Level 1 Drainage Report

The Lodge at Saint Edward
Coughlin Porter Lundeen
Project No. C140624-01
June 29, 2016

TABLE OF CONTENTS

I. PROJECT OVERVIEW 1
GENERAL DESCRIPTION 1
EXISTING CONDITIONS 1
PROPOSED DRAINAGE SYSTEM 1
II. CONDITIONS AND REQUIREMENTS SUMMARY 1
KING COUNTY SURFACE WATER MANAGEMENT DESIGN MANUAL CORE REQUIREMENTS: 1
SPECIAL REQUIREMENTS: 2
PROJECT SPECIFIC REQUIREMENTS: 2
III. OFF-SITE ANALYSIS 3
IV. FLOW CONTROL AND WATER QUALITY FACILITY ANALYSIS AND DESIGN 4
EXISTING SITE HYDROLOGY (PART A) 4
DEVELOPED SITE HYDROLOGY (PART B) 4
PERFORMANCE STANDARDS (PART C) 5
FLOW CONTROL SYSTEMS (PART D) 5
WATER QUALITY SYSTEM (PART E) 5
V. CONVEYANCE SYSTEM ANALYSIS AND DESIGN 6
STANDARD REQUIREMENTS (BASED ON KCSWDM AND SAO): 6
VI. SPECIAL REPORTS AND STUDIES 6
VII. OTHER PERMITS 8
VIII. CSWPPP ANALYSIS AND DESIGN 9
STANDARD REQUIREMENTS 9
IX. BOND QUANTITY, FACILITY SUMMARIES, AND DECLARATION OF COVENANT 9
X. OPERATION AND MAINTENANCE MANUAL 10
STANDARD MAINTENANCE 10
XI. APPENDIX A 11
ENGINEERING CALCULATIONS 11

LIST OF TABLES

TABLE 1 - EXISTING SITE CONDITIONS AREA BREAKDOWN 4
TABLE 2A - DEVELOPED SITE CONDITIONS AREA BREAKDOWN 4
TABLE 2B – TOTAL EFFECTIVE SURFACES 5
TABLE 3 - FLOW CONTROL AND WATER QUALITY COMPENSATORY AREAS 5

I. PROJECT OVERVIEW

GENERAL DESCRIPTION

The following Level 1 Drainage Report provides the preliminary technical information and design analysis required for developing the drainage for the renovation of the existing seminary building at St. Edward State Park and associated site improvements. The design for the site upgrades is based on the requirements set forth in the 2009 King County Surface Water Design Manual (KCSWDM), chapter I, section 1.1.2, "Full Drainage Review" as adopted by the City of Kenmore.

The current site area for the renovation and site improvements is approximately 7 acres including lease area of 5.5 acres. Existing impervious surfaces to remain within the project limits include the existing seminary building (internal renovation) and existing parking lots north and east of the seminary building which will receive an asphalt overlay. New/replaced impervious surfaces include new drive aisles surrounding the site and a new asphalt parking lot at the northeast corner of the site.

The proposed impervious site work includes a new covered parking garage (below landscaped area), asphalt drive aisle, and asphalt parking lot. The project does not propose improvements within the public Right of Way (ROW).

The majority of surficial soils onsite are AgC – Alderwood Gravelly Sandy Loam 8 to 15 Percent Slopes (see geo-technical engineering report). These soils are not prone to erosion. The site is not within the 100-yr floodplain. Finally, the drainage complaints on and around the site have been addressed and will not affect the project.

This project will be constructed during a single phase. For the purposes of this report, "existing conditions" will refer to pre-demolition of any existing structures or features.

EXISTING CONDITIONS

Existing conditions consist of lawn, building and surface parking. The site runoff is handled primarily by a combination of sheet flow and piped drainage to the surrounding wooded park area including an existing flow control pond at the north end of the site.

PROPOSED DRAINAGE SYSTEM

According to Table 1.1.2.A of the 2009 KCSWDM, this project meets the criteria for a Full Drainage Review, including flow control and water quality requirements. New bio-filtration swales and filter strips will be installed to mitigate runoff from target impervious surfaces. Several parking areas will receive an asphalt overlay (no removal of existing paving). These areas will not be subject to water quality and flow control requirements.

II. CONDITIONS AND REQUIREMENTS SUMMARY

This section will address the requirements set forth by the Core and Special Requirements listed in Chapter 1 of the KCSWDM.

KING COUNTY SURFACE WATER MANAGEMENT DESIGN MANUAL CORE REQUIREMENTS:

1. ***Discharge at the Natural Location (1.2.1):*** All developed flows will continue to discharge to their natural discharge point – un-named streams onsite which drain to Lake Washington.

2. ***Off-site Analysis (1.2.2):*** This subject is covered Sections III and IV.

3. ***Flow Control (1.2.3):*** Refer to Section IV. The site will use dispersion and a flow control pond as flow control.

4. ***Conveyance System (1.2.4):*** Refer to Section V. Closed pipe systems have been provided for on-site stormwater conveyance. A large portion of the runoff travels by sheet flow to flow control facilities.

5. ***Erosion and Sedimentation Control (1.2.5):*** Refer to Section IX. The project will construct a series of sediment controls to address the specific conditions at the site. A SWPPP will be provided as part of the T.I.R. required for the grading permit.

6. ***Maintenance and Operations (1.2.6):*** Refer to Section X. The proposed storm drainage system will be owned, operated and maintained by the owner.

7. ***Financial Guarantees and Liability (1.2.7):*** The owner and contractor will obtain all necessary permits prior to the beginning of construction. Construction bonds will be required.

8. ***Water Quality (1.2.8):*** Refer to Section IV. Water quality measures will be provided through filter strips and bio-filtration swales.

SPECIAL REQUIREMENTS:

Special Requirement #1. Other Adopted Area-Specific Requirements Section 1.3.1

a. Critical Drainage Areas (CDAs): Not Applicable
b. Master Drainage Plans (MDPs): There are no known master drainage plans covering this project site
c. Basin Plans (BPs): Not Applicable
d. Salmon Conservation Plans (SCPs): Not Applicable
e. Stormwater Compliance Plans (SWCPs): Not Applicable
f. Lake Management Plans(LMPs): Not Applicable
g. Flood Hazard Reduction Plan Updates (FHRPs): Not Applicable
h. Shared Facility Drainage Plans(SFDPs): Not Applicable

Special Requirement #2. Flood Hazard Area Delineation, Section 1.3.2: Not Applicable

Special Requirement #3. Flood Protection Facilities, Section 1.3.3: Not Applicable

Special Requirement #4. Source Controls, Section 1.3.4: Not Applicable

Special Requirement #5. Oil Control: The site will not meet the definition of a high-use site; therefore oil control will not be required. A spill control device will be installed downstream of PGIS

PROJECT SPECIFIC REQUIREMENTS:

There are no project specific requirements.

III. OFF-SITE ANALYSIS

Runoff from the existing site either infiltrates onsite or sheet flows into the surrounding forested park area where it ultimately discharges to Lake Washington via two un-names creeks. A full off-site analysis will be provided at a later date when topographic survey data is available.

IV. FLOW CONTROL AND WATER QUALITY FACILITY ANALYSIS AND DESIGN

This section describes the conditions that contribute to the storm water runoff values and mitigation efforts proposed for the site.

EXISTING SITE HYDROLOGY (PART A) (TO BE PROVIDED AT A LATER DATE)

The existing site totals approximately 7 acres (including leased area of 5.5 acres) and consists of lawn, building, and asphalt parking. The site slopes is on a ridgeline and slopes down/away in all directions. These conditions are summarized in Table 1 below.

TABLE 1 - EXISTING SITE CONDITIONS AREA BREAKDOWN

Land Cover	Area (acres)	% of Total	Description
Impervious Area	-	-	-
Pervious Area	-	-	-
Total	**-**		

DEVELOPED SITE HYDROLOGY (PART B) (TO BE PROVIDED AT A LATER DATE)

This site falls into the category of Full Drainage Review according to Section 1.1.2 of the KCSWDM because the proposed site development will increase the existing total impervious area by greater than 2,000 SF.

The developed condition of the site are shown in Tables 2a and 2b. Both new and replaced impervious areas will require on-site BMPS's, storm water runoff treatment (water quality) and flow control (infiltration).

TABLE 2A - DEVELOPED SITE CONDITIONS AREA BREAKDOWN

Land Cover	Area (acres)	% of Total	Description
Impervious Area	-	-	-
Pervious Area	-	-	-
Hard Surface Area	-	-	-
Sub-Total	**-**		
Total	**-**		

TABLE 2B – TOTAL EFFECTIVE SURFACES

Land Cover	Area (acres)	% of Total	Description
Effective Impervious Area	-	-	-
PGIS	-		
NPGIS	-		
Effective Pervious Area	-	-	-
PGPS	-		
NPGPS	-		
Sub-Total	**-**		
Total	**-**		

Flow Control and Water Quality Area Bypass

Due to the existing paving that will be maintained and expanded onsite it is likely that the project will use compensatory area to use onsite BMP's efficiently.

TABLE 3 - FLOW CONTROL AND WATER QUALITY COMPENSATORY AREAS

Swapped Areas	Land Cover	Area (AC)	Description
-	-	-	-
	-	-	-
	Total	**-**	
-	-	-	-
	-	-	-
	Total	**-**	

PERFORMANCE STANDARDS (PART C)

To be provided at a later date.

FLOW CONTROL SYSTEMS (PART D)

To be provided at a later date.

WATER QUALITY SYSTEM (PART E)

To be provided at a later date.

Spill Control

Spill control is required for projects constructing or replacing onsite pipe systems that receive runoff from pollution-generating surfaces such as parking lots (1.2.4-G). Spill control measures are intended to temporarily detain oil or other floatable pollutants and prevent them from entering the downstream storm system (4.2.1). Spill control will be provided by two control risers located in each of the inlet catch basins directly upstream from the various discharge points. The control riser will be designed per KCSWDM section 5.3.4.1 and will consist of multiple orifice restrictors constructed on a tee section per Figure 5.3.4.A.

V. CONVEYANCE SYSTEM ANALYSIS AND DESIGN

This section discusses the criteria that will be used to analyze and design the proposed storm conveyance system.

STANDARD REQUIREMENTS (BASED ON KCSWDM AND SAO):

1. ***Facilities must convey the 100-year flow without overtopping the crown of the roadway, flooding buildings, and if sheet flow occurs it must pass through a drainage easement.*** The proposed facilities will be designed to accommodate proposed flows up to and including the 100-year design storm event.

2. ***New pipe systems and culverts must convey the 25-year flow with at least 0.5 feet of freeboard. (1.2.4-1).*** The new pipe systems will be designed to convey the 25-year flow with at least 0.5 feet of freeboard. The supporting calculations will provided in the T.I.R.

3. ***Bridges must convey the 100-year flow and provide a minimum of two feet, varying up to six feet, of clearance based on 25% of the mean channel width. (1.2.4-2)(4.3.5-6). N/A*** This project does not propose a bridge.

4. ***Drainage ditches must convey the 25-year flow with 0.5 feet of freeboard and the 100-year flow without overtopping. (1.2.4-2).*** Drainage ditches will be designed to accommodate this requirement. Calculations will be provided in the final TIR.

5. ***Floodplain Crossings must not increase the base flood elevation by more than 0.01 feet [41(83.C)] and shall not reduce the flood storage volume [37(82.A)]. Piers shall not be constructed in the FEMA floodway. [41(83.F.1)].*** There are no floodplain crossings associated with the construction of this project.

6. ***Stream Crossings shall require a bridge for class 1 streams that does not disturb or banks. For type 2 and type 3 steams, open bottom culverts or other method may be used that will not harm the stream or inhibit fish passage. [60(95.B)].*** There are no stream crossings associated with the construction of this project.

7. ***Discharge at natural location is required and must produce no significant impacts to the downstream property (1.2.1-1).*** The project discharges to the natural location, mirroring current conditions.

Detailed information and calculations will be included in the T.I.R submittal for the grading permit.

On-site Conveyance

Conveyance calculations and figures will be located in the T.I.R submittal for the grading permit.

Existing Conditions:

There is no existing conveyance system on site. All runoff currently infiltrates onsite or sheet flows off site.

Developed Storm system description:

The proposed storm system will largely utilize sheet flow to collect runoff and convey it to filtration facilities.

Outfalls

All stormwater runoff is infiltrated on site so the energy dissipation requirements of 1.2.3-3 do not apply.

VI. SPECIAL REPORTS AND STUDIES

1. Geotechnical Recommendations & Geologically Hazardous areas Assessment Kenmore, Washington. Prepared by PanGEO, Inc. June, 2016.

VII. OTHER PERMITS

This project will require a building permit and grading permit from City of Kenmore.

VIII. CSWPPP ANALYSIS AND DESIGN

This section lists the requirements that will be used when designing the TESC plan for this site. A copy of the Draft SWPPP has been included.

STANDARD REQUIREMENTS

This section lists the requirements that will be used when designing the TESC plan for this site. A copy of the SWPPP will be included in the T.I.R which will be submitted for the grading permit.

Standard Requirements

Erosion/Sedimentation Plan shall include the following:

1. ***Facilities required include: stabilized construction entrance, sedimentation pond, interceptor swales, filter fabric fencing. (1.2.5-1).*** The project will provide a stabilized construction entrance, filter fabric fencing, a sediment storage facility, and interceptor swales.

2. ***Timing – For the period between November 1 through March 1 disturbed areas greater than 5,000 square feet left undisturbed for more than 12 hours must be covered with mulch, sodding, or plastic covering. A construction phasing plan shall be provided to ensure that erosion control measures are installed prior to clearing and grading. (1.2.5-1).*** Notes addressing each of these items will be placed on the civil engineering plans.

3. ***Planning – Plan shall limit tributary drainage to an area to be cleared and graded. Delineate dimension, stake and flag clearing limits (1.2.5-1).*** The clearing limits have been indicated on the TESC plan. Notes addressing this item have been placed on the civil engineering plans.

4. ***Revegetation – Revegetate areas to be cleared as soon as practicable after grading. (1.2.5-1).*** Notes addressing this item have been placed on the civil engineering plans.

5. ***SWPP Plan.*** A SWPPP will be prepared for construction. The contractor will take ownership of this SWPPP during construction.

IX. BOND QUANTITY, FACILITY SUMMARIES, AND DECLARATION OF COVENANT

Bond Quantity Worksheets

Bond Quantity worksheets will be submitted with the TIR.

Flow Control and Water Quality Facility Summary Sheet and Sketch

Water quality and flow control facility summaries will be submitted to the City of Kenmore.

Declaration of Covenant for Privately Maintained Flow Control and WQ Facilities

A Declaration of Covenant for the proposed storm facilities will be recorded with the City of Kenmore.

X. OPERATION AND MAINTENANCE MANUAL

STANDARD MAINTENANCE

Per standards set forth in the King County Surface Water Design Manual, the owner will maintain facilities. Sections of the King County Storm Water Management Design Manual outlining the Operations and Maintenance of these facilities have been included in this section on the following pages.

XI. APPENDIX A

ENGINEERING CALCULATIONS (TO BE PROVIDED AT A LATER DATE)