

**Critical Aquifer Recharge Area  
Level 1 Hydrogeological Report**

**La Center Development**

**La Center, Washington**

**April 11, 2024**

Geotechnical ■ Environmental ■ Special Inspections

**Columbia West**  
Engineering, Inc





April 11, 2024

Timberland, Inc.  
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Attn: Luke Sasse

**Re: Critical Aquifer Recharge Area  
Level 1 Hydrogeological Report  
La Center Development  
La Center, Washington  
CWE Project: Timberland-1-02-01**

Columbia West is pleased to present this Critical Aquifer Recharge Area Level 1 Hydrogeological Report for the proposed La Center Development located in La Center, Washington. Our services were conducted in accordance with our proposal dated February 28, 2024 and executed on February 29, 2024.

We appreciate the opportunity to work on the project. Please contact us if you have any questions regarding this document.

Sincerely,  
Columbia West Engineering, Inc.



Terry Rice  
Environmental Project Manager



Lance V. Lehto, PE, GE  
President

TTR:LVL:glw

Document ID: Timberland-1-02-01-041124-envrcara



## EXECUTIVE SUMMARY

This executive summary presents the environmental considerations associated with the proposed La Center Development located in La Center, Washington. Our conclusions and recommendations are based upon the information presented in this report and proposed development information provided by the design team. Detailed discussion of the environmental considerations summarized here is presented in respective sections of the report.

- Due to the location and susceptibility and/or vulnerability of groundwaters underlying aquifer recharge areas to contamination, and recognizing the importance of such groundwaters as sources of public water supply, a CARA Level 1 Hydrogeological Report (CARA report) is required by La Center Municipal Code (LCMC), Section 18.300.90.
- To lower potential risk of groundwater contamination, Best Management Practices (BMPs) as outlined in Section 5.0 should be followed.
- Preliminary plans show that stormwater will be collected, treated, and discharged offsite. Stormwater disposal via subsurface infiltration is not proposed. Provided that Spill Prevention and Response Measures as outlined in Section 7.0 are followed, onsite contaminants and hazardous materials pose a limited risk to potential groundwater contamination.
- Based upon Columbia West's review of the site hydrogeology, proposed site development plans and the assessment described herein, it is our opinion that implementation of this CARA report, design and installation of stormwater management systems in accordance with the *Stormwater Management Manual for the Puget Sound Basin* (Puget Sound Manual) and adherence to maintenance requirements outlined in the Puget Sound Manual and Clark County Stormwater Manual will result in limited potential for environmental contamination or degradation of groundwater.



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**CRITICAL AQUIFER RECHARGE AREA  
LEVEL 1 HYDROGEOLOGICAL REPORT  
LA CENTER DEVELOPMENT  
LA CENTER, WASHINGTON**

## **1.0 INTRODUCTION**

Columbia West Engineering, Inc. was retained to prepare a Critical Aquifer Recharge Area (CARA) Level 1 Hydrogeological Report for the proposed commercial development on portions of Parcel Number 209708000 and Parcel Number 209703000 in La Center, Washington. Based upon information provided by the client, proposed development on the subject property consists of new commercial buildings, a single-story restaurant/retail building, a 5-story hotel, private paved parking lots and drive aisles, stormwater management facilities, and essential underground utilities. Due to the site's location in a Category 1 aquifer recharge area, a CARA Level 1 Hydrogeological Report is required per La Center Municipal Code (LCMC) 18.300.090(1), *Category I Aquifer Recharge Areas*.

This CARA report has been prepared in accordance with City of La Center requirements and summarizes hydrogeologic information, stormwater treatment, Best Management Practices (BMPs), and describes how the risk of degradation of groundwater will be limited.

The purpose of this CARA report is to identify procedures, processes, and protective and mitigative methods that will protect public health, safety, and welfare by limiting groundwater degradation and where possible, enhance the quality and quantity of groundwater which will be, or might likely be, used in the future for drinking water, agricultural use, or business purposes. The CARA report presents guidelines, procedures, and methods to reduce or limit groundwater degradation from proposed activities conducted onsite. The CARA report also establishes emergency response guidelines to minimize impacts to the environment in the event of a release.

## **1.1 SCOPE OF SERVICES**

The scope of services for this CARA report consists of the following items:

### **Site Reconnaissance**

Site reconnaissance, consisting of visual and physical observation of the subject site, was conducted to identify current conditions and potential issues.

### **Interviews and Correspondence**

Interviews and correspondence were conducted with PLS Engineering, the project site planner and civil engineer, and Timberland, Inc., the project developer. The purpose of interviewing knowledgeable personnel was to obtain information regarding proposed development design and expected material and product use at the subject property.

### **Evaluation and Report Preparation**

This report was prepared in accordance with LCMC 18.300.090(1), *Critical Aquifer Recharge Areas* and is subject to the limitations expressed in Section 7.0, *Conclusion and Limitations* and Appendix B, *Report Limitations and Important Information*. The CARA report outlines procedures that follow the *State of Washington's Growth Management Act, Section 36.70A.060, Group A Public Water Supplies, Section 246-290-135 Washington Administrative Code (WAC), Groundwater*



*Management Areas and Programs, Chapter 173-100 WAC, Water Quality Standards for Groundwater of the State of Washington, Section 173-200-090 WAC, and Dangerous Waste Regulations, Chapter 173-303 WAC.*

## **2.0 SITE DESCRIPTION**

### **2.1 LOCATION AND LEGAL DESCRIPTION**

As indicated on Figures 1 and 2, the subject property is located southeast of the intersection NW La Center Road and NW Paradise Park Road in La Center, Washington. The site is comprised of portions of Parcel Number 209708000 and Parcel Number 209703000 encompassing approximately 3.36 acres. A preliminary site plan provided by PLS Engineering is shown on Figure 3. The proposed development area is bounded by NW La Center Road to the north, undeveloped properties to the east and south, and NW Paradise Park Road to the west. The approximate latitude and longitude are N 45.852261° and W -122.699250°, and the legal description is a portion of the NW ¼ of Section 9, T4N, R1E, Willamette Meridian. The regulatory jurisdictional agency is the City of La Center.

### **2.2 GENERAL SITE SETTING AND PROPOSED DEVELOPMENT**

Field observations and review of site topographic mapping indicate that the project area modestly slopes to the east with grades ranging from 0 to 10 percent. Elevations within the proposed development area range from approximately 268 to 224 feet (NAVD88). The site is undeveloped and unoccupied. The property contains graveled areas with some truck and equipment parking.

Review of preliminary development plans indicates that proposed development will consist of a new stormwater catch basins, piping, a stormwater management and treatment system, as well as construction of new commercial buildings and associated parking. Proposed buildings include a single-story restaurant/retail building and a 5-story hotel. No onsite stormwater disposal is proposed at this time. This report is based upon proposed development as described above and may not be applicable if modified. A proposed site map with buildings, paved areas, and stormwater collection, conveyance systems, and treatment areas is shown on Figure 3, *Site Development Plan*.

No proposed temporary construction dewatering wells or other resource wells are planned as part of site development.

### **2.3 SITE ACTIVITIES**

As described previously, the purpose of this CARA report is to assess groundwater information and identify stormwater treatment methods and BMPs that will reduce or limit groundwater degradation from proposed commercial/industrial business practices conducted onsite. Based on correspondence with the design team, Columbia West understands paved areas will be subject to vehicle parking and regular vehicle traffic to the proposed buildings.

### **2.4 SITE SOIL AND GROUNDWATER CHARACTERISTICS**

Columbia West conducted site research and a review of literature to study site geology, near-surface soils, and hydrology and groundwater conditions as they pertain to subsurface conditions at the subject site.

Research and interviews did not indicate any wells on the subject site.



### 2.4.1 Regional Geology and Site Soil Conditions

The subject site lies within the Willamette Valley/Puget Sound Lowland, a wide physiographic depression flanked by the mountainous Coast Range on the west and the Cascade Range on the east. Inclined or uplifted structural zones within the Willamette Valley/Puget Sound Lowland constitute highland areas and depressed structural zones form sediment-filled basins. The site is located in the northern portion of the Portland/Vancouver Basin, an open, somewhat elliptical, northwest-trending syncline approximately 60 miles wide.

According to the *Geological Map of the Ridgefield Quadrangle, Clark County, Washington, and Multnomah County, Oregon, (U.S. Geological Survey Scientific Investigations Map 2844)*, near-surface soils are expected to consist of upper-Pleistocene, fine-textured, rhythmically-bedded periglacial deposits derived from catastrophic outburst floods of Glacial Lake Missoula (Qfs). Surficial flood deposits are underlain by an unnamed, Pleistocene to Pliocene, semi-consolidated, pebble to cobble conglomerate (QTc) and Miocene, poorly indurated mudstone, siltstone, and carbonaceous sandstone known as the Sandy River Mudstone formation (Tsr). Historic geologic mapping has included the unnamed conglomerate with the Troutdale Formation, a water-bearing, poorly-indurated pebble and cobble conglomerate. However, current classification differentiates the two units based on age of emplacement and constituent clast lithology. Both the unnamed conglomerate and the Sandy River Mudstone are mapped as outcrops along the ravine side slopes east of the subject site.

The *Web Soil Survey* (USDA, NRCS, 2024 Website) identifies surface soils primarily as Gee silt loam or Odne silt loam. Gee and Odne series soils are fine-textured sands, silts, and clays with very low permeability, high water capacity, and low shear strength. Gee and Odne soils have moderate shrink-swell potential and a slight erosion hazard based primarily upon slope grade. Sites mantled with fine textured silts and clays are generally less susceptible to groundwater contamination due to low infiltration rates and limited migratory contaminate pathways.

### 2.4.2 Site Hydrology and Groundwater Conditions

There are four primary hydrogeologic units identified in the region: (1) a surficial, unconsolidated sedimentary aquifer; (2) the Upper Troutdale Aquifer; (3) Lower Troutdale Aquifer, which may also be called the Troutdale Sandstone Aquifer, and (4) a deeper aquifer, known as the Sand and Gravel Aquifer.

Columbia West reviewed well logs published by Washington Department of Ecology and according to information evaluated, the depth of the unconfined unconsolidated sedimentary aquifer at the site is approximately 100 feet below ground surface (bgs) or deeper. Over 15 well logs in the area did not observe or record static water levels within 100 feet of ground surface. Based on surface topography and information reviewed, groundwater flow direction is generally to the northwest. Additional well logs to the east, located near McCormick Creek at lower elevations of approximately 90 feet amsl, report groundwater as shallow as 16 feet below ground surface. These wells likely draw from the shallow, unconfined groundwater table within unconsolidated sedimentary deposits. Groundwater levels are also often subject to seasonal variance and may rise during extended periods of increased precipitation. Perched groundwater may also be present in localized areas.



The Upper Troutdale Aquifer and other aquifers are shown on Figure 4, *Hydrogeologic Cross Section* obtained from Pacific Groundwater Group (PGG) Exhibit 3-2, *Salmon Creek Basin Management Plan, 2002*. Groundwater flow direction of the Upper Troutdale Aquifer is likely toward the west at a slight gradient. The Lower Troutdale Aquifer underlies the Upper Troutdale Aquifer, separated by a confining unit. Some deeper wells may be screened in the Lower Troutdale Aquifer or the Sand and Gravel Aquifer, which underlies the Lower Troutdale Aquifer separated by a confining unit.

Depths of wells listed as domestic or primarily used for drinking water purposes in the site vicinity vary from approximately 168 to 338 feet bgs depending upon the location, elevation, and screened interval of the well. These wells are typically screened in the second hydrogeological unit below ground surface (i.e., the Upper Troutdale Aquifer), although some may be screened in the unconsolidated sedimentary aquifer. Other wells near the site may be screened in lower hydrogeological units (i.e., the Lower Troutdale Aquifer or the Sand and Gravel Aquifer).

#### **2.4.3 Wellhead Protection Areas**

According to review of Washington Department of Health (DoH) Source Water Assessment Program (SWAP) mapping, the subject property is located within a 5-year groundwater protection area of public wells. The source wells are Clark Public Utilities Source Number 66 located approximately 1.3 miles northwest of the site.

#### **2.5 SITE RECONNAISSANCE**

Columbia West personnel conducted physical and visual reconnaissance of the subject site on March 16, 2024 from the west and north property boundaries. The objective of site reconnaissance was to observe site conditions, observe geomorphic, topographic and hydrogeologic characteristics, and obtain relevant site information.

#### **2.6 IMPERVIOUS AREA**

Impervious area is defined as area preventing or prohibiting the infiltration of rain and stormwater, and includes buildings, paved areas, concrete sidewalks, etc. Impervious ground surfaces may act as a barrier and decrease the risk of subsurface contamination, but may increase the potential for impacted stormwater runoff. According to preliminary site plans provided by the design team, impervious surface areas associated with the proposed development are anticipated to occupy approximately three acres.

##### **2.6.1 Stormwater Drainage**

Stormwater from the property is anticipated to drain to conveyance, treatment, storage, and stormwater management facilities designed in accordance with the Puget Sound Manual and the *Clark County Stormwater Manual*. Based upon review of preliminary site plans, site research, and subsurface exploration, onsite stormwater management will likely consist of collection systems, catch basins, piping, StormFilter vaults with StormFilter ZPG cartridges or alternative cartridges for treatment, and offsite discharge to the City of La Center or Clark County's storm sewer system. No onsite stormwater infiltration is planned.

#### **3.0 ONSITE SIGNIFICANT MATERIALS**

Significant materials are products or chemicals that could cause undue harm to the environment if spilled, uncontrollably released, or exposed. Materials include gasoline, diesel fuel, lube oil, waste



oils, automotive fluids, and other hydrocarbon products, and other chemicals that have the potential to impact stormwater discharges or migrate to groundwater.

Based upon the proposed end use, significant materials may be used and stored at the subject site. Significant materials should be stored indoors or in approved tanks. A list of onsite significant materials and SDSs or MSDS forms should be maintained onsite. Disposal of significant materials should be conducted by an approved offsite contractor. Garbage, recycling, and storage bins should be covered to reduce exposure of raw materials or chemicals from stormwater that could leach to surface water or groundwater.

#### **4.0 POTENTIAL CONTAMINANT RELEASES**

This section discusses reducing the risk of potential releases of hazardous or petroleum products to public waters or the ground. Diligent awareness and preparedness measures assist in early identification of potential issues that could result in an unanticipated accidental release. Verification of proper functioning equipment and disposal protocol also assist in reducing potential for releases. Appropriate spill response and control measures identified in Section 7.0, *Spill Prevention and Response* outline means and techniques to mitigate accidental releases.

The following list identifies several potential issues or actions that if not controlled or adequately addressed, could result in elevated risk of accidental release:

- Damaged containers
- Drum or container lids loose or not present
- Outdoor work or repair
- Collision
- Overfilling containers or tanks
- Leaking underground or above-ground storage tanks
- Other spills and leaks
- Fire

Under normal operating circumstances, the potential for release is minimal. Incidental drips and spills are usually of such small quantity that potential release is easily contained in small areas and may not pose a risk to groundwater. If not properly mitigated, addressed, or contained, overfilling, equipment malfunction, or collision could lead to release of petroleum products and potentially pose a risk of contact with groundwater. Incidental oil and petroleum products collected by the storm sewer system may be treated by the oil-water separator. Proper maintenance, operation, preparedness, and response procedures should be implemented to reduce the risk of release and mitigate the effects of potential incidents.

#### **5.0 STORMWATER TREATMENT AND BEST MANAGEMENT PRACTICES (BMPs)**

Best management practices, commonly referred to as "BMPs", are stormwater treatment methods, source controls, or operational practices that reduce, eliminate, or limit pollution from entering stormwater or groundwater. These measures assist in improving stormwater quality. BMPs are required by the City of La Center and Washington Department of Ecology to address site activities that have the potential to release pollutants into the stormwater conveyance system.

BMPs should be periodically evaluated and inspected to maintain compliance and protect water quality.



The following BMPs are recommended for the site:

### **Catch Basin Cleaning BMPs**

Catch basins should be inspected regularly to determine the appropriate course of action for cleaning, or more frequently during and after heavy precipitation events. Catch basins should be cleaned when deposit depth reaches 60 percent of sump depth (measured from bottom of basin to lowest pipe invert into or out of the basin) or 6 inches of separation between debris surface and invert. Sludge and debris should be removed from catch basins and properly disposed offsite.

### **Clean and Orderly Work Environment Program**

Practices should be implemented to provide a clean and orderly work environment. These general cleaning procedures play an important role in providing well-organized environmental management and effective overall site operation. These measures also assist in improving operational industrial processes at the facility. The clean and orderly work environment program consists of the following approaches and procedures, where applicable:

- Addressing spills quickly
- Maintaining well-organized work areas
- Implementing careful material storage practices
- Properly covering containers or drums
- Storing all liquid-containing drums inside, if possible
- Minimize outdoor storage of any containers
- Identifying chemical substances present in the workplace
- Labeling containers with name, type of substance, stock number, etc.
- Reducing or preventing stormwater run-on to containment or loading areas
- Recycling when possible
- Scheduling routine cleaning operations
- Protecting against vandalism

### **Hazardous Waste Disposal BMPs**

Proper hazardous waste disposal should be conducted if applicable. Waste should be managed, stored, manifested, and properly disposed in accordance with applicable regulations.

### **Landscaping and Vegetation Management BMPs**

Good landscaping and vegetation management should be employed to minimize erosion and stormwater pollutant discharge. Landscaping berms should slope away from impervious areas. This includes growing and maintaining appropriate plants and landscaping soils in addition to controlling weeds, bacteria or pests. Pesticides, herbicides, and fertilizers should be applied and stored in accordance with their instructions and federal law and should generally not be used in and around the detention facilities.

### **Preventative Maintenance**

Preventative maintenance programs verify that equipment, machinery, and infrastructure operate at optimum performance levels. Proper maintenance also minimizes potential for negative impacts to stormwater runoff by limiting the occurrence of significant or unforeseen detrimental events.



Preventative maintenance programs implemented at the facility should include:

- Evaluation through inspections of the stormwater catch basins, storm sewer system, monitoring locations, and discharge points;
- Inspection of areas where leaks or potential spills of significant material or industrial activities could impact stormwater runoff;
- Inspection of waste disposal;
- Inspection of areas that are eroding or areas that may need sweeping, cleaning, or maintenance; and
- Periodic cleaning, maintenance, or repair of materials and storage areas, staging areas, stormwater control measures, structures, stormwater conveyance systems, catch basins, manholes, and treatment systems.

The preventative maintenance program also includes proper vehicle, truck, and equipment maintenance to guard against spills or leaks of significant materials and sweeping of asphalt paved areas to reduce sediment and debris.

Additional information regarding Operational and Structural Source Control BMPs may be found in the *Stormwater Facility Operations and Maintenance* of the *Clark County Stormwater Manual*.

#### **Significant Materials Secondary Containment**

Secondary containment consists of storing significant materials under cover, indoors, or in containers providing redundant protection and containment with the capacity to hold the volumes of original containers. These secondary containment measures limit potential for soil, stormwater, or groundwater pollution.

#### **Spill Prevention and Response Measures Kits**

Spill prevention and response measures kits should be maintained at the facility to mitigate water quality impacts in the event of a spill or leak. The spill response kits should meet the minimum required spill clean-up materials and consist of granular hydrocarbon-absorbent material, booms, pads, and a storm drain plug or cover kit.

#### **Spill Prevention and Response Measures Plan**

A spill prevention and response plan is described in Section 7.0, *Spill Prevention and Response*. This program describes specific response measures and reporting requirements for site spills or accidental releases of significant materials.

#### **StormFilter Vault with StormFilter ZPG cartridges**

A StormFilter vault system captures stormwater runoff from impervious areas, including parking lots, that may have contamination and treats it with StormFilter ZPG or alternative cartridges before discharging. Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site. Maintenance activities may be required in the event of a chemical spill or due to excessive oils, fuels, or sediment loading from site erosion or extreme storms. The manufacturer recommends inspecting the system after major storm events. StormFilter vault with StormFilter ZPG or alternative cartridges system operations and maintenance recommendations are included in Appendix A.



## 6.0 EMPLOYEE EDUCATION AND AWARENESS TRAINING

Proper employee education and awareness training is essential for effective BMP implementation. Properly trained and informed employees are more capable of preventing stormwater and groundwater pollution and responding safely and effectively to potential emergency situations or spills.

Awareness training should consist of annual instruction, discussion and/or review of all parts of this CARA report, including the following items:

- Health and safety issues;
- Proper handling of significant materials;
- BMP implementation and effectiveness;
- Good housekeeping techniques and procedures;
- Proper spill prevention and response; and
- Maintenance, monitoring, and inspections.

## 7.0 SPILL PREVENTION AND RESPONSE

This section describes various spill prevention devices and methods to control potential releases of significant materials.

### Product Storage

- Significant materials, including fuels, lubricants, and oils should be stored in original or approved containers in accordance with manufacturer's recommendations in designated locations that are not likely to discharge to the storm sewer system.
- Properly dispose or recycle products or wastes in a manner acceptable to the manufacturer and local, state, and federal law.
- Maintain original labels and MSDS forms on file for petroleum products or other liquid products at the facility.

### Immediate Response

The owner, facility manager, or a supervisor should be immediately contacted in the event of a spill or accidental release of significant material into the environment. If the spill or chemical release is gasoline, diesel fuel, or other petroleum hydrocarbon product, attempts should be made to mitigate the extent of the spill immediately by utilizing spill kits and applying absorbent booms and pads.

If the spill or emergency situation could potentially cause impacts to stormwater, groundwater quality, or personal health, a qualified internal emergency response team or emergency response contractor should be notified. If the spill is a reportable quantity as defined by state or federal regulations, the appropriate agencies will be notified.

### 7.1 Emergency Spill Procedures

1. Determine if the site and spill area are safe to occupy. If not, retreat to a safe area.
2. Determine the source of leak or spill; immediately identify the character, exact source, amount, and area affected by the release.
3. Determine as much information as possible about the chemical or material spilled from shipping papers, MSDS forms, etc.
4. Evaluate the hazards of the release with the type, amount, and location of the spill.



5. Eliminate and continue to restrict all sources of ignition from spill area and areas downwind of the spill area.
6. Determine under what conditions the spill area is safe to enter.
7. Determine appropriate personal protective equipment (PPE). This may include gloves, boots, disposable suits, goggles, or respirators.
8. If safe, remedy and stop the source of the spill wherever and whenever possible.
9. Stop the flow and dike or contain the spill if possible.
10. Once flow is stopped, absorb the spilled material from pavement or ground with absorbent pads, booms, and/or absorbent granular material if practical.
11. Collect the contaminated material (i.e., absorbent pads, soil, etc.) and place in 55-gallon drums or other approved storage containers.
12. Use portable pumps or other equipment as needed to recover spilled material or to transfer material to a compatible storage container.
13. Decontaminate all personnel, PPE, including boots, gloves, respiratory equipment, before leaving the site.
14. Label and appropriately dispose of all contaminated materials and container drums with description of the waste, date, and other information in accordance with applicable hazardous waste rules and regulations.
15. Clean, restore, or replace spill response equipment and used spill kits, and return them to their original location.

## 7.2 SPILL REPORTING

The appropriate regulatory agencies should be notified within 24 hours of discovering a release. For catastrophic emergencies involving hazardous materials and potential impacts to human health, call 911 immediately. The following types of releases must be reported to Ecology within 24 hours (WAC 173 and 317):

- Above-ground releases to land that pose a potential threat to human health or the environment.
- Above-ground releases to water which result in a sheen on waters of the state.

The following regulatory agencies should be contacted in the event of an accidental spill or reportable quantity:

- **National Response Center - U.S. Environmental Protection Agency,  
1-800-424-8802**
- **Washington Department of Ecology - Emergency Management Division,  
Spills 1-800-258-5990 or 1-800-OILS-911**
- **Washington Department of Ecology - Southwest Region,  
360-407-6300**

The person responsible for notification of an accident should provide as much detailed information as possible.

## 8.0 FINDINGS

This CARA report identifies BMPs, source controls, operational controls, stormwater treatment measures, and spill prevention and response measures that will limit or minimize potential impacts



to onsite soils, surface water, and groundwater. Preliminary plans show that stormwater will be collected, treated, and discharged offsite and no designed stormwater will be infiltrated on site. Provided that spill prevention and response measures as outlined in Section 7.0 are followed, onsite contaminants and hazardous materials pose a limited risk to potential groundwater contamination.

Depths to groundwater primarily used for drinking water purposes in the site vicinity vary from approximately 168 to 338 feet depending upon the location, elevation, and screened interval of the well. These wells are typically screened in the second hydrogeological unit below ground surface (i.e., the Upper Troutdale Aquifer). Other wells near the site may be screened in lower hydrogeological units (i.e., the Lower Troutdale Aquifer or the Sand and Gravel Aquifer). Lower aquifers are overlain by thick partially consolidated and cemented sedimentary deposits with low to moderate permeability. The significant depths to well screen intervals, the presence of thick overburden deposits, and low permeability formations limit risk of potential groundwater contamination.

Based upon Columbia West's review of the site hydrogeology, proposed site development plans and the assessment described herein, it is our opinion that implementation of this CARA report, design and installation of stormwater management systems in accordance with The Puget Sound Manual, and adherence to maintenance requirements outlined in the The Puget Sound Manual and *Clark County Stormwater Manual* will result in limited potential for environmental contamination or degradation of groundwater.

## 9.0 CONCLUSION AND LIMITATIONS

Columbia West conducted a CARA Level 1 Hydrogeological Report in general accordance with LCMC 18.300.090(1), *Critical Aquifer Recharge Areas* and the scope of work identified in Section 1.1, *Scope of Services*. Project work was conducted in accordance with accepted professional engineering and consulting principles and practices.

This assessment did not include soil, water, or waste monitoring, sampling, exploratory subsurface boring, or laboratory analytical analysis. This assessment does not purport to address compliance with past or present environmental codes or regulations by subject property occupants and should not be construed as a legal opinion or document. Columbia West is not responsible for independent conclusions or recommendations made by others based on information presented in this report.

This report is based in part upon unsubstantiated information provided to Columbia West from third-party sources during interviews or written correspondence. Columbia West provides no warranty as to the validity of the information. This evaluation report is also based upon professional interpretations of acquired information relevant to the subject property at the time of investigation and the proposed future end use as described herein. This report should not be construed as a representative warranty of subsurface conditions.

This CARA report should be periodically reviewed and evaluated to determine its applicability and effectiveness. Significant changes or modifications to onsite activities may require revisions to BMPs and spill response measures.



Sincerely,  
Columbia West Engineering, Inc.



Terry Rice  
Environmental Project Manager



Lance V. Lehto, PE, GE  
President

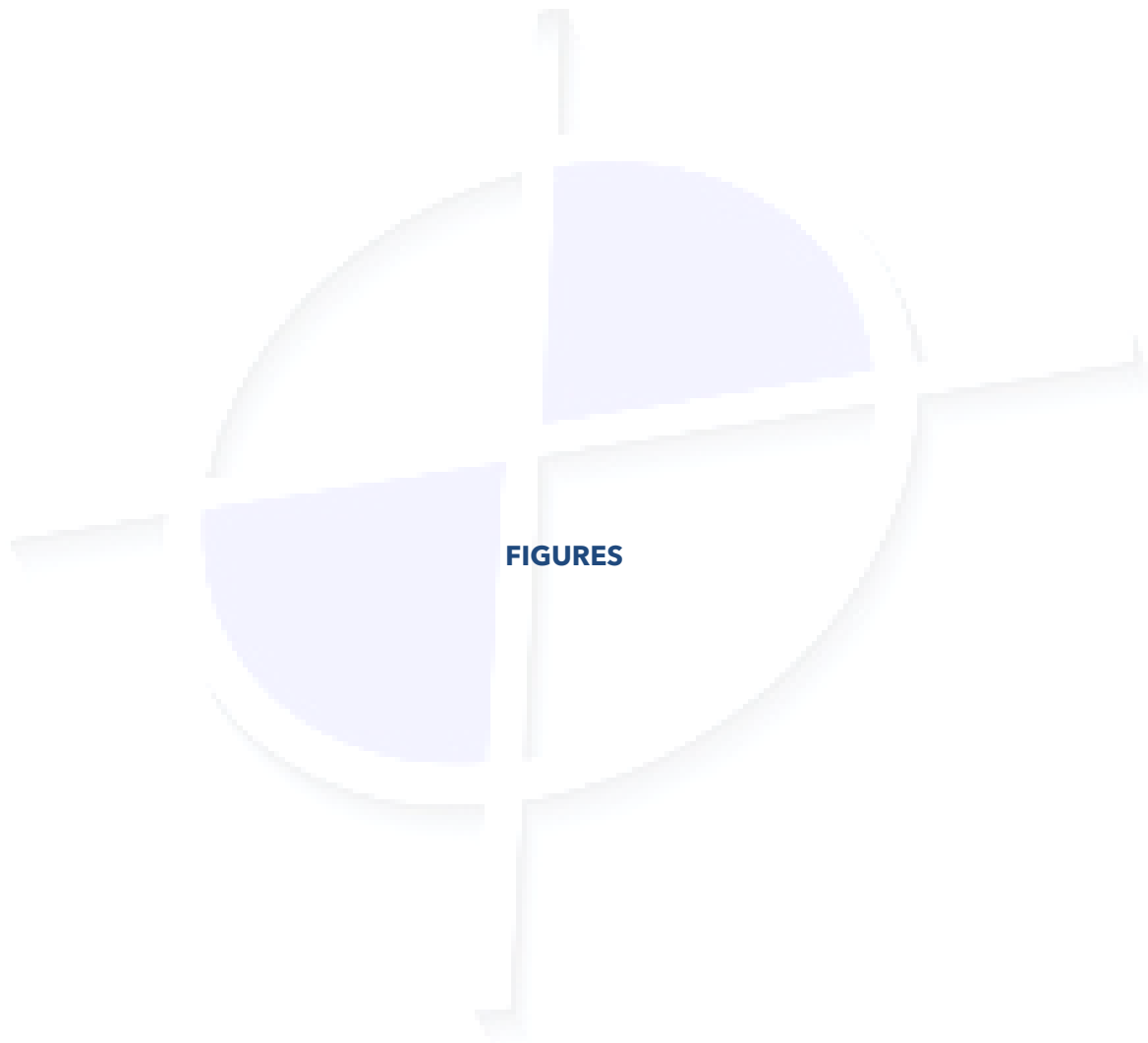
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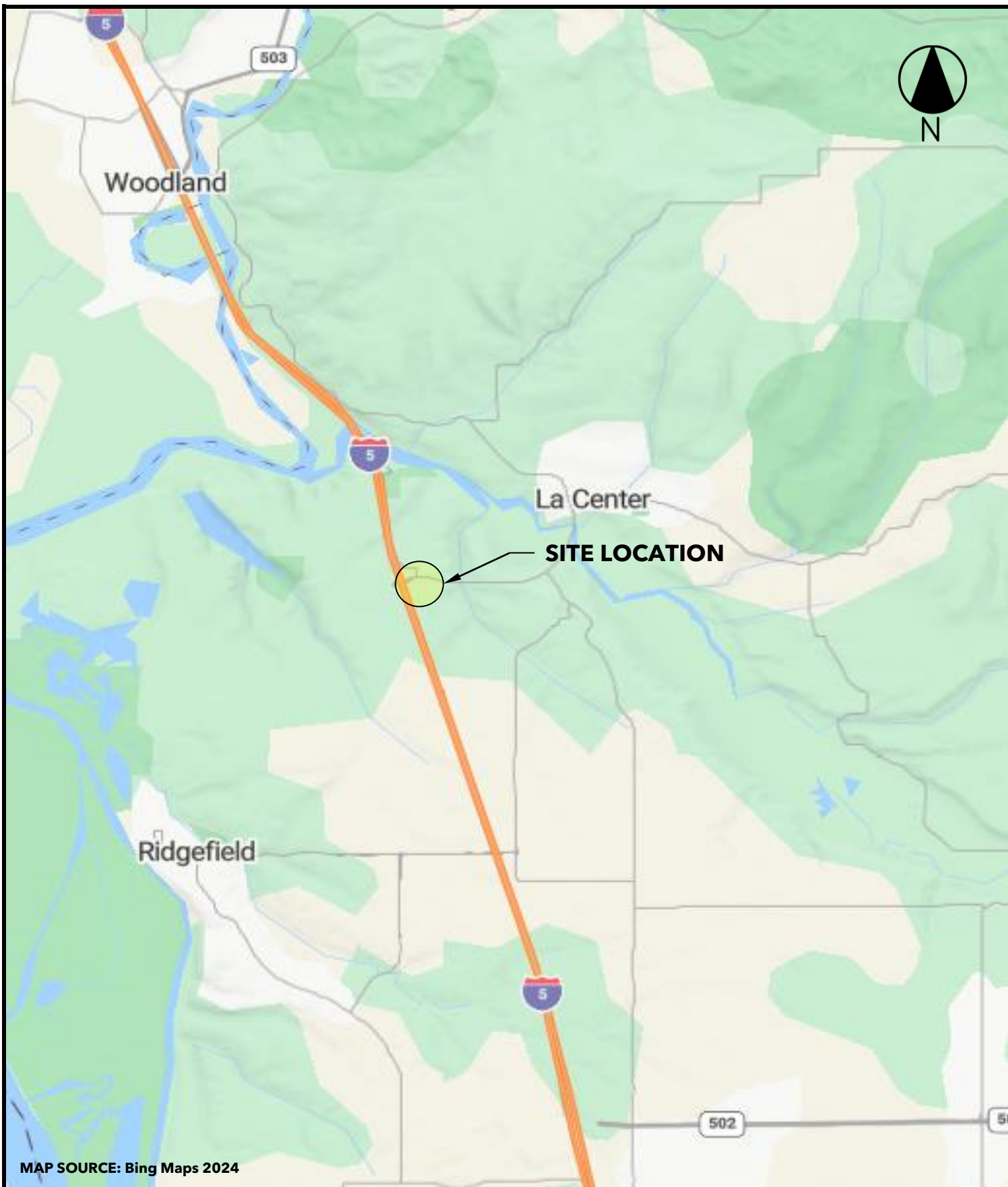
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16. *Washington Administrative Code (WAC) 173-340, Model Toxics Control Act Cleanup Regulation*, Washington Department of Ecology.
17. *Washington Administrative Code (WAC) 173-360A, Underground Storage Tank Regulations*.
18. *Web Soil Survey*, Natural Resources Conservation Service, United States Department of Agriculture 2024 website (<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>.)

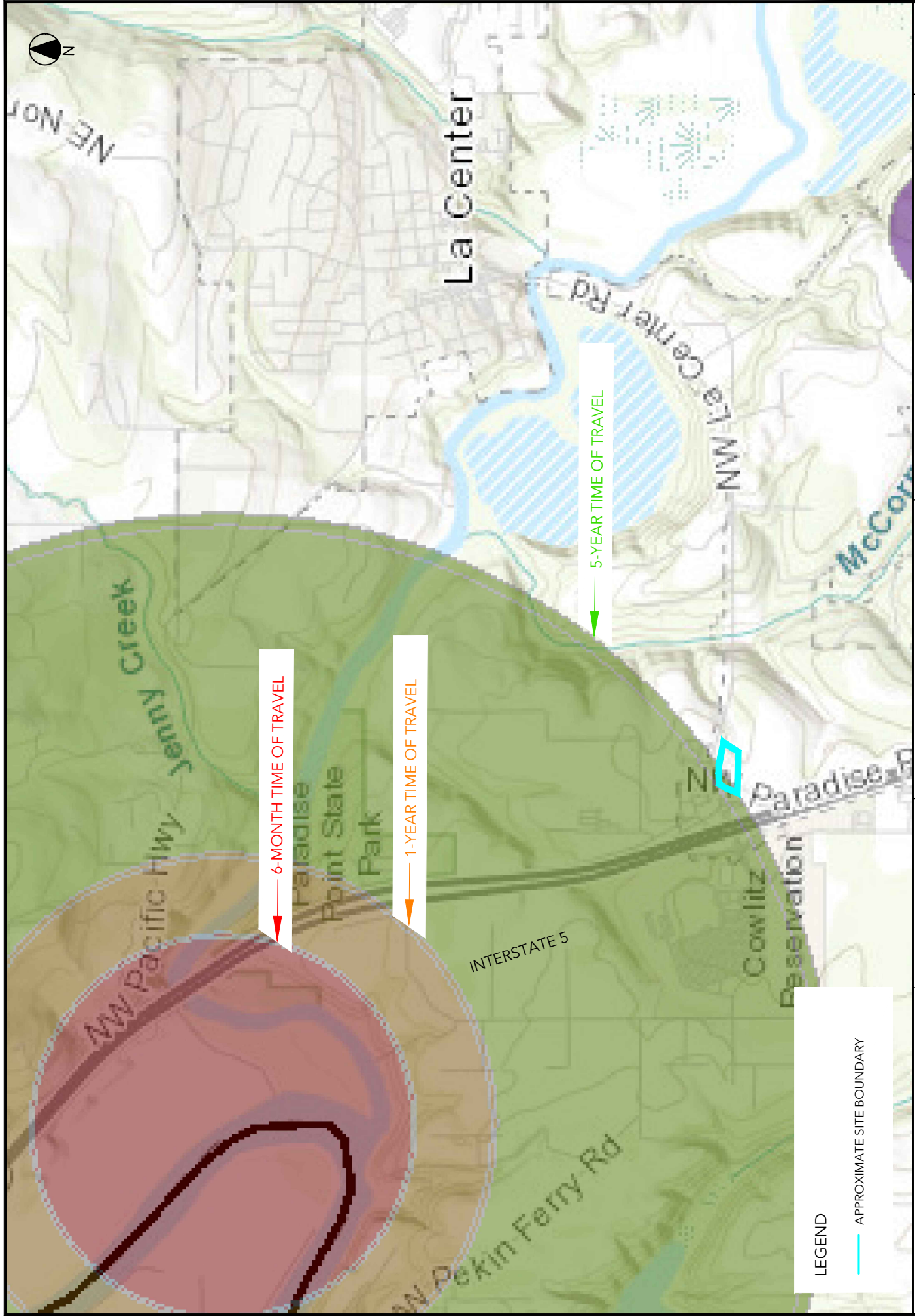












LEGEND

— APPROXIMATE SITE BOUNDARY



# Site Plan

Located in the SW 1/4 of Section 4, T4N, R1E, W.M.  
La Center, Washington

**APPLICANT:**  
Luxe Sazee  
9321 NE 72nd Ave Bldg C #7  
Vancouver, WA 98685  
PH: (360) 507-0026  
luxe@luxe.com

**OWNER:**  
John & Shanna Vanasse  
95000 NW 15th Avenue  
Vancouver, WA 98685

**CONSULTING ENGINEER:**  
PLS Engineering  
404 W. Evergreen Blvd.  
Vancouver, WA 98680  
PH: (360) 544-5519  
pls@plsengineering.com

## GENERAL NOTES

**SITE LOCATION:** Southwest quadrant of La Center Road and Paradise Park Road  
Parcel #1: 209708000

Public Water Functor = CO/C

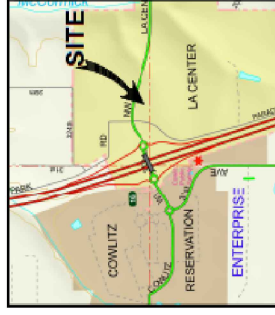
Public Sewer Functor = CO/C

Boundary and topographic survey data shown on the plan was prepared by PLS Engineering.

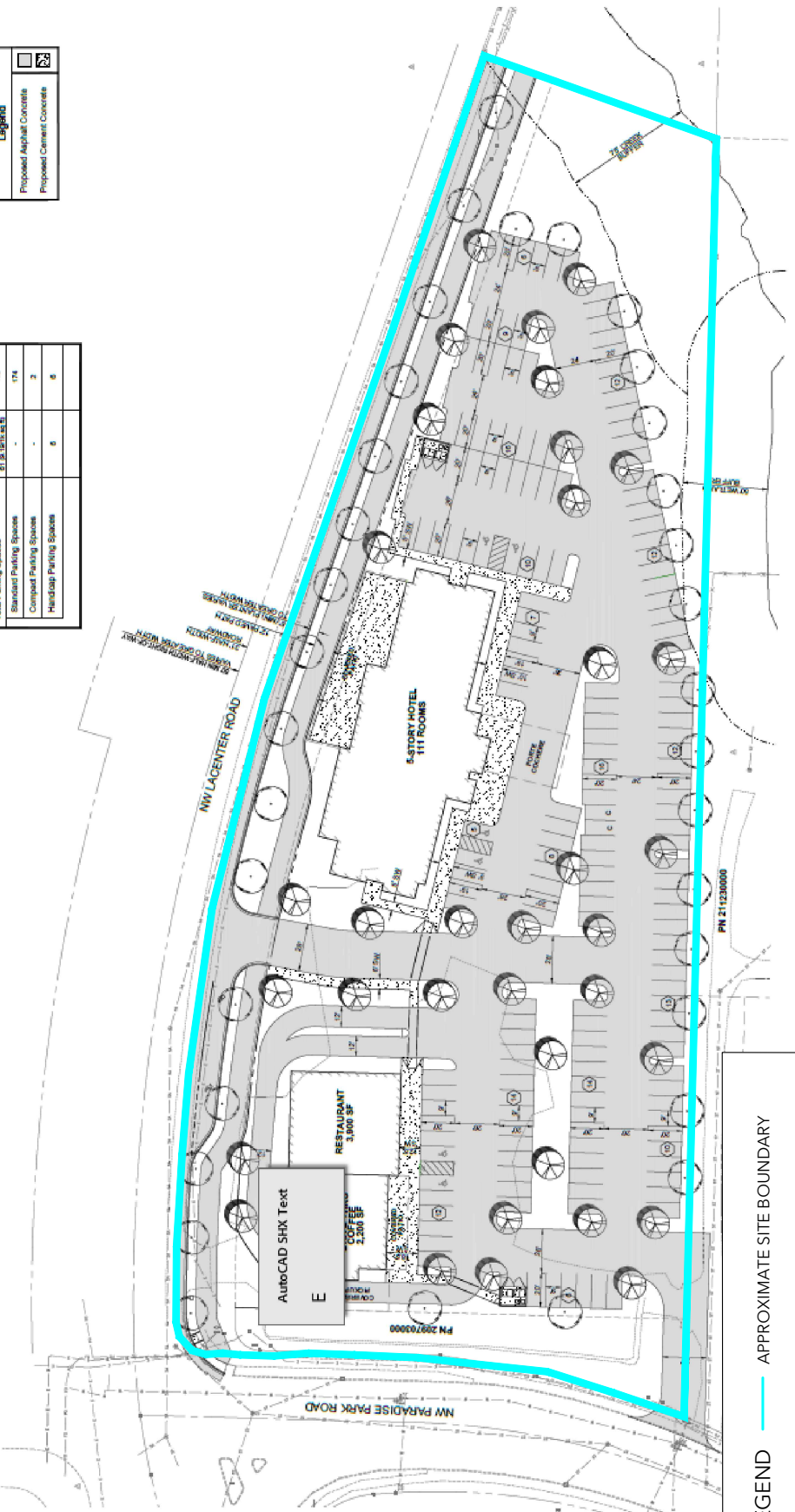
**BOUNDARY DATA:**  
The boundary data was derived from a 2004 EPOCH, Washington State Plane, South Zone, U.S. survey tied to the Washington State reference network (NAD83).

**Vertical Data:**  
Vertical data was derived from RTK data utilizing the Washington State reference network (NAD83).

SITE STATISTICS	
Zone - Junction Plan (JP)	
Existing Site Area	148,001 sq ft
Right of Way Dedication	1,389 sq ft
Right of Way Vacation	4,388 sq ft
Critical Area	12,348 sq ft
Developed Site Area	537,280 sq ft
Total Building SF	11,873 sq ft
Hotel	6,100 sq ft
Cafe / Restaurant	5,773 sq ft
Total Parking Spaces	121 (11 spaces)
Standard Parking Spaces	174
Compact Parking Spaces	2
Handicap Parking Spaces	6



VICINITY MAP  
NOT TO SCALE



LEGEND — APPROXIMATE SITE BOUNDARY

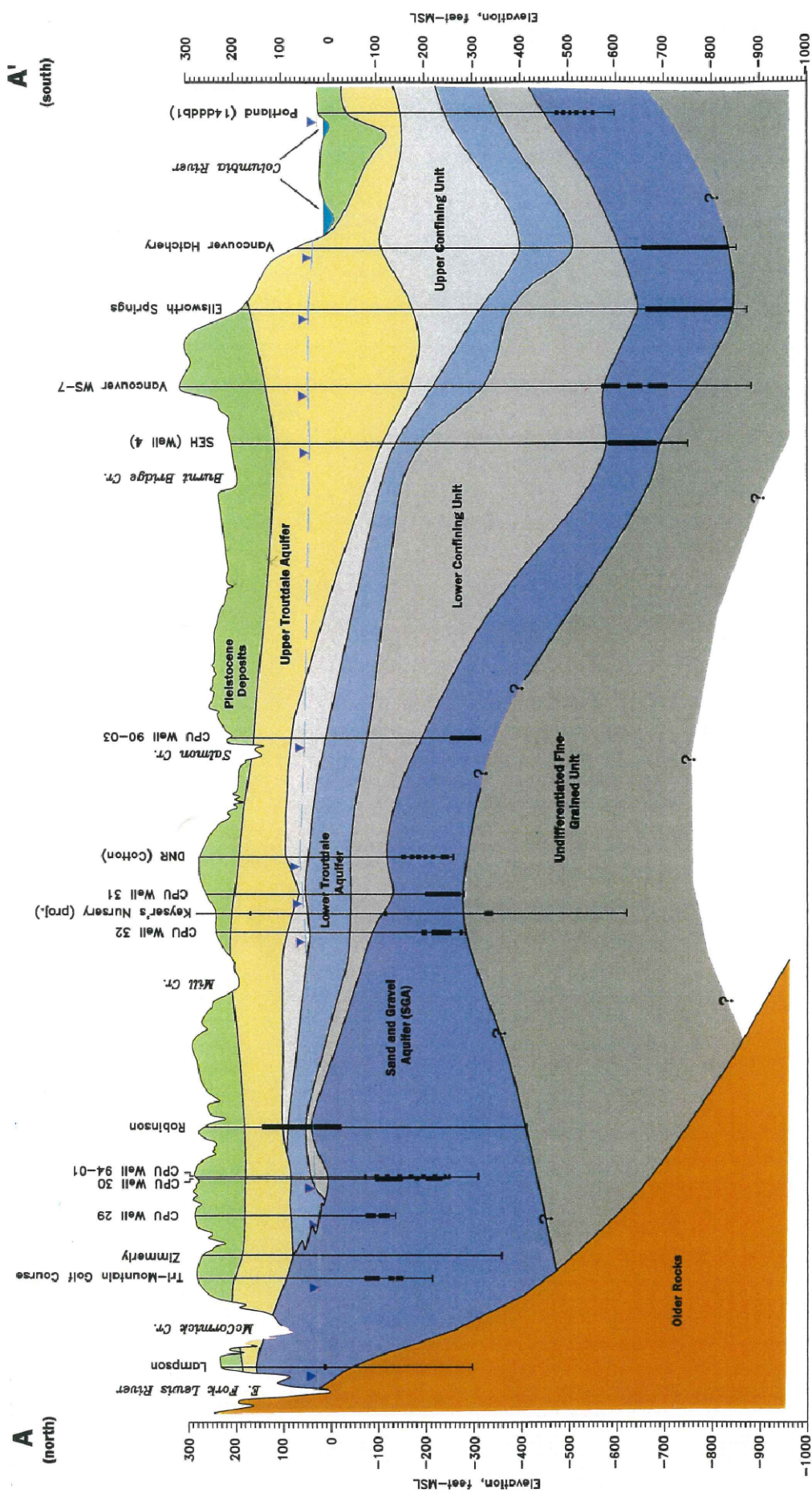


Job No: Timberland-1-02-1  
Date: 04/09/24  
Drawn: TTR  
Checked: LVL

SITE DEVELOPMENT PLAN  
LA CENTER DEVELOPMENT  
LA CENTER, WASHINGTON

NOTES:  
SITE LOCATION: SOUTHEAST OF THE INTERSECTION NW LA CENTER ROAD AND NW PARADISE PARK ROAD.  
THE SUBJECT PROPERTY CONTAINS TAX LOT 209708000 AND PORTIONS OF TAX LOT 209703000 TOTALING APPROXIMATELY 3.36 ACRES.  
BASE MAP PROVIDED BY PLS ENGINEERING.





**LEGEND**

- Pleistocene Deposits
- Upper Troutdale Aquifer
- Upper Confining Unit
- Lower Troutdale Aquifer
- Lower Confining Unit
- Sand and Gravel Aquifer (SGA)
- Undifferentiated Fine-Grained Unit
- Older Rocks

Well Water Level

Well Completion Interval

Piezometric Surface

Sand and Gravel Aquifer (SGA)

Horizontal Scale: 1" = 1 Mile

Vertical Exaggeration: X 52

**PGG**

Prepared for Clark Public Utilities by Pacific Groundwater Group

**SALMON CREEK BASIN MANAGEMENT PLAN**

**Exhibit 3-2**

**Hydrogeologic Cross Section A-A'**

Geotechnical = Environmental = Special Inspections

**Columbia West**

Engineering, Inc.

Job No: Timberland-1-02-1

Date: 04/09/24

Drawn: TTR

Checked: LVL

**HYDROGEOLOGIC CROSS SECTION**

**LA CENTER DEVELOPMENT**

**LA CENTER, WASHINGTON**

NOTES:

1. BASE MAP OBTAINED FROM PACIFIC GROUND WATER GROUP, SALMON CREEK BASIN MANAGEMENT PLAN, 2002.

**FIGURE 4**





**APPENDIX A**  
**Stormwater BMPs and Infrastructure and Facility Maintenance Information**



## StormFilter Inspection and Maintenance Procedures





## Maintenance Guidelines

The primary purpose of the Stormwater Management StormFilter® is to filter and prevent pollutants from entering our waterways. Like any effective filtration system, periodically these pollutants must be removed to restore the StormFilter to its full efficiency and effectiveness.

Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site. Maintenance activities may be required in the event of a chemical spill or due to excessive sediment loading from site erosion or extreme storms. It is a good practice to inspect the system after major storm events.

## Maintenance Procedures

Although there are many effective maintenance options, we believe the following procedure to be efficient, using common equipment and existing maintenance protocols. The following two-step procedure is recommended::

### 1. Inspection

- Inspection of the vault interior to determine the need for maintenance.

### 2. Maintenance

- Cartridge replacement
- Sediment removal

## Inspection and Maintenance Timing

At least one scheduled inspection should take place per year with maintenance following as warranted.

First, an inspection should be done before the winter season. During the inspection the need for maintenance should be determined and, if disposal during maintenance will be required, samples of the accumulated sediments and media should be obtained.

Second, if warranted, a maintenance (replacement of the filter cartridges and removal of accumulated sediments) should be performed during periods of dry weather.

In addition to these two activities, it is important to check the condition of the StormFilter unit after major storms for potential damage caused by high flows and for high sediment accumulation that may be caused by localized erosion in the drainage area. It may be necessary to adjust the inspection/maintenance schedule depending on the actual operating conditions encountered by the system. In general, inspection activities can be conducted at any time, and maintenance should occur, if warranted, during dryer months in late summer to early fall.

## Maintenance Frequency

The primary factor for determining frequency of maintenance for the StormFilter is sediment loading.

A properly functioning system will remove solids from water by trapping particulates in the porous structure of the filter media inside the cartridges. The flow through the system will naturally decrease as more and more particulates are trapped. Eventually the flow through the cartridges will be low enough to require replacement. It may be possible to extend the usable span of the cartridges by removing sediment from upstream trapping devices on a routine as-needed basis, in order to prevent material from being re-suspended and discharged to the StormFilter treatment system.

The average maintenance lifecycle is approximately 1-5 years. Site conditions greatly influence maintenance requirements. StormFilter units located in areas with erosion or active construction may need to be inspected and maintained more often than those with fully stabilized surface conditions.

Regulatory requirements or a chemical spill can shift maintenance timing as well. The maintenance frequency may be adjusted as additional monitoring information becomes available during the inspection program. Areas that develop known problems should be inspected more frequently than areas that demonstrate no problems, particularly after major storms. Ultimately, inspection and maintenance activities should be scheduled based on the historic records and characteristics of an individual StormFilter system or site. It is recommended that the site owner develop a database to properly manage StormFilter inspection and maintenance programs..







## Inspection Procedures

The primary goal of an inspection is to assess the condition of the cartridges relative to the level of visual sediment loading as it relates to decreased treatment capacity. It may be desirable to conduct this inspection during a storm to observe the relative flow through the filter cartridges. If the submerged cartridges are severely plugged, then typically large amounts of sediments will be present and very little flow will be discharged from the drainage pipes. If this is the case, then maintenance is warranted and the cartridges need to be replaced.

**Warning:** In the case of a spill, the worker should abort inspection activities until the proper guidance is obtained. Notify the local hazard control agency and Contech Engineered Solutions immediately.

To conduct an inspection:

**Important:** Inspection should be performed by a person who is familiar with the operation and configuration of the StormFilter treatment unit and the unit's role, relative to detention or retention facilities onsite.

1. If applicable, set up safety equipment to protect and notify surrounding vehicle and pedestrian traffic.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.
3. Open the access portals to the vault and allow the system vent.
4. Without entering the vault, visually inspect the inside of the unit, and note accumulations of liquids and solids.
5. Be sure to record the level of sediment build-up on the floor of the vault, in the forebay, and on top of the cartridges. If flow is occurring, note the flow of water per drainage pipe. Record all observations. Digital pictures are valuable for historical documentation.
6. Close and fasten the access portals.
7. Remove safety equipment.
8. If appropriate, make notes about the local drainage area relative to ongoing construction, erosion problems, or high loading of other materials to the system.
9. Discuss conditions that suggest maintenance and make decision as to whether or not maintenance is needed.

## Maintenance Decision Tree

The need for maintenance is typically based on results of the inspection. The following Maintenance Decision Tree should be used as a general guide. (Other factors, such as Regulatory Requirements, may need to be considered).

Please note Stormwater Management StormFilter devices installed downstream of, or integrated within, a stormwater storage facility typically have different operational parameters (i.e. draindown time). In these cases, the inspector must understand the relationship between the retention/detention facility and the treatment system by evaluating site specific civil engineering plans, or contacting the engineer of record, and make adjustments to the below guidance as necessary. Sediment deposition depths and patterns within the StormFilter are likely to be quite different compared to systems without upstream storage and therefore shouldn't be used exclusively to evaluate a need for maintenance.

1. Sediment loading on the vault floor.
  - a. If  $>4"$  of accumulated sediment, maintenance is required.
2. Sediment loading on top of the cartridge.
  - a. If  $>1/4"$  of accumulation, maintenance is required.
3. Submerged cartridges.
  - a. If  $>4"$  of static water above cartridge bottom for more than 24 hours after end of rain event, maintenance is required. (Catch basins have standing water in the cartridge bay.)
4. Plugged media.
  - a. While not required in all cases, inspection of the media within the cartridge may provide valuable additional information.
  - b. If pore space between media granules is absent, maintenance is required.
5. Bypass condition.
  - a. If inspection is conducted during an average rain fall event and StormFilter remains in bypass condition (water over the internal outlet baffle wall or submerged cartridges), maintenance is required.
6. Hazardous material release.
  - a. If hazardous material release (automotive fluids or other) is reported, maintenance is required.
7. Pronounced scum line.
  - a. If pronounced scum line (say  $\geq 1/4"$  thick) is present above top cap, maintenance is required.



## Maintenance

Depending on the configuration of the particular system, maintenance personnel will be required to enter the vault to perform the maintenance.

**Important:** If vault entry is required, OSHA rules for confined space entry must be followed.

Filter cartridge replacement should occur during dry weather. It may be necessary to plug the filter inlet pipe if base flows is occurring.

Replacement cartridges can be delivered to the site or customers facility. Information concerning how to obtain the replacement cartridges is available from Contech Engineered Solutions.

**Warning:** In the case of a spill, the maintenance personnel should abort maintenance activities until the proper guidance is obtained. Notify the local hazard control agency and Contech Engineered Solutions immediately.

To conduct cartridge replacement and sediment removal maintenance:

1. If applicable, set up safety equipment to protect maintenance personnel and pedestrians from site hazards.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.
3. Open the doors (access portals) to the vault and allow the system to vent.
4. Without entering the vault, give the inside of the unit, including components, a general condition inspection.
5. Make notes about the external and internal condition of the vault. Give particular attention to recording the level of sediment build-up on the floor of the vault, in the forebay, and on top of the internal components.
6. Using appropriate equipment offload the replacement cartridges (up to 150 lbs. each) and set aside.
7. Remove used cartridges from the vault using one of the following methods:

### Method 1:

- A. This activity will require that maintenance personnel enter the vault to remove the cartridges from the under drain manifold and place them under the vault opening for lifting (removal). Disconnect each filter cartridge from the underdrain connector by rotating counterclockwise 1/4 of a turn. Roll the loose cartridge, on edge, to a convenient spot beneath the vault access.

Using appropriate hoisting equipment, attach a cable from the boom, crane, or tripod to the loose cartridge. Contact Contech Engineered Solutions for suggested attachment devices.

- B. Remove the used cartridges (up to 250 lbs. each) from the vault.



**Important:** Care must be used to avoid damaging the cartridges during removal and installation. The cost of repairing components damaged during maintenance will be the responsibility of the owner.

- C. Set the used cartridge aside or load onto the hauling truck.
- D. Continue steps a through c until all cartridges have been removed.

### Method 2:

- A. This activity will require that maintenance personnel enter the vault to remove the cartridges from the under drain manifold and place them under the vault opening for lifting (removal). Disconnect each filter cartridge from the underdrain connector by rotating counterclockwise 1/4 of a turn. Roll the loose cartridge, on edge, to a convenient spot beneath the vault access.
- B. Unscrew the cartridge cap.
- C. Remove the cartridge hood and float.
- D. At location under structure access, tip the cartridge on its side.
- E. Empty the cartridge onto the vault floor. Reassemble the empty cartridge.
- F. Set the empty, used cartridge aside or load onto the hauling truck.
- G. Continue steps a through e until all cartridges have been removed.



8. Remove accumulated sediment from the floor of the vault and from the forebay. This can most effectively be accomplished by use of a vacuum truck.
9. Once the sediments are removed, assess the condition of the vault and the condition of the connectors.
10. Using the vacuum truck boom, crane, or tripod, lower and install the new cartridges. Once again, take care not to damage connections.
11. Close and fasten the door.
12. Remove safety equipment.
13. Finally, dispose of the accumulated materials in accordance with applicable regulations. Make arrangements to return the used **empty** cartridges to Contech Engineered Solutions.

## Related Maintenance Activities - Performed on an as-needed basis

StormFilter units are often just one of many structures in a more comprehensive stormwater drainage and treatment system.

In order for maintenance of the StormFilter to be successful, it is imperative that all other components be properly maintained. The maintenance/repair of upstream facilities should be carried out prior to StormFilter maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil loading, and discharges of inappropriate materials.

## Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads.

Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.





# Inspection Report

Date: \_\_\_\_\_ Personnel: \_\_\_\_\_

Location: \_\_\_\_\_ System Size: \_\_\_\_\_ Months in Service: \_\_\_\_\_

System Type: Vault ☐ Cast-In-Place ☐ Linear Catch Basin ☐ Manhole ☐ Other: \_\_\_\_\_

Sediment Thickness in Forebay: \_\_\_\_\_ Date: \_\_\_\_\_

Sediment Depth on Vault Floor: \_\_\_\_\_

Sediment Depth on Cartridge Top(s): \_\_\_\_\_

Structural Damage: \_\_\_\_\_

Estimated Flow from Drainage Pipes (if available): \_\_\_\_\_

Cartridges Submerged: Yes ☐ No ☐ Depth of Standing Water: \_\_\_\_\_

StormFilter Maintenance Activities (check off if done and give description)

☐ Trash and Debris Removal: \_\_\_\_\_

☐ Minor Structural Repairs: \_\_\_\_\_

☐ Drainage Area Report \_\_\_\_\_

Excessive Oil Loading: Yes ☐ No ☐ Source: \_\_\_\_\_

Sediment Accumulation on Pavement: Yes ☐ No ☐ Source: \_\_\_\_\_

Erosion of Landscaped Areas: Yes ☐ No ☐ Source: \_\_\_\_\_

Items Needing Further Work: \_\_\_\_\_

Owners should contact the local public works department and inquire about how the department disposes of their street waste residuals.

Other Comments:

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Review the condition reports from the previous inspection visits.



# StormFilter Maintenance Report

Date: \_\_\_\_\_ Personnel: \_\_\_\_\_

Location: \_\_\_\_\_ System Size: \_\_\_\_\_

System Type: Vault ☐ Cast-In-Place ☐ Linear Catch Basin ☐ Manhole ☐ Other: \_\_\_\_\_

List Safety Procedures and Equipment Used: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## System Observations

Months in Service: \_\_\_\_\_

Oil in Forebay (if present): Yes ☐ No ☐

Sediment Depth in Forebay (if present): \_\_\_\_\_

Sediment Depth on Vault Floor: \_\_\_\_\_

Sediment Depth on Cartridge Top(s): \_\_\_\_\_

Structural Damage: \_\_\_\_\_

## Drainage Area Report

Excessive Oil Loading: Yes ☐ No ☐ Source: \_\_\_\_\_

Sediment Accumulation on Pavement: Yes ☐ No ☐ Source: \_\_\_\_\_

Erosion of Landscaped Areas: Yes ☐ No ☐ Source: \_\_\_\_\_

## StormFilter Cartridge Replacement Maintenance Activities

Remove Trash and Debris: Yes ☐ No ☐ Details: \_\_\_\_\_

Replace Cartridges: Yes ☐ No ☐ Details: \_\_\_\_\_

Sediment Removed: Yes ☐ No ☐ Details: \_\_\_\_\_

Quantity of Sediment Removed (estimate?): \_\_\_\_\_

Minor Structural Repairs: Yes ☐ No ☐ Details: \_\_\_\_\_

Residuals (debris, sediment) Disposal Methods: \_\_\_\_\_

Notes:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_





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- Site-specific design support is available from our engineers.

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## **APPENDIX B**

### **REPORT LIMITATIONS AND IMPORTANT INFORMATION**

#### **Report Purpose, Use, and Standard of Care**

This report has been prepared in accordance with standard fundamental principles and practices of geotechnical engineering and/or environmental consulting, and in a manner consistent with the level of care and skill typical of currently practicing local engineers and consultants. This report has been prepared to meet the specific needs of specific individuals for the indicated site. It may not be adequate for use by other consultants, contractors, or engineers, or if change in project ownership has occurred. It should not be used for any other reason than its stated purpose without prior consultation with Columbia West Engineering, Inc. (Columbia West). It is a unique report and not applicable for any other site or project. If site conditions are altered, or if modifications to the project description or proposed plans are made after the date of this report, it may not be valid. Columbia West cannot accept responsibility for use of this report by other individuals for unauthorized purposes, or if problems occur resulting from changes in site conditions for which Columbia West was not aware or informed.

#### **Report Conclusions and Preliminary Nature**

This geotechnical or environmental report should be considered preliminary and summary in nature. The recommendations contained herein have been established by engineering interpretations of subsurface soils based upon conditions observed during site exploration. The exploration and associated laboratory analysis of collected representative samples identifies soil conditions at specific discreet locations. It is assumed that these conditions are indicative of actual conditions throughout the subject property. However, soil conditions may differ between tested locations at different seasonal times of the year, either by natural causes or human activity. Distinction between soil types may be more abrupt or gradual than indicated on the soil logs. This report is not intended to stand alone without understanding of concomitant instructions, correspondence, communication, or potential supplemental reports that may have been provided to the client.

Because this report is based upon observations obtained at the time of exploration, its adequacy may be compromised with time. This is particularly relevant in the case of natural disasters, earthquakes, floods, or other significant events. Report conclusions or interpretations may also be subject to revision if significant development or other manmade impacts occur within or in proximity to the subject property. Groundwater conditions, if presented in this report, reflect observed conditions at the time of investigation. These conditions may change annually, seasonally or as a result of adjacent development.

#### **Additional Investigation and Construction QA/QC**

Columbia West should be consulted prior to construction to assess whether additional investigation above and beyond that presented in this report is necessary. Even slight variations in soil or site conditions may produce impacts to the performance of structural facilities if not adequately addressed. This underscores the importance of diligent QA/QC construction observation and testing to verify soil conditions do not differ materially or significantly from the interpreted conditions utilized for preparation of this report.



Therefore, this report contains several recommendations for field observation and testing by Columbia West personnel during construction activities. Actual subsurface conditions are more readily observed and discerned during the earthwork phase of construction when soils are exposed. Columbia West cannot accept responsibility for deviations from recommendations described in this report or future performance of structural facilities if another consultant is retained during the construction phase or Columbia West is not engaged to provide construction observation to the full extent recommended.

### **Collected Samples**

Uncontaminated samples of soil or rock collected in connection with this report will be retained for thirty days. Retention of such samples beyond thirty days will occur only at client's request and in return for payment of storage charges incurred. All contaminated or environmentally impacted materials or samples are the sole property of the client. Client maintains responsibility for proper disposal.

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### **Report Limitations for Contractors**

Geotechnical or environmental reports, unless otherwise specifically noted, are not prepared for the purpose of developing cost estimates or bids by contractors. The extent of exploration or investigation conducted as part of this report is usually less than that necessary for contractor's needs. Contractors should be advised of these report limitations, particularly as they relate to development of cost estimates. Contractors may gain valuable information from this report, but should rely upon their own interpretations as to how subsurface conditions may affect cost, feasibility, accessibility and other components of the project work. If believed necessary or relevant, contractors should conduct additional exploratory investigation to obtain satisfactory data for the purposes of developing adequate cost estimates. Clients or developers cannot insulate themselves from attendant liability by disclaiming accuracy for subsurface ground conditions without advising contractors appropriately and providing the best information possible to limit potential for cost overruns, construction problems, or misunderstandings.

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