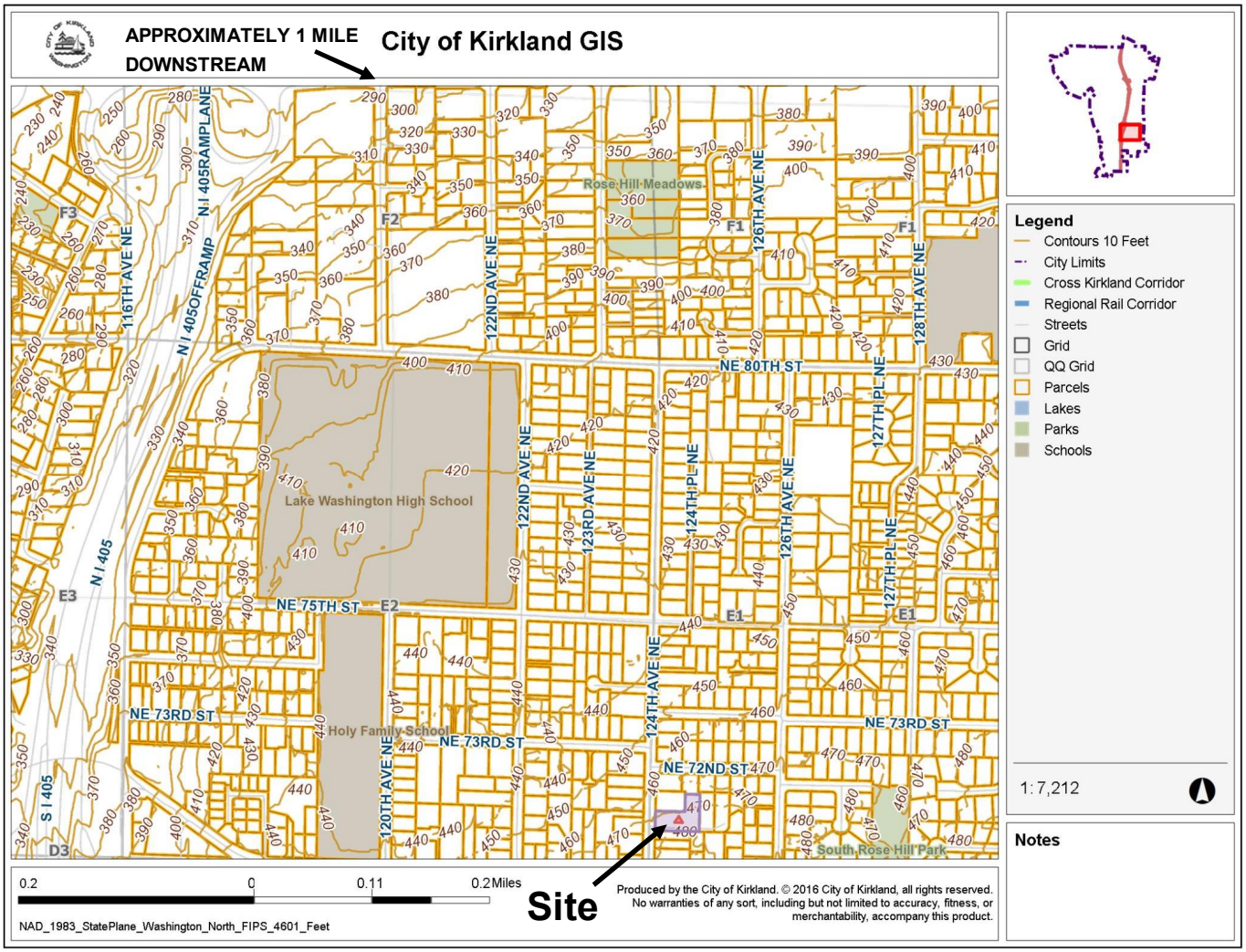
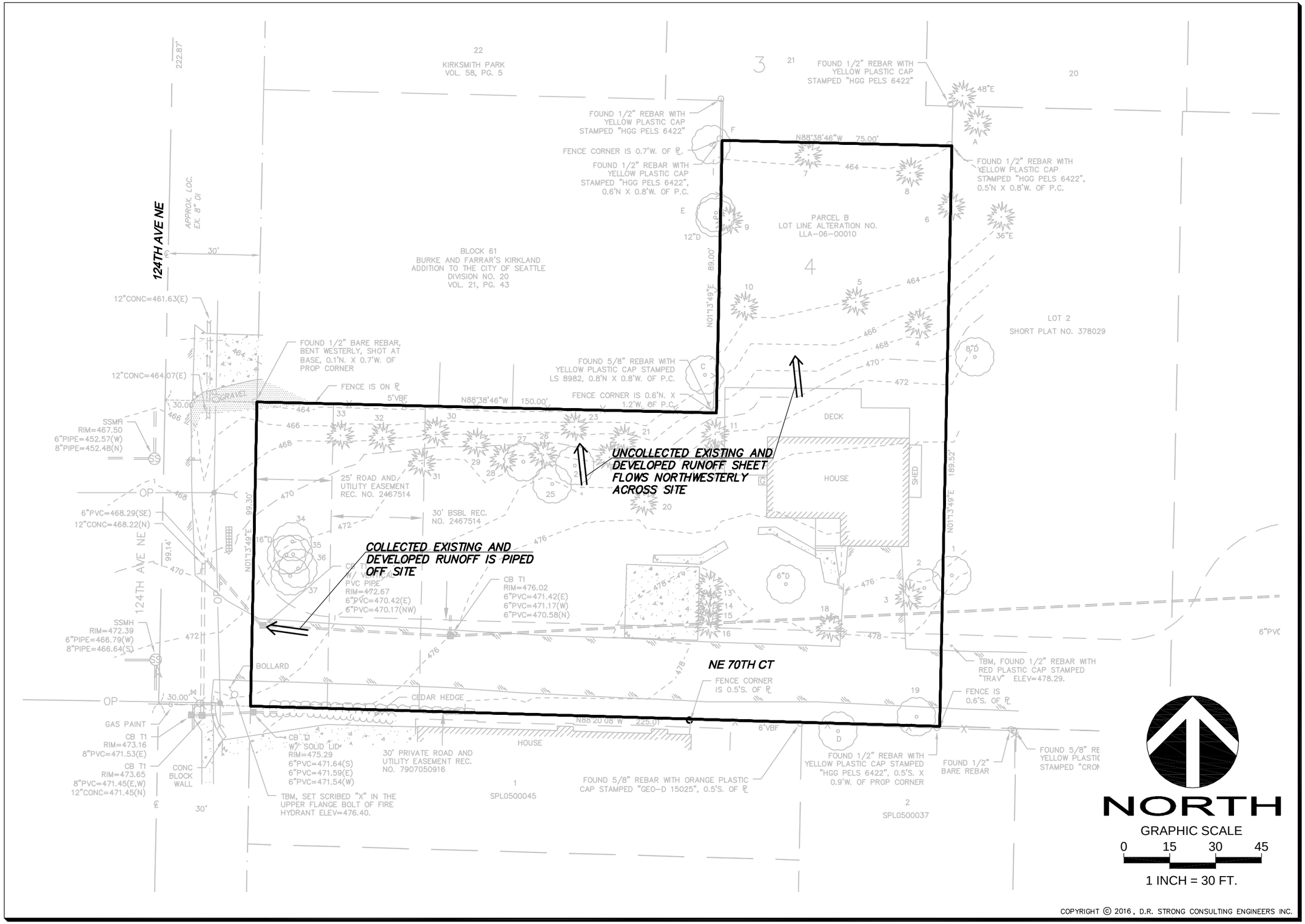


Figure 3
Drainage Basins and Site Characteristics



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WOODY SHORT PLAT

FIG 3: DRAINAGE BASIN AND SITE CHARACTERISTICS

12420 70TH CT
KIRKLAND, WA 98033

DRAFTED BY: MES
DESIGNED BY: MES
PROJECT ENGINEER: WJS
DATE: 01.14.16
PROJECT NO.: 15122

DRAWING: 1
SHEET: 1

Figure 4
Soils

King County Area, Washington

AgC—Alderwood gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2t626
Elevation: 50 to 800 feet
Mean annual precipitation: 20 to 60 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Alderwood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alderwood

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Glacial drift and/or glacial outwash over dense glaciomarine deposits

Typical profile

A - 0 to 7 inches: gravelly sandy loam
Bw1 - 7 to 21 inches: very gravelly sandy loam
Bw2 - 21 to 30 inches: very gravelly sandy loam
Bg - 30 to 35 inches: very gravelly sandy loam
2Cd1 - 35 to 43 inches: very gravelly sandy loam
2Cd2 - 43 to 59 inches: very gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Other vegetative classification: Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XS301WA), Limited Depth Soils (G002XF303WA)

Minor Components

Everett

Percent of map unit: 5 percent
Landform: Eskers, kames, moraines
Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Crest, base slope
Down-slope shape: Convex
Across-slope shape: Convex

Indianola

Percent of map unit: 5 percent
Landform: Eskers, kames, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Shalcar

Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

Norma

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave

SECTION II
CONDITIONS AND REQUIREMENTS SUMMARY

CORE REQUREMENTS

Based on the City of Kirkland Drainage Review Flow Chart, the Project is subject to the requirements of Targeted Drainage Review Policy D-3. The Project adds less than 10,000 s.f. of new plus replaced impervious surface, and less than 5,000 s.f. of new impervious surface. The Project adds less than 35,000 s.f. of new pervious area, does not contain or is adjacent to a flood, erosion, steep slope, or landslide area, does not contain or is adjacent to a sensitive drainage area. However the Project does propose to construct or modify a drainage pipe that is 12 inches or more in diameter size and must comply with the following Core and Special Requirements:

- **Core Requirement #1: Discharge at the Natural Location**
  Roof runoff from Lot 1 will be conveyed to a drywell with an overflow to the conveyance system in NE 70th Ct. All other runoff from Lot 1 will be directed to the conveyance system in NE 70th Ct. No changes are proposed to Lot 2. Runoff will continue to discharge to its current location.

- **Core Requirement #2: Off-site Analysis**
  An off-site analysis has been prepared and is included in Section III of this report.

- **Core Requirement #3: Runoff Control**
  Formal Flow Control Facilities are not required for this project as the proposed development is adding less than 5,000 s.f. of new impervious area. See Section I, Developed Site Conditions for a detailed new/replaced area breakdown for the Project.

- **Core Requirement #4: Conveyance System**
  Calculations for the conveyance system will be provided during final engineering.

- **Core Requirement #5: Temporary Erosion and Sediment Control Plan**
  An erosion and sediment control plan, which will serve to minimize soil erosion/sedimentation during the proposed site construction, will be prepared for approval by the City of Kirkland at the time of final engineering. Several standard Best Management Practices (BMPõs) will be utilized by the contractor to minimize the amount of erosion and sedimentation that may be perpetuated by the construction of the site. Some of the measures include installation of filter fence, catch basin protection and standard ground cover practices.

Core Requirement #6: Maintenance & Operation

The private storm water system on Lot 1 will be maintained by the lot owner. The existing private drainage system in NE 70th Ct will continue to be maintained by the existing HOA. Standard Maintenance & Operation guidelines will be provided for storm water BMPs at the time of final engineering.

- **Core Requirement #7 – Financial Guarantees**

  Prior to commencing construction, the Applicant must post a drainage facilities restoration and site stabilization financial guarantee.

- **C.R. #8 – Water Quality:**

  Total Pollution Generating Impervious Surface (P.G.I.S.) will be less than 5,000 s.f. therefore a formal water quality treatment facility is not required.

- **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 since the Project does not propose new or improved commercial, industrial, or multifamily development.

- **S.R.#5 – Oil Control:**

  Not applicable for this project.

SECTION III
OFFSITE ANALYSIS

A Level One Downstream Analysis prepared by D.R. STRONG Consulting Engineers, Inc. is included in this section.

LEVEL ONE DOWNSTREAM ANALYSIS
Woody Short Plat

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LEVEL ONE DOWNSTREAM ANALYSIS

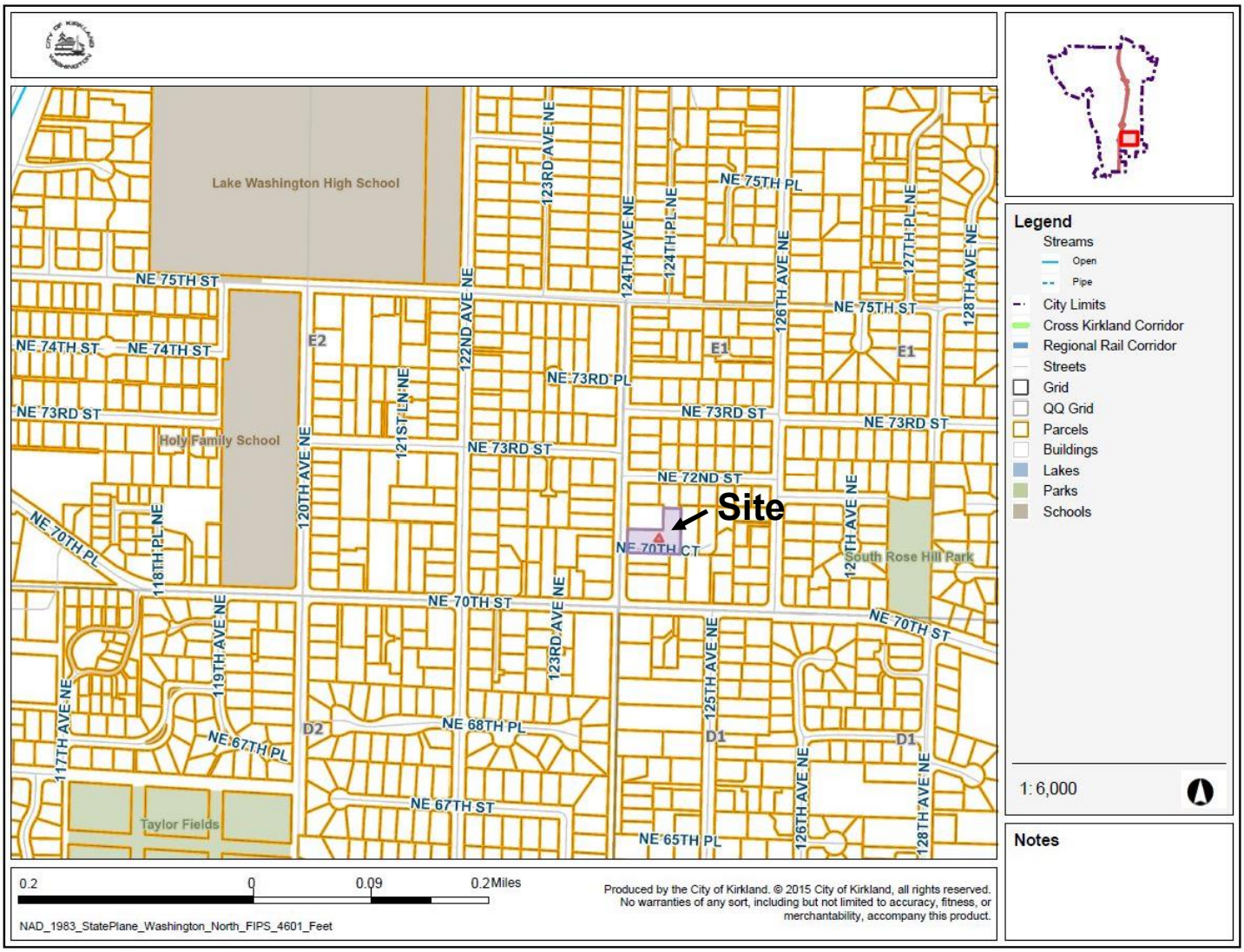
DISCLAIMER:

This report was prepared at the request of D.C. Granger Homes, Inc. for the 0.669 acre parcel known as a portion of (the southwest quarter of the southwest quarter) Section 9, Township 25 North, Range 5 East, W.M., in King County, Tax Parcel Number 124150-0022. 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 2009 King County Surface Water Design Manual per City of Kirkland Policy D-3: Targeted Drainage Review Requirements. The Site is located at 12420 NE 70th Ct., Kirkland, Washington. The Project is the subdivision of the subject parcel into two single family lots.

FIGURE 1
STUDY AREA MAP



TASK 2: RESOURCE REVIEW

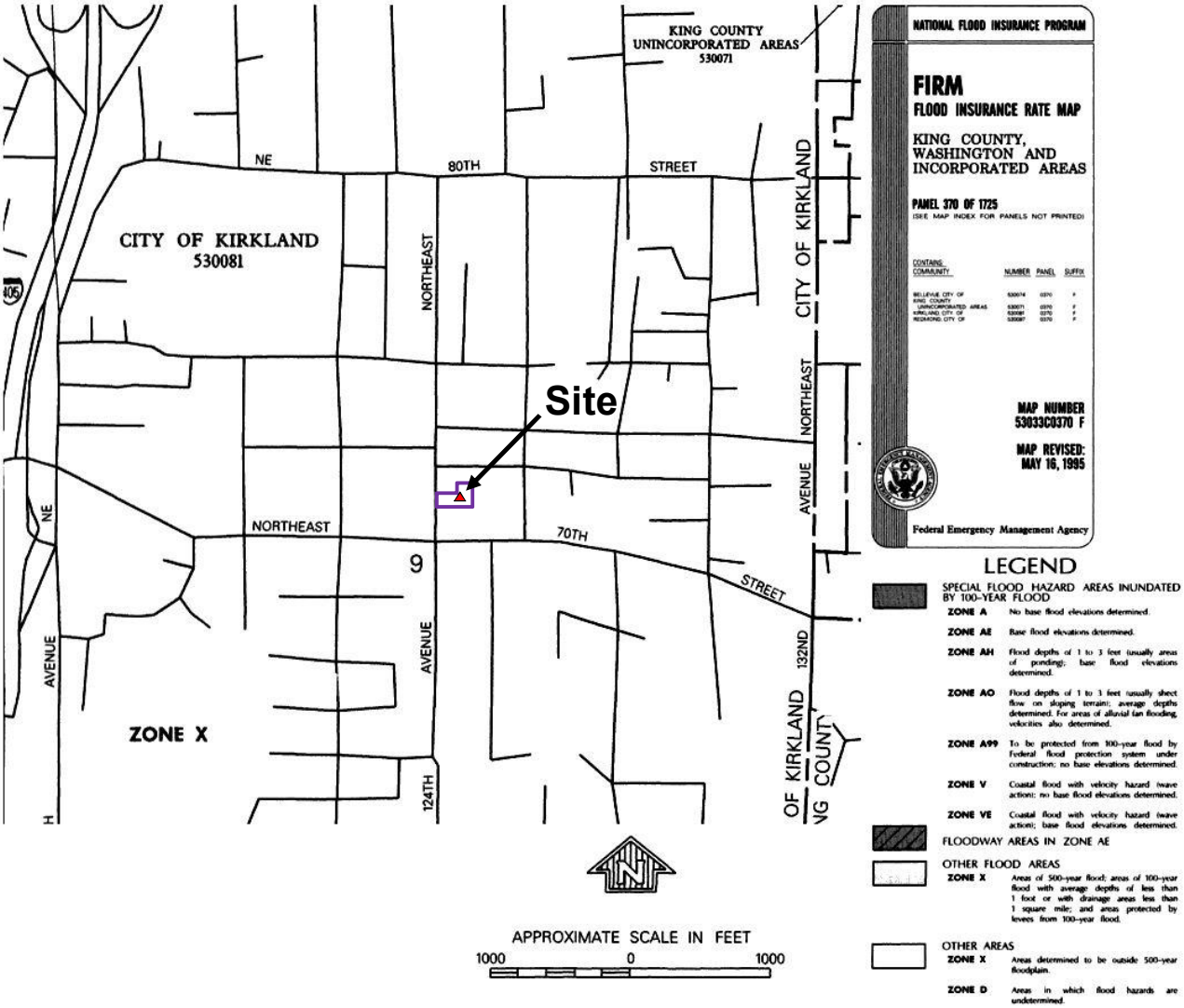
Adopted Basin Plans:

The City of Kirkland Natural Resource Management Plan, section D Water, Drainage Basins, covers protection and restoration of resources and quality of natural drainage systems. This section is part of the Guiding Principles the City Council adopted on August 5, 2003.

Floodplain/Floodway

A section of FEMAôs Flood Insurance Rate Map is included below and shows no floodplains exist on site. Web source: https://msc.fema.gov/portal/

FIGURE 2
FEMA MAP



Other Offsite Analysis Reports

None available at this time.

Sensitive Areas Folio Maps

A series of online maps cataloging environmentally critical areas based on the City of Kirkland GIS data and King County iMAP data were used to develop Figures 4-7. We discuss critical areas within the study area where relevant to the Project.

- ***Critical Aquifer Recharge Area and Aquifer Susceptibility***

  Figure 3 indicates the project site is not located within any Critical Aquifer Recharge Areas (CARA).

- ***Wetlands and Streams***

  Per the 1990 King County Wetlands Inventory Vol. 1, Forbes Creek Sub Basin was annexed to Kirkland and is regulated by the jurisdiction in which it is located. Figure 4, City of Kirkland GIS indicates no significant wetlands exist within one mile downstream of the Site. City of Kirkland Sensitive Areas Map coincides with this information.

- ***Landslide Hazard***

  Figure 4 indicates there are no Landslide Hazard areas within approximately one mile downstream of the site.

- ***Seismic Hazard***

- Figure 4 does not show that the site is located in a Seismic Hazard area.

- ***Erosion Hazard***

  Figure 5 identifies no erosion hazard areas within a quarter mile of the site.

DNRP Drainage Complaints and Studies

Per King County Water and Land Resources Division, all of the drainage complaints shown on Figure 6 are more than 10 years old and are not considered further. A check with the City revealed no additional drainage complaints.

King County Soils Survey

Figure 7 includes the soil survey of the area and indicates the Site is underlain by Alderwood gravely sandy loam (AgC).

Wetlands Inventory

Wetlands are discussed above and depicted in Figure 4.

Migrating River Studies

This section is not applicable.

Section 303d Polluted Water Listing

Department of Ecology (DOE) online mapping assessment does not indicate listed waters within the study area.

King County Designated Water Quality Problems

King County does not identify any water quality problems within the study area.

FIGURE 3
CRITICAL AQUIFER RECHARGE AREAS

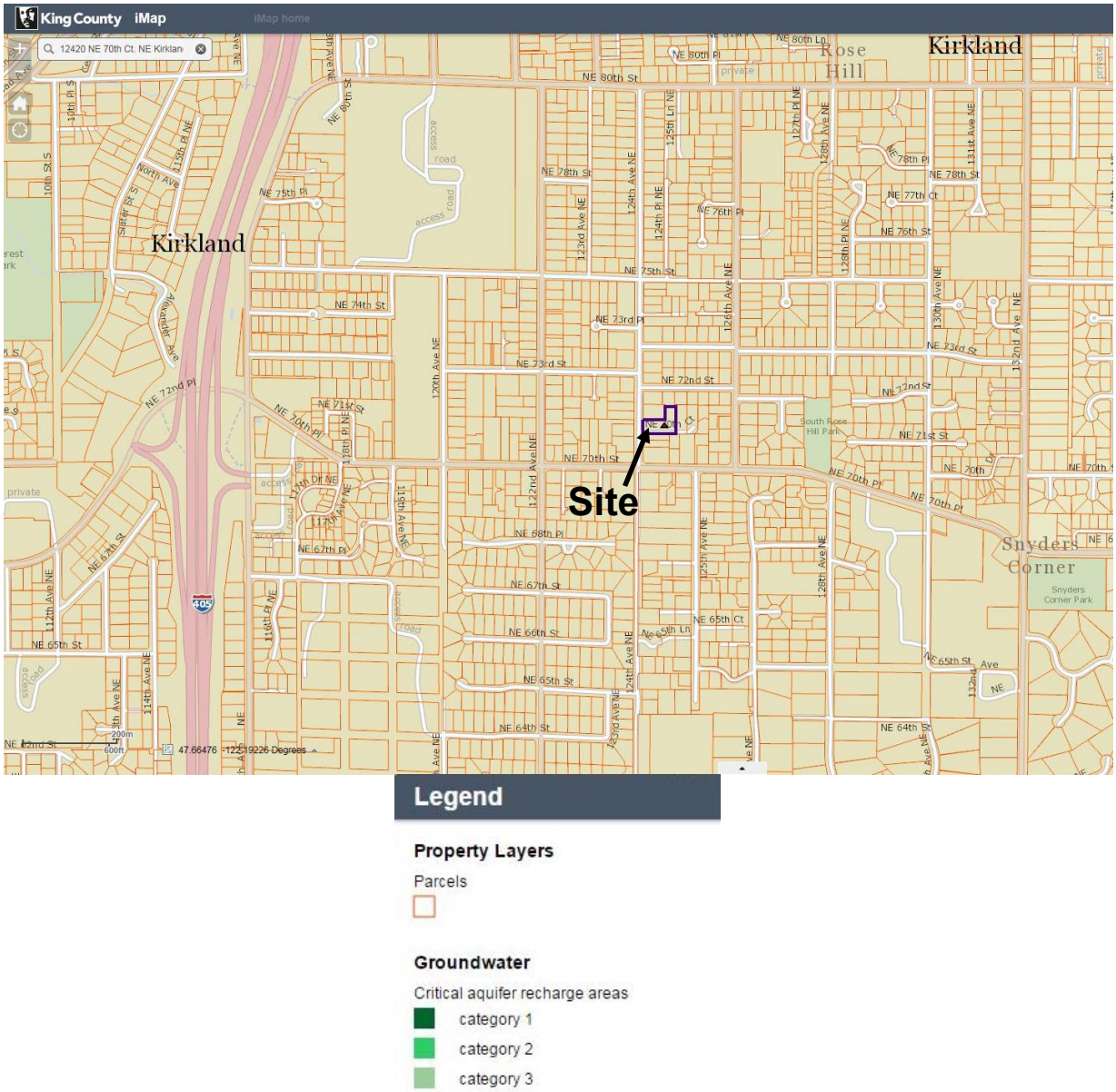


FIGURE 4
ENVIRONMENTALLY SENSITIVE AREAS

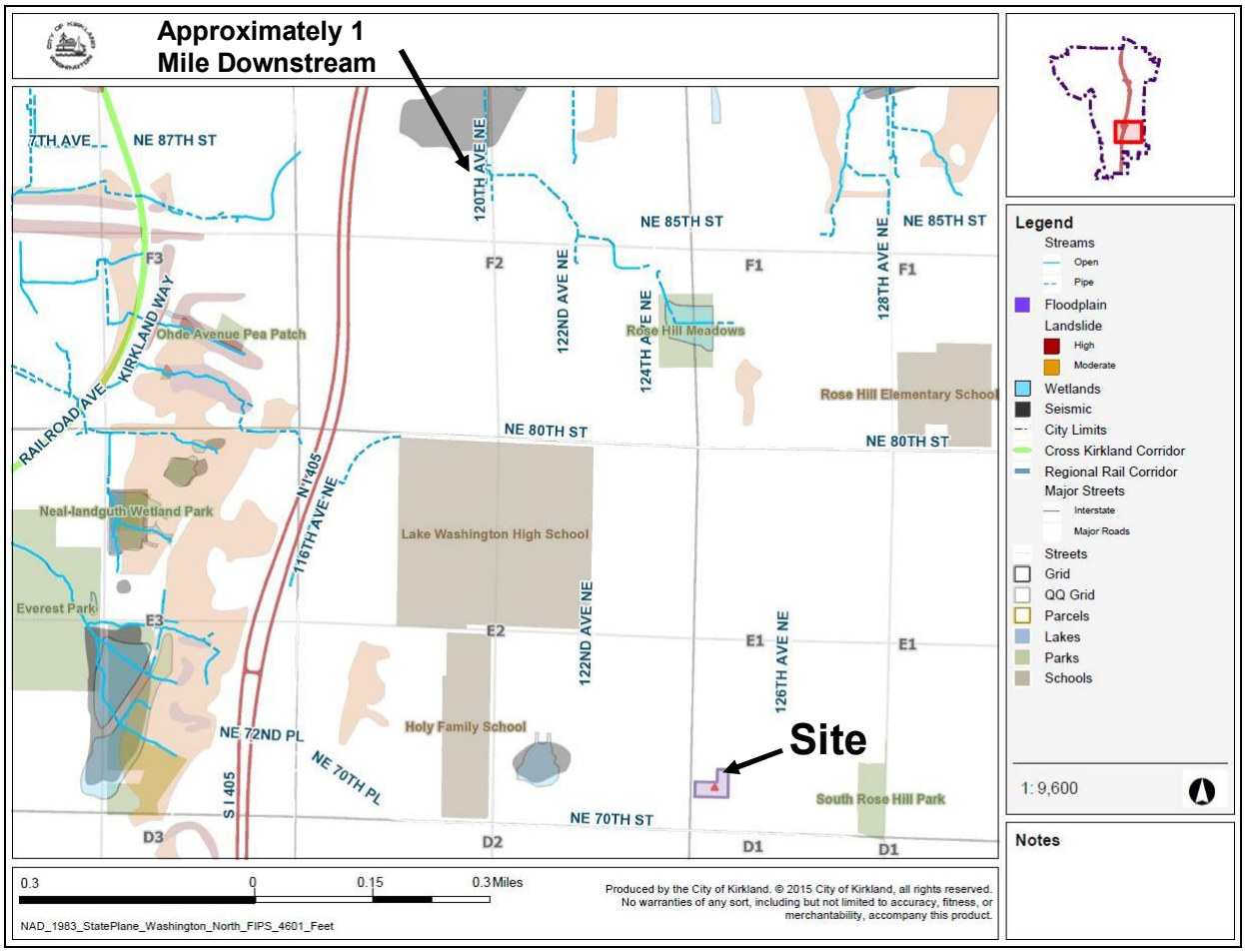


FIGURE 5
EROSION HAZARD MAP

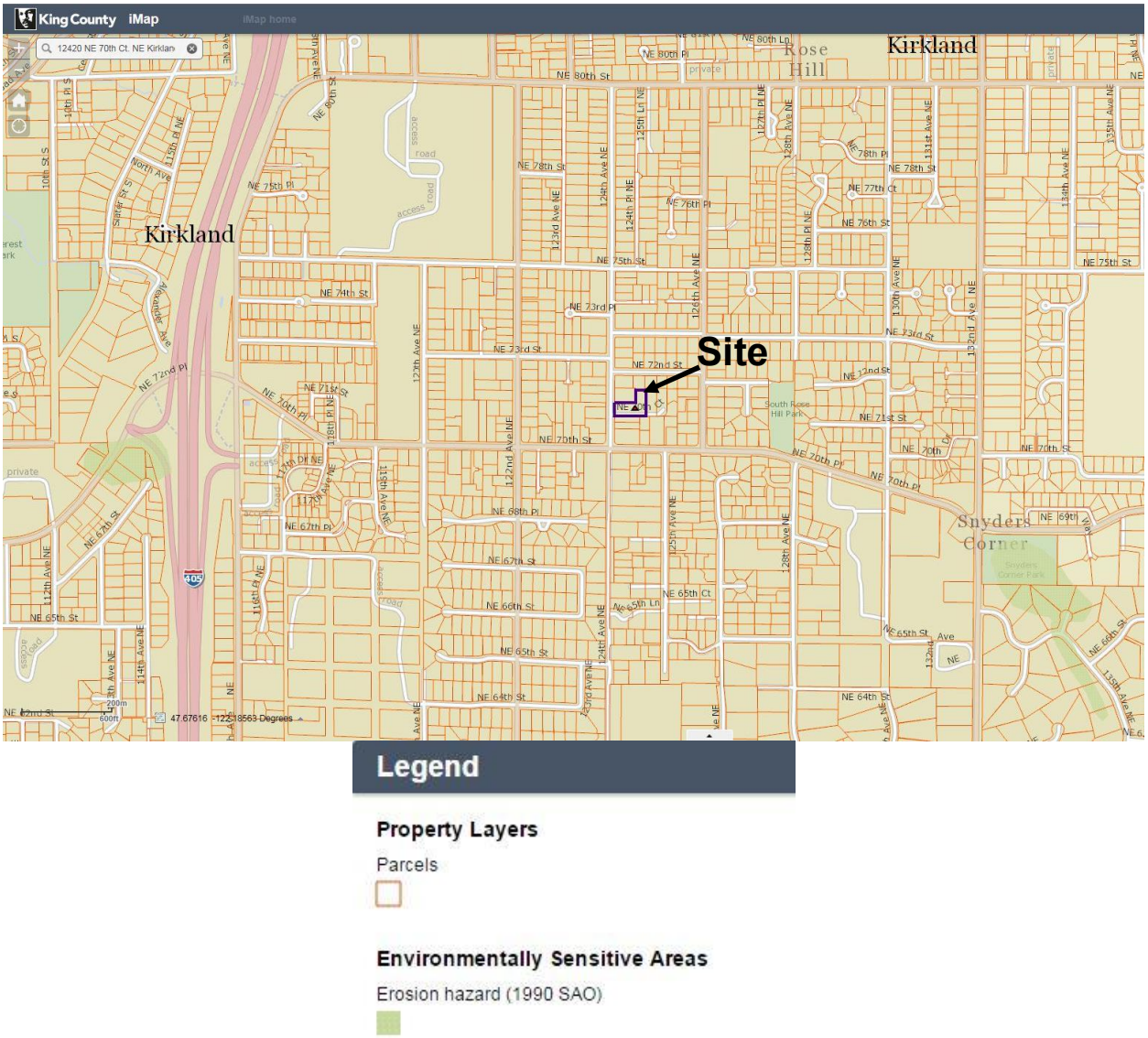


FIGURE 6
DRAINAGE COMPLAINTS MAP

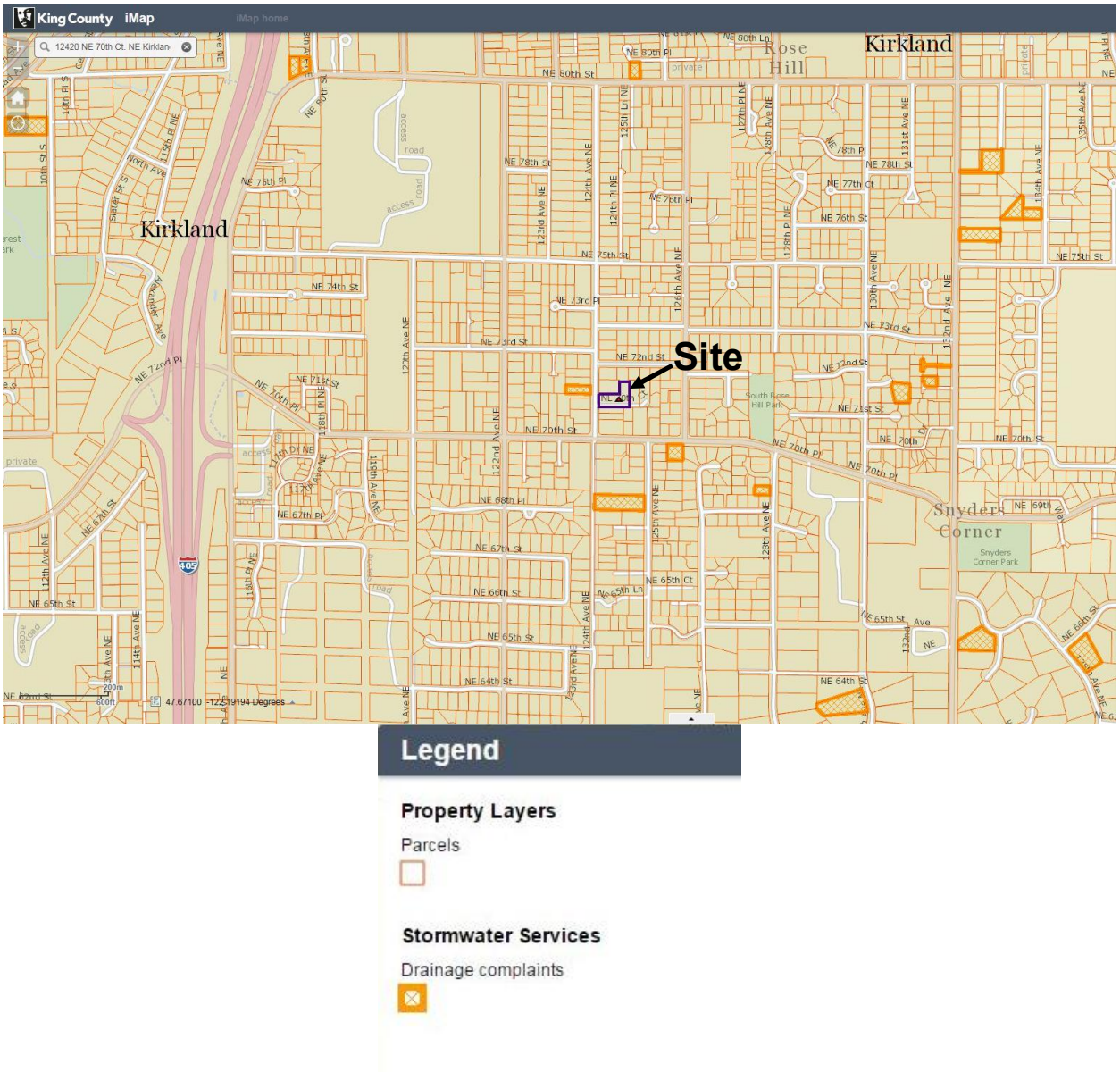


FIGURE 7
USDA SOILS SURVEY MAP

King County Area, Washington

AgC—Alderwood gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2t626
Elevation: 50 to 800 feet
Mean annual precipitation: 20 to 60 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Alderwood and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alderwood

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Glacial drift and/or glacial outwash over dense glaciomarine deposits

Typical profile

A - 0 to 7 inches: gravelly sandy loam
Bw1 - 7 to 21 inches: very gravelly sandy loam
Bw2 - 21 to 30 inches: very gravelly sandy loam
Bg - 30 to 35 inches: very gravelly sandy loam
2Cd1 - 35 to 43 inches: very gravelly sandy loam
2Cd2 - 43 to 59 inches: very gravelly sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Other vegetative classification: Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XS301WA), Limited Depth Soils (G002XF303WA)

Minor Components

Everett

Percent of map unit: 5 percent
Landform: Eskers, kames, moraines
Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Crest, base slope
Down-slope shape: Convex
Across-slope shape: Convex

Indianola

Percent of map unit: 5 percent
Landform: Eskers, kames, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Shalcar

Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

Norma

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave

TASK 3: FIELD INSPECTION

Upstream Tributary Area

The upstream basin area was evaluated by examining the City of Kirkland topographic map and by conducting field reconnaissance on December 30th 2015.

There is no upstream area to the south due to topography. Runoff from the adjacent properties south of the Site is collected and conveyed away from the Site. Upstream tributary area is therefore considered negligible.

General Onsite and Offsite Drainage Description

The Site is contained within one Threshold Discharge Area (TDA), and contains two Natural Discharge Areas (NDA). Generally the Site slopes from the southern property line to the northern property lines with slopes from 8-15%. The Site is lightly vegetated with grass and trees allowing for sheet flow across the property lines onto the two northern adjacent properties.

Existing Conditions

Runoff from NDA1 (west), which consists of the western portion of the Site, drains to the west portion of the northern property line, exiting as sheet flow onto property 7034 124th Ave NE. After crossing the property line to the single family home storm water will continue as sheet flow to the drainage ditch conveyance system on the east side of 124th Ave.

Runoff collected in the drainage ditch will flow north through the conveyance system along 124th Ave NE to NE 80th St. NE 80th St is beyond a quarter mile downstream and the downstream reconnaissance was terminated at residence 7544 124th Ave NE approximately 1,479ôdownstream of the Site.

Runoff from NDA2 (east), which consists of the eastern portion of the Site, drains to the east portion of the northern property line, exiting as sheet flow onto properties 7034 124th Ave NE and 12419 NE 72nd St. After crossing the property line to the single family homes storm water will continue through property 12407 NE 72nd St. collected in the drainage ditch on the south side of NE 73nd St. NDA2 runoff will then combine with NDA1 runoff at the conveyance inlet under NE 72nd St and flow north along the same conveyance system to NE 80th St.

Runoff beyond a quarter mile flows northerly, staying east of Interstate 405 and eventually discharging into Forbes Lake. Discharge from Forbes Lake continues northerly until runoff crosses under Interstate 405 at approximately NE 104th St.

Proposed Conditions

No work is proposed on Lot 2. Runoff from Lot 1 will be conveyed to a drywell located near the existing access/ utility easement. Overflow from the drywell will flow south to a CB. From this catch basin, runoff will flow west through the existing conveyance system in NE 70th Ct to the existing system in 124th Ave NE.

TASK 4: DRAINAGE SYSTEM DESCRIPTION AND PROBLEM DESCRIPTIONS

Drainage System Description

The downstream analysis is further illustrated and detailed in the Downstream Map and Downstream Table located in Appendix A. The drainage area is located within the Forbes Creek Drainage Basin and Cedar River/Lake Washington watershed. The drainage area was evaluated by reviewing available resources, and by conducting a field reconnaissance on December 30th 2015 during clear conditions.

Downstream Path NDA 1 (West)

Point ñAò is natural discharge location of NDA1 of the TDA. It is located along the west portion of the north property line of 12420 NE 70th Ct. (±0).

From Point ñAò to Point ñBò, runoff continues northwesterly as sheet flow through the lot located at 7034 124th Ave NE. No flow was observed (±0ô80ô).

Point ñBò, sheet flow runoff is collected in the drainage ditch along the east side of 124th Ave NE (±80).

From Point ñB1ò to Point ñC1ò, runoff continues as channel flow north along the drainage ditch. No flow was observed (±80ô260ô).

Point ñCò, runoff enters 12ò diameter concrete pipe (±260ô).

From Point ñCò to Point ñDò, runoff flows north as pipe flow under NE 72nd Street. No flow was observed (±260ô299ô).

Point ñDò, runoff discharges into drainage ditch located on the east side of 124th Ave NE (±299ô).

From Point ñDò to Point ñEò, runoff flows north as channel flow. No flow was observed (±299ô356ô).

Point ñEò, runoff enters 12ò diameter concrete pipe (±356ô).

From Point ñEò to Point ñFò, runoff continues north as pipe flow under the gravel driveway of residence 12408 NE 72nd St. No flow was observed (±356ô383ô).

Point ñFò, runoff discharges into drainage ditch located on the east side of 124th Ave NE (±383ô).

From Point ñFò to Point ñGò, runoff continues north as channel flow. No flow was observed (±383ô423ô).

Point ñGò, runoff enters 12ò diameter concrete pipe (±423ô).

From Point ñGò to Point ñHò, runoff continues north as pipe flow under the gravel driveway of residence 7212 124th Ave NE. No flow was observed (±423ô455ô).

Point ñHò, runoff discharges into drainage ditch located on the east side of 124th Ave NE (±455ô).

From Point ñHò to Point ñIò, runoff continues north as channel flow. No flow was observed (±455ô539ô).

Point ñIò, runoff enters 12ò diameter CMP pipe (±539ô).

From Point ñIò to Point ñJò runoff flows north as pipe flow under NE 73rd Street. No flow was observed (±539ô590ô).

Point ñJò runoff discharges into drainage ditch located on the east side of 124th Ave NE (±590ô).

From Point ñJò to Point ñKò runoff continues north as channel flow. No flow was observed (±590ô701ô).

Point ñKò runoff enters 12ò diameter concrete pipe (±701ô).

From Point ñKò to Point ñLò runoff continues north as pipe flow under the asphalt driveway of residence 7332 124th Ave NE. No flow was observed (±701ô723ô).

Point ñLò runoff discharges into drainage ditch located on the east side of 124th Ave NE (±723ô).

From Point ñLò to Point ñMò runoff continues north as channel flow. No flow was observed (±723ô757ô).

Point ñMò runoff enters 12ò diameter pipe with debris barrier in front of residence 7332 124th Ave NE (±757ô).

From Point ñMò to Point ñNò runoff flows northeast as pipe flow. No flow was observed (±757ô770ô).

Point ñNò runoff enters Kirkland type 1 catch basin 18744 (±770ô).

From Point ñNò to Point ñOò runoff flows north as pipe flow via 12ò diameter PVC pipe. No flow was observed (±770ô870ô).

Point ñOò runoff enters Kirkland type 1 catch basin 18740 (±870ô).

From Point ñOò to Point ñPò runoff flows north as pipe flow via 12ò diameter PVC pipe. No flow was observed (±870ô1,000ô).

Point ñPò runoff enters Kirkland 48ò-type 2 catch basin 12152 (±1,000ô).

From Point ñPò to Point ñQò runoff flows northwest as pipe flow via 12ò diameter PVC pipe. No flow was observed (±1,000ô1,016ô).

Point ñQò runoff enters Kirkland 48ò-type 2 catch basin 12151 (±1,016ô).

From Point ñQò to Point ñRò runoff flows north as pipe flow via 12ò diameter concrete pipe under NE 75th St. No flow was observed (±1,016ô1,218ô).

Point ñRò runoff discharges into drainage ditch located on the east side of 124th Ave NE. (±1,218ô).

From Point ñRò to Point ñSò runoff continues north as channel flow. No flow was observed (±1,218ô1,263ô).

Point ñSò runoff enters 12ò diameter concrete pipe (±1,263ô).

From Point ñSò to Point ñTò, runoff continues north as pipe flow under the asphalt driveway of residence 7520 124th Ave NE and gravel portion of driveway 7528 124th Ave NE. No flow was observed (±1,263ô1,324ô).

Point ñTò, runoff discharges into drainage ditch located on the east side of 124th Ave NE. (±1,324ô).

From Point ñTò to Point ñUò, runoff continues north as channel flow. No flow was observed (±1,324ô1,423ô).

Point ñUò, runoff enters 12ò diameter concrete pipe (±1,423ô).

From Point ñUò to Point ñVò, runoff continues north as pipe flow under the asphalt driveway of residence 7536 124th Ave NE. No flow was observed (±1,423ô1,447ô).

Point ñVò, runoff discharges into drainage ditch located on the east side of 124th Ave NE. (±1,447ô).

From Point ñVò to Point ñWò, runoff continues north as channel flow. No flow was observed (±1,447ô1,452ô).

Point ñWò, runoff enters 12ò diameter concrete pipe (±1,452ô).

From Point ñWò to Point ñXò, runoff continues north as pipe flow under the asphalt driveway of residence 7544 124th Ave NE. No flow was observed (±1,452ô1,479ô).

Point ñXò, runoff discharges into drainage ditch located on the east side of 124th Ave NE. (±1,479ô).

Downstream Path NDA 2 (East)

Point ñA1ò is natural discharge location of NDA2 of the TDA. It is located along the east portion of the north property line of 12420 NE 70th Ct. (±0).

From Point ñAò to Point ñBò, runoff continues northwesterly as sheet flow through the lot located at 7034 124th Ave NE and 12419 NE 72nd St. No flow was observed (±0ô180ô).

Point ñBò, sheet flow runoff is collected in the drainage ditch along the south side of NE 72nd St. (±180).

From Point ñB1ò to Point ñC1ò, runoff continues as channel flow north along the drainage ditch. No flow was observed (±180ô200ô).

Point ñCò, runoff enters 12ò diameter concrete pipe (±200ô).

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 complaints within the last ten years. A check with the City revealed no additional drainage complaints.

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.

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 8
OFFSITE ANALYSIS DOWNSTREAM MAP

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FIG. 12 DOWNSTREAM MAP
12420 70TH CT
KIRKLAND, WA 98033

DRAFTED BY: MES
DESIGNED BY: MES
PROJECT ENGINEER: WJS
DATE: 1-14-16
PROJECT NO.: 15122

DRAWING: 1
SHEET: 1

FIGURE 9
OFFSITE ANALYSIS DOWNSTREAM TABLE NDA 1

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 mi=1,320 ft	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 point	Runoff exits Site along the west portion of the north property line.		±0ô	None observed	None Anticipated	No flow observed
A-B	Sheet flow	Vegetated slope 8-15%			None Observed	None Anticipated	No flow observed
B	Drainage ditch (trapezoidal)	Begins as rock lined ditch and ends lined with vegetation (1ôbottom x 3ôtop x 1ô deep)		±80ô	None Observed	None Anticipated	No flow observed
B-C	Northerly channel flow	Begins as rock lined ditch and ends lined with vegetation (1ôbottom x 3ôtop x 1ô deep)			None Observed	None Anticipated	No flow observed
C	Pipe inlet	12òØ concrete pipe		±260ô	None Observed	None Anticipated	No flow observed
C-D	North pipe flow	12òØ concrete pipe			None Observed	None Anticipated	No flow observed
D	Pipe outlet	Grass lined ditch (1ôbottom x 5ôtop x 2ô deep)		±299ô	None Observed	None Anticipated	No flow observed
D-E	Northerly channel flow	Grass lined ditch (1ôbottom x 5ôtop x 2ô deep)			None Observed	None Anticipated	No flow observed
E	Pipe inlet	12òØ concrete pipe		±356ô	None Observed	None Anticipated	No flow observed
E-F	North pipe flow	12òØ concrete pipe			None Observed	None Anticipated	No flow observed
F	Pipe outlet	Grass lined ditch (1ôbottom x 5ôtop x 2ô deep)		±383ô	None Observed	None Anticipated	No flow observed

F-G	Northerly channel flow	Grass lined ditch (1ôbottom x 5ôtop x 2ô deep)			None Observed	None Anticipated	No flow observed
G	Pipe inlet	12òØ concrete pipe		±423	None Observed	None Anticipated	No flow observed
G-H	North pipe flow	12òØ concrete pipe			None Observed	None Anticipated	No flow observed
H	Pipe outlet	Grass lined ditch (1ôbottom x 5ôtop x 2ô deep)		±455ô	None Observed	None Anticipated	No flow observed
H-I	Northerly channel flow	Grass lined ditch (1ôbottom x 5ôtop x 2ô deep)			None Observed	None Anticipated	No flow observed
I	Pipe inlet	12òØ pipe		±539ô	None Observed	None Anticipated	No flow observed
I-J	North pipe flow	12òØ pipe			None Observed	None Anticipated	No flow observed
J	Pipe outlet	Grass lined ditch (1.5ôbottom x 5ôtop x 2ô deep)		±590ô	None Observed	None Anticipated	No flow observed
J-K	Northerly channel flow	Grass lined ditch (1.5ôbottom x 5ôtop x 2ô deep)			None Observed	None Anticipated	No flow observed
K	Pipe inlet	12òØ concrete pipe		±701ô	None Observed	None Anticipated	No flow observed
K-L	North pipe flow	12òØ concrete pipe			None Observed	None Anticipated	No flow observed
L	Pipe outlet	Grass lined ditch (1.5ôbottom x 5ôtop x 2ô deep)		±723ô	None Observed	None Anticipated	No flow observed
L-M	Northerly channel flow	Grass lined ditch (1.5ôbottom x 5ôtop x 2ô deep)			None Observed	None Anticipated	No flow observed
M	Pipe inlet	12òØ pipe with debris barrier		±757ô	None Observed	None Anticipated	No flow observed
M-N	Northeasterly pipe flow	12òØ Polyethylene pipe			None Observed	None Anticipated	No flow observed
N	Type 1 CB	Type 1 CB 18744		±770ô	On property, could not lift lid.	None Anticipated	No flow observed
N-O	North pipe flow	12òØ PVC pipe			None Observed	None Anticipated	No flow observed
O	Type 1 CB	Type 1 CB 18740		±870ô	Could not lift lid	None Anticipated	No flow observed

O-P	North pipe flow	12òØ PVC pipe			None Observed	None Anticipated	No flow observed
P	Type 2 CB	Type 2 CB 48ò12152		±1,000ô	None Observed	None Anticipated	No flow observed
P-Q	Northwesterly pipe flow	12òØ PVC pipe			None Observed	None Anticipated	No flow observed
Q	Type 2 CB	Type 2 CB 48ò12151		±1,016ô	None Observed	None Anticipated	No flow observed
Q-R	North pipe flow	12òØ concrete pipe			None Observed	None Anticipated	No flow observed
R	Pipe outlet	Vegetated ditch (2ôbottom x 5ôtop x 2ô deep)		±1,218ô	None Observed	None Anticipated	No flow observed
R-S	Northerly channel flow	Vegetated ditch (2ôbottom x 5ôtop x 2ô deep)			None Observed	None Anticipated	No flow observed
S	Pipe inlet	12òØ concrete pipe		±1,263ô	None Observed	None Anticipated	No flow observed
S-T	North pipe flow	12òØ concrete pipe			None Observed	None Anticipated	No flow observed
T	Pipe outlet	Grass lined ditch (1.5ôbottom x 5ôtop x 1.5ôdeep)		±1,324ô	None Observed	None Anticipated	No flow observed
T-U	Northerly channel flow	Grass lined ditch (1ôbottom x 5ôtop x 1ô deep)			None Observed	None Anticipated	No flow observed
U	Pipe inlet	12òØ concrete pipe		±1,423ô	None Observed	None Anticipated	No flow observed
U-V	North pipe flow	12òØ concrete pipe			None Observed	None Anticipated	No flow observed
V	Pipe outlet	Grass lined ditch (1ôbottom x 3ôtop x 1ô deep)		±1,447ô	None Observed	None Anticipated	No flow observed
V-W	Northerly channel flow	Grass lined ditch (1ôbottom x 3ôtop x 1ô deep)			None Observed	None Anticipated	No flow observed
W	Pipe inlet	12òØ concrete pipe		±1,452ô	None Observed	None Anticipated	No flow observed
W-X	North pipe flow	12òØ concrete pipe			None Observed	None Anticipated	No flow observed
X	Pipe outlet	Rock lined ditch (3ôbottom x 6ôtop x 2ô deep). End ¼ mile reconnaissance.		±1,479ô	Sedimentation	None Anticipated	No flow observed

OFFSITE ANALYSIS DOWNSTREAM TABLE NDA 2

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 mi=1,320 ft	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.
A1	Natural discharge point	Runoff exits Site along the east portion of the north property line.		±0ô	None observed	None Anticipated	No flow observed
A1-B1	Sheet flow	Vegetated slope 8-15%			None Observed	None Anticipated	No flow observed
B1	Drainage ditch	Grass lined ditch (1ôbottom x 5ôtop x 2ô deep)		±115ô	None Observed	None Anticipated	No flow observed
B1-C	West channel flow	Grass lined ditch (1ôbottom x 5ôtop x 2ô deep)			None Observed	None Anticipated	No flow observed
C	Pipe inlet	12òØ concrete pipe		±160ô	None Observed	None Anticipated	No flow observed

SECTION IV
FLOW CONTROL AND WATER QUALITY FACILITY ANALYSIS AND DESIGN

The Project proposed less than 10,000 s.f. of new/ replaced impervious and is therefore exempt from providing formal flow control facilities.

Figure 5
Predeveloped Conditions Map

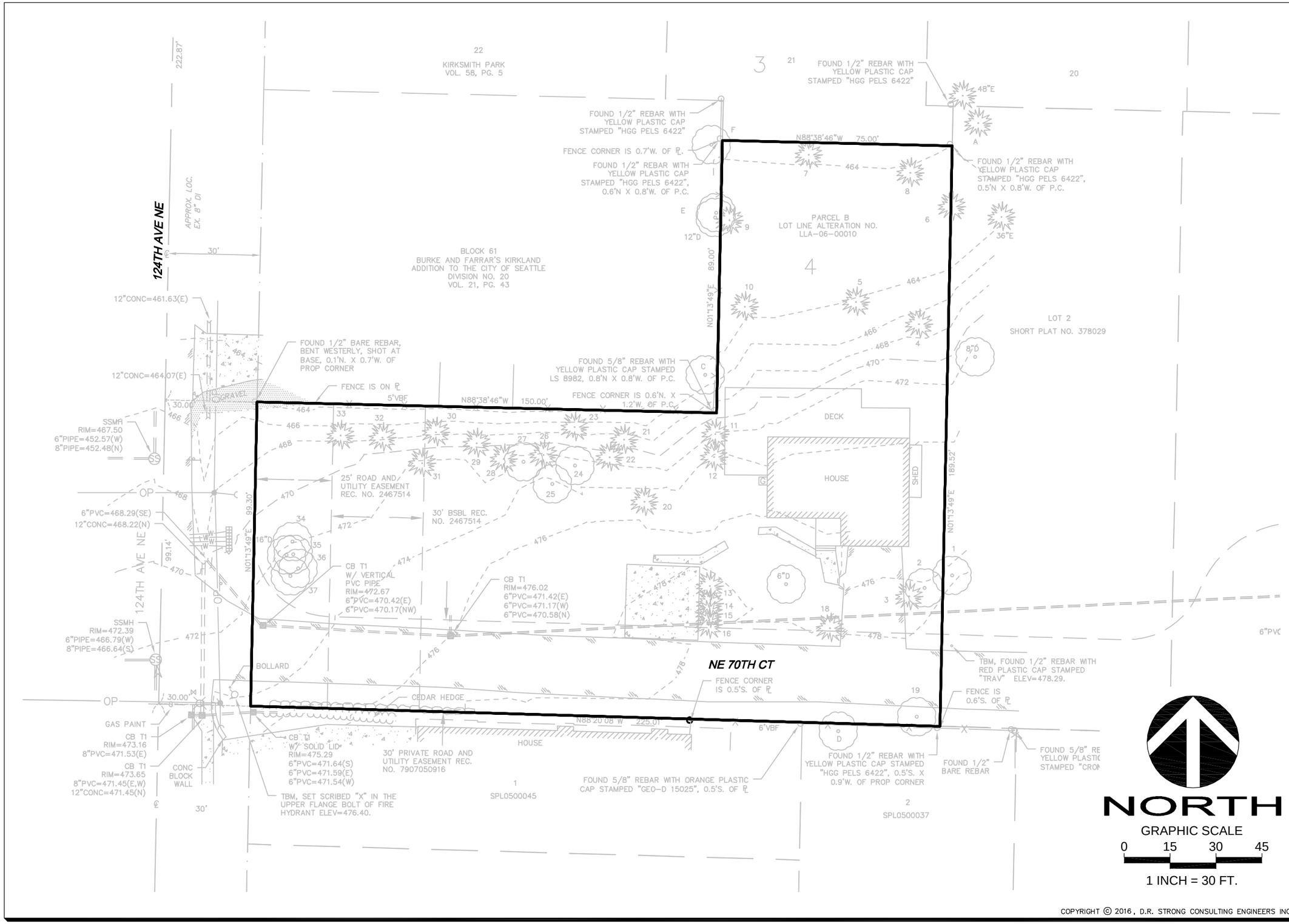

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FIG 5: PREDEVELOPED CONDITIONS

12420 70TH CT
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DESIGNED BY: MES
PROJECT ENGINEER: WJS
DATE: 01.14.16
PROJECT NO.: 15122

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SHEET: 1

Figure 6
Developed Conditions Map

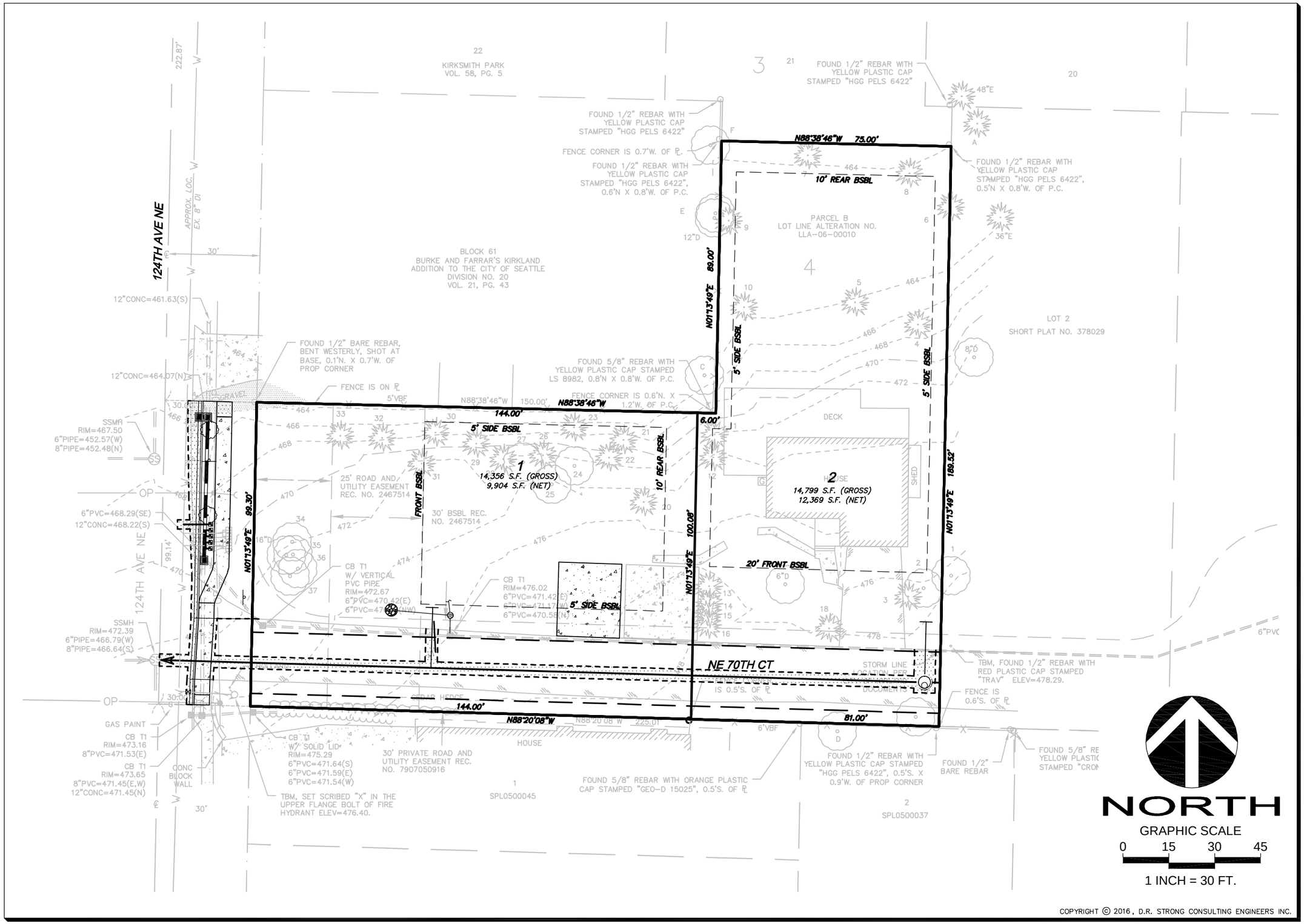

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FIG 6: DEVELOPED CONDITIONS

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DATE: 01.14.16
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WATER QUALITY TREATMENT SYSTEM

Total Pollution Generating Impervious Surface (P.G.I.S.) will be less than 5,000 s.f., therefore no water quality treatment is proposed. The Project is exempt from providing a formal Water Quality treatment facility.

SECTION V
CONVEYANCE SYSTEM ANALYSIS AND DESIGN

GENERAL DESIGN PARAMETERS

New pipe systems and ditches/channels 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 and ditches/channels 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 ñsevere flooding problemò or ñsevere erosion problemò as defined in Core Requirement #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.

NEW SITE DRAINAGE FACILITIES

This Project proposes to install three new catch basins. The new storm drain lines will be 8 or 12-inch diameter PVC. No storm drainage work is proposed in NE 70th Ct.

CONVEYANCE SYSTEM ANALYSIS AND DESIGN

Per C.R. #4 of the KCSWDM, the conveyance system must be analyzed and designed for existing tributary and developed onsite runoff from the proposed project. Pipe systems shall be designed to convey the 25-year design storm. A detailed engineering analysis will be provided during engineering review.

SECTION VI
SPECIAL REPORTS AND STUDIES

None at this time

SECTION VII
OTHER PERMITS, VARIANCES AND ADJUSTMENTS

OTHER PERMITS

No other permits are required as of the date of this report.

VARIANCES

A modification to access standards is requested for the access to Lot 1. Lot 1 access is proposed from the existing access and utility easement (NE 70th Court) located near the southern property line instead of directly from 124th Ave NE. The existing access easement is 30 feet wide with a pavement width of 18 feet to 20 feet and provides access to both of the proposed Lots plus three residences to the east not associated with the Project. The easement terminates approximately 376 feet from the eastern edge of the 124th Ave NE R.O.W. at a paved cul-de-sac. There are no proposed changes to the access easement or pavement width. Adding one to two additional feet of pavement to make the entire access driveway 20 feet wide would not improve emergency or regular access to the Site or the three adjacent residences.

The proposed driveway on Lot 1 will provide at least 20 feet of driveway/ parking so parked cars do not extend into the access easement. The existing driveway to remain on Lot 2 provides approximately 30 feet of parking between the garage and edge of easement pavement.

This modification will not affect the ability to provide any of the existing or proposed properties served by the easement with police, fire, emergency medical, or other essential services.

The modification is requested due to the existing physical conditions on the Site. The roadway will serve only one additional home on proposed Lot 1, which borders 124th Ave NE.

ADJUSTMENTS

No other adjustments are proposed as of the date of this report.

SECTION VIII
CSWPPP ANALYSIS AND DESIGN

ESC PLAN ANALYSIS AND DESIGN (PART A)
The Erosion and Sedimentation Control Design meets the nine minimum 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 –** Disturbed Site areas shall be covered with mulch and seeded, as appropriate, for temporary or permanent measures.
3. **Perimeter protection –** Perimeter protection shall consist of a silt fence down slope of any disturbed areas or stockpiles.
4. **Traffic Area Stabilization –** A stabilized construction entrance will be located at the point of ingress/egress for Lot 1.
5. **Sediment Retention –** A silt fence down slope of disturbed areas and stockpiles will keep soil on-site. A sediment trap may be required for sediment retention. The sediment trap will be designed during the final engineering stage of the project.
6. **Surface Water Control –**Surface water control will be provided by grading the site to drain into the sediment retention trap, if required.
7. **Dewatering Control –** Not Applicable to 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 trap will have its overflow routed to the conveyance system.

SWPPS PLAN DESIGN (PART B)

Construction activities that could contribute pollutants to surface and storm water include the following, with applicable BMPõs 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. **Building 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.
4. **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.

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

SECTION IX
IMPROVEMENT EVALUATION PACKET, FACILITY SUMMARIES, AND DECLARATION OF COVENANT

IMPROVEMENT EVALUATION PACKET

Will be submitted with LSM engineering

STORMWATER FACILITY SUMMARY SHEET

N/A to this Project

DECLARATION OF COVENANT

A covenant restricting impervious on Lot 1 will be provided prior to final plat recording.

SECTION X
OPERATIONS AND MAINTENANCE MANUAL

Your property contains a stormwater management flow control BMP (best management practice) called "limited infiltration," which was installed to mitigate the stormwater quantity and quality impacts of some or all of the impervious surfaces on your property. Limited infiltration is a method of soaking runoff from impervious area (such as paved areas and roofs) into the ground. Infiltration devices, such as gravel filled trenches, drywells, and ground surface depressions, facilitate this process by putting runoff in direct contact with the soil and holding the runoff long enough to soak most of it into the ground. To be successful, the soil condition around the infiltration device must be able to soak water into the ground for a reasonable number of years.

The infiltration device used on your property is a drywell. The size, placement, and composition of this device as depicted by the site plan and design details must be maintained and may not be changed.

Infiltration devices must be inspected annually and after major storm events to identify and repair any physical defects. Maintenance and operation of the system should focus on ensuring the system's viability by preventing sediment-laden flows from entering the device. Excessive sedimentation will result in a plugged or non-functioning facility. If the infiltration device has a catch basin, sediment accumulation must be removed on a yearly basis or more frequently if necessary. Prolonged ponding around or atop a device may indicate a plugged facility. If the device becomes plugged, it must be replaced. Keeping the areas that drain to infiltration devices well swept and clean will enhance the longevity of these devices. For roofs, frequent cleaning of gutters will reduce sediment loads to these devices.

The catch basins have a one-foot deep sump for sediment accumulation. The sumps should be periodically checked and the sediment removed when accumulated to more than 1/3 of the depth from the bottom of the basin to the invert of the lowest pipe into or out of the basin. Grates should be cleaned when trash or debris of more than ½ cubic foot is located immediately in front of the basin opening, or is blocking capacity of the basin by more than 10%. Conveyance pipes should be periodically checked and cleaned when more than 20% of the pipe diameter is obstructed by accumulated sediment or debris. Landscaped areas receiving Amended Soil should be periodically checked and the soil replaced as necessary. Floating debris and accumulated petroleum products should be removed as needed, but at least annually. Perform inspections of all components quarterly during the first year of operation, then annually thereafter.

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