Port of Bellingham

Healthy Housing Integrated Planning Grant
Lignin Parcel, Bellingham Waterfront District

RMC ARCHITECTS

Final Consultant Report
February 25, 2022

Contents

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Aspect Consultants
Mercy Housing
Wilson Survey and Engineering

The Port would like to thank all community members that participated in this planning process and contributed your valuable insights.

Background

In early 2019, the Washington State Department of Ecology selected the Port as a recipient of a Healthy Housing Integrated Planning Grant (IPG) to fund early project planning efforts at the approximately 3-acre Lignin Parcel is part of the GP West cleanup site, which requires remediation under the Model Toxics Control Act prior to redevelopment.

Project Description

The Bellingham Healthy Housing project concept includes the redevelopment of approximately 3-acres of property located at the corner of Cornwall Avenue and Laurel Streets in Bellingham, Washington. The Parcel is located within the Chlor-Alkali Remedial Action Unit (RAU) of the GP West cleanup Site.

The Parcel is located within walking distance of Downtown Bellingham, bus routes, Western Washington University, and other community oriented services including the Opportunity Council and Work Source.

The Integrated Planning Grant process included coordination with internal Port and City of Bellingham staff, evaluation of project opportunities and constraints, public outreach and involvement, and development of recommendations for next steps.

The task is to have environmental analysis, geotechnical investigation, programming, and planning activities completed for the 3-acre contaminated Lignin Parcel. The goal is to facilitate property redevelopment to include a mix of affordable housing and other public benefit uses while providing opportunity for job creation. This project fits with the overall community goals of reactivation of the former industrial Georgia Pacific property in Bellingham while providing much need affordable housing.

Executive Summary

The Healthy Housing Integrated Grant process successfully brought together a diverse group of people each with their particular ideas for the Lignin Parcel site. The consultant team provided context and analysis to further test what is possible for the site and to suggest ways of moving the project into reality.

The Port of Bellingham, City of Bellingham, Whatcom Community Foundation along with key input from the community provided the vision at the district and site specific levels. The goal to have a community gathering space that supports the local economy, provides eduction opportunities and embraces a broader sense of equity and justice resulted in a program organized around two buildings.

The first building is to provide affordable housing to families, bringing them downtown and to the waterfront. The building includes community spaces with resident services aiming to build a more robust, equitable society. The building is also to provide classroom space for an early learning center, thus engaging our youngest community members while supporting the parents and their goals.

The second building is a food campus that connects the community with local food producers and produces meals for local early learning centers, schools, and senior programs. This is to be done in a transparent way that educates the general public and supports the local non-profit community. In addition, the food campus will connect and compliment services provided in the apartment building and Early Learning Center (ELC). The apartment building will provide workforce housing that may house some of the food campus employees and the ELC may be available for their children.

The consultant team then reviewed the site to understand how best to achieve these goals. A study of existing conditions including environmental and geotechnical parameters, zoning and site attributes laid the foundation. A study of opportunities for sustainable design, consideration of ways to reinforce connections to the community and a close look at financing opportunities for the affordable housing component all showed the way forward.

The team developed scenarios to match program to site via masterplan studies. Assumptions for each building produced initial models that were then organized on the property to best achieve the initial vision of the community.

This grant has served its purpose and is building momentum for the future. We are pleased to report both buildings and the site are continuing to develop options and Mercy Housing is in the process of securing financing for the affordable housing component. If successful, construction on the affordable housing project would begin by the end of 2022 with occupancy slated for mid 2024.

1. Introduction

The Port of Bellingham (Port) received a Healthy Housing Integrated Planning Grant (IPG) from Washington State's Department of Ecology in 2019. The grant focused on a 3 acre site know as the Lignin Parcel. A site survey is included in the Appendix A.

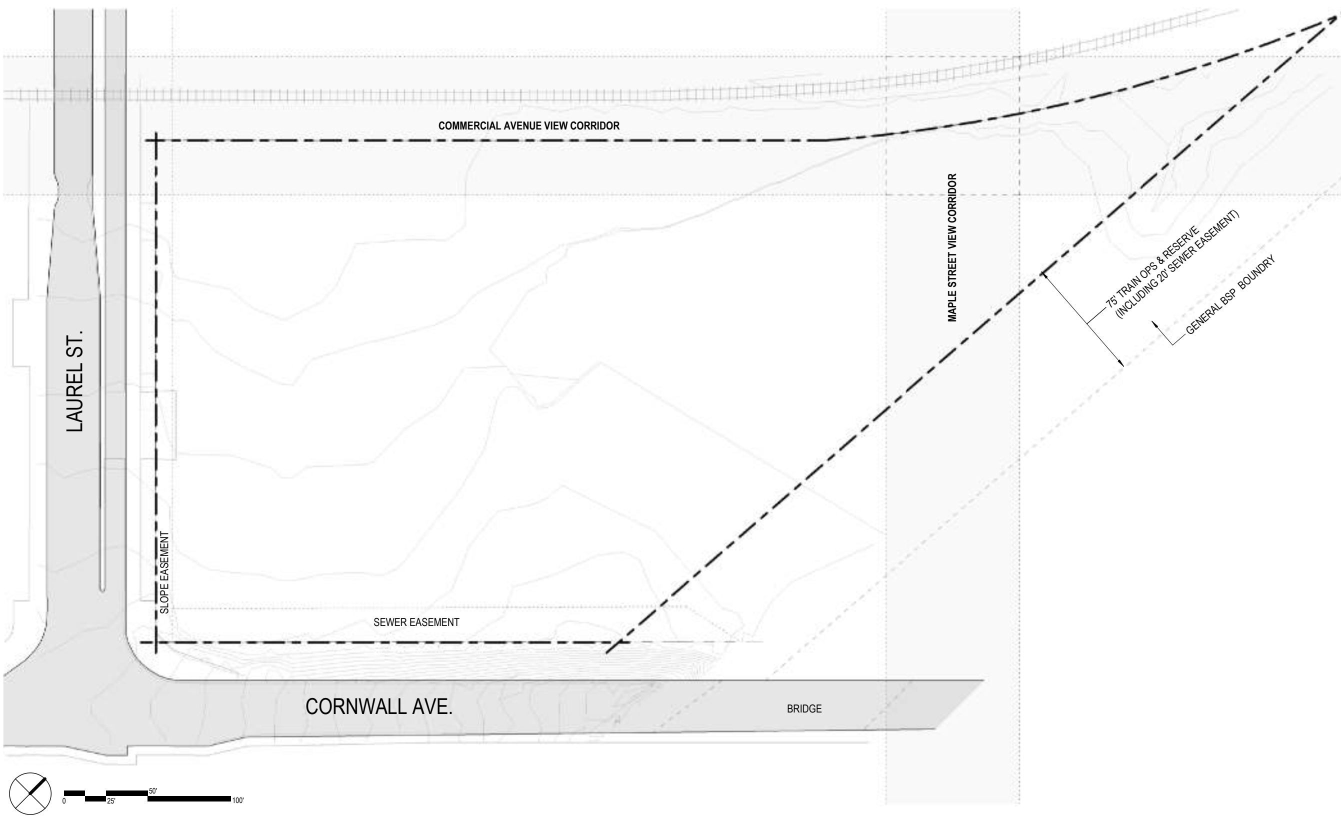


Figure 1.1: Site Plan

A consultant team was assembled to study the development potential of the site with a focus on affordable housing. The study also included an environmental and geotechnical assessment with the goal of understand possible strategies to transition the property from a brownfield to a viable development site. The consultant team was led by RMC Architects and included Aspect Consulting (environmental and geotechnical assessment), Mercy Housing (affordable housing consultant) and Wilson Survey and Engineering (surveying).

1. Introduction

A. History of Site.

This site is part of traditional lands of the Lummi, Nooksack and Coast Salish peoples. Prior to development, the site was primarily tidelands located adjacent to the Whatcom Creek estuary. Early development in the tidelands included the railway trestle, various piers and Morrison Mill. See figure 1.2. By 1913, the site was being filled with dredge spoils as dredging occurred in the Whatcom Creek Waterway. See figures 1.3 and 1.4.

Figure 1.2: Low Tide, 1900

Figure 1.3: dredger beyond on the bay, 1913

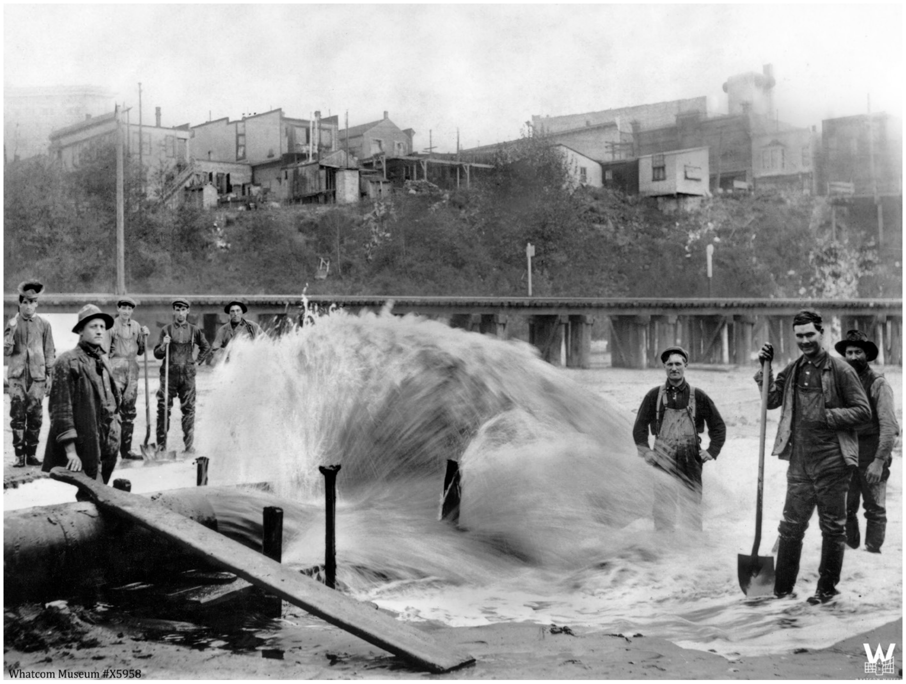


Figure 1.4: Fill from dredging, 1913

In 1926, the San Juan Pulp Company opened the first pulp mill on 5 acres of filled tideland adjacent to Bellingham Bay. It was designed to make use of pulp logs and fiber leftovers from a local wood box plant and several lumber mills.

Three years later, the business was reorganized as the Puget Sound Pulp and Timber Company. In 1958, Puget Sound Pulp and Timber acquired the adjacent tissue manufacturing operations of Pacific Coast Paper Mills. In1963, the company merged with the Georgia-Pacific Corporation who owned and operated the mill until the Port acquired it in 2005. Georgia-Pacific operated the pulp mill until 2001 and, under lease to the Port operated the tissue mill until 2007. See Figure 1.5.

The Lignin Parcel was part of the Georgia Pacific site. It included a lignin warehouse and above ground tanks for the storage of waste liquors from the lignin processes. The tanks have been removed and the warehouse was demolished in 2020.

Figure 1.5: Old GP Mill Site

B. Scope of Work

The project was subdivided into two main tasks. Task 1 focused on assessments and remedial investigations. Task 2 focused on the integrated planning. More specifically the tasks performed were as follows:

Task 1 Assessments and Remedial Investigations

- 1.1 Undertake focused environmental site assessments to confirm site conditions.
- 1.2 Perform geotechnical investigations
- 1.3 Survey the parcel.
- 1.4 Write report.

Task 2 Integrated Planning

- 2.1 Coordinate consultant team efforts with client group.
- 2.2 Coordinate work with potential property developers
- 2.3 Identify and evaluate project opportunities and constraints.
- 2.4 Develop conceptual site master plan for possible redevelopment.
- 2.5 Coordinate public outreach and community involvement
- 2.6 Write report and include recommendations for next steps.

2. Environmental and Geotechnical Assessment

Environmental and geotechnical assessments were performed by Aspect Consulting to suit the requirements of Task 1 of the Integrated Planning Grant.

Task 1 of the Integrated Planning Grant (IPG), entitled “Assessments and Remedial Investigations”, included focused environmental assessment, geotechnical/geophysical investigation, and Parcel-specific survey with the goal of advancing environmental and geotechnical characterization of the Lignin Parcel in preparation for redevelopment for affordable housing and other intended uses. A Work Plan was developed that described the scope of work for the Task 1 assessment and included the following Task 1 subtasks in the IPG:

1.1. Work Plan for Site
1.2. Sampling and Analysis Plan
1.3. Quality Assurance Project Plan
1.4. Inadvertent Discovery Plan

Once the assessment data was collected and analyzed, the assessment findings and recommendations were presented and distributed as per the following IPG Task 1 subtasks:

1.5. Analytical data uploaded to Ecology’s Environmental Information Management (EIM) database
1.6. Report of Assessment Findings

The full environmental and geotechnical report is included as Appendix B to this document. It includes both environmental and geotechnical assessment findings. Additional exploration and laboratory analysis is recommended as the project progresses.

3. Opportunities and Constraints

The consultant team reviewed the site's potential through four different lenses to better understand the project's opportunities and constraints. This deeper understanding points the way to optimum development solutions. The four lenses used are physical site analysis, zoning review, affordable housing strategies and sustainable design options.

A. Site Analysis

Analyzing the physical attributes of the property revealed various strengths and weaknesses of the site. We began by looking at the micro climate associated with this location. A review of solar access and prevailing winds provides clues as to how best organize the site.

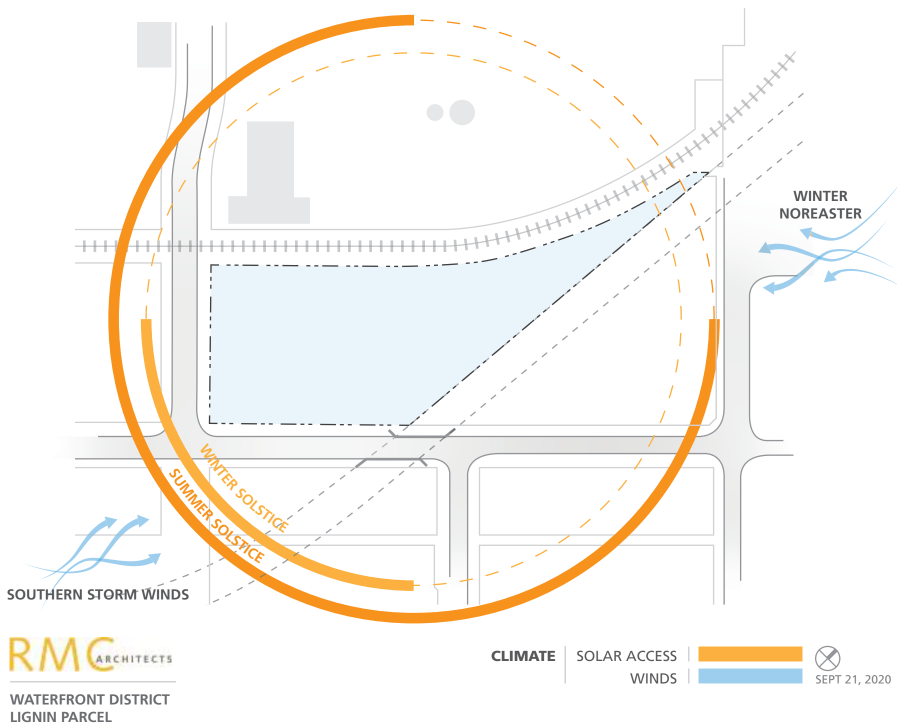


Figure 3.1 Climate

This waterfront and downtown area location provides opportunities for views both from the site and through the site from the bluff above.

3. Opportunities and Constraints

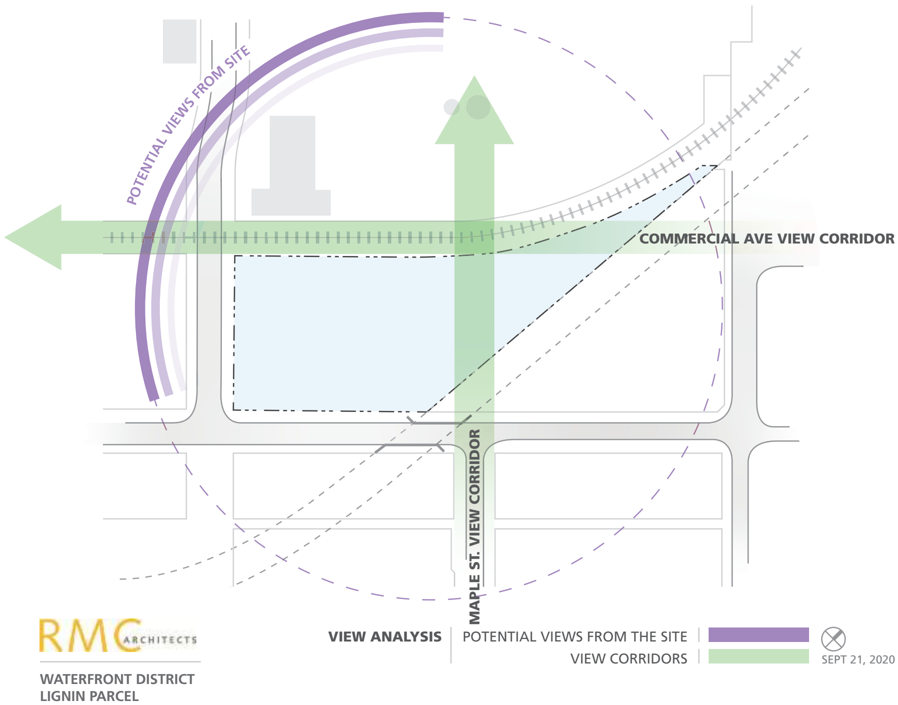


Figure 3.2 View

Understanding movement to the site, around the site and through the site provides clues as to where to locate access points, front doors and connections through the site. The following diagram shows pedestrian, bicycle and vehicular connections.

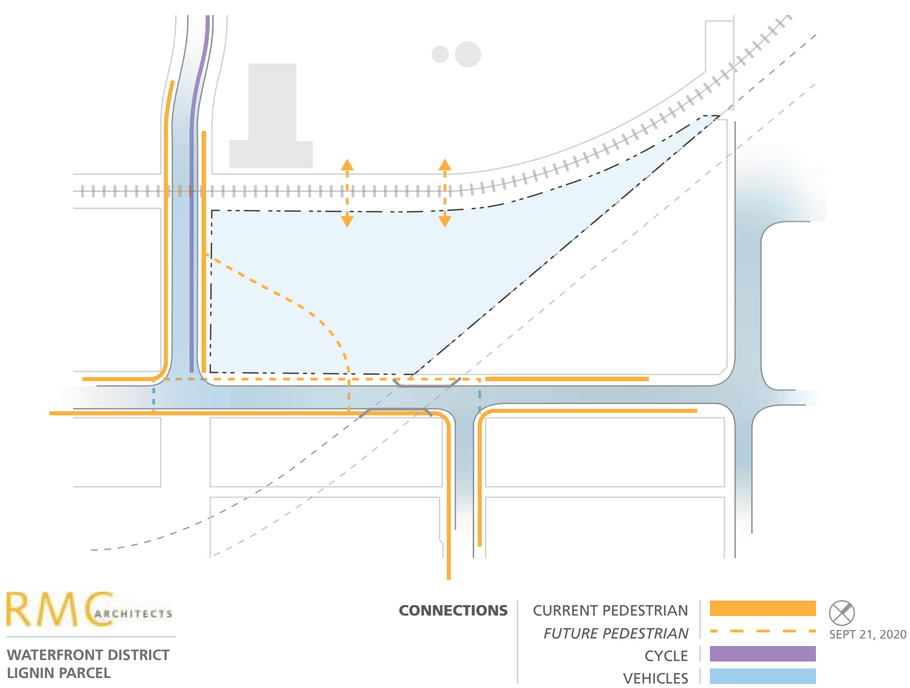


Figure 3.3 Connections

The site is part of a larger emerging waterfront district. The following diagram identifies important characteristics of the district that will influence the future design of this property.

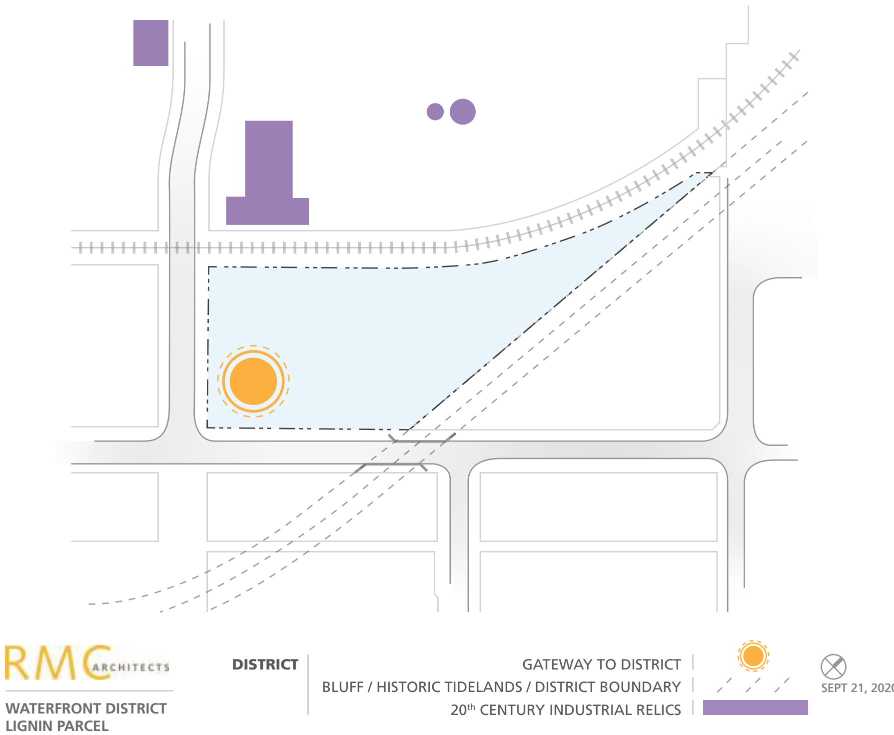


Figure 3.4 District

And finally a clear understanding of the challenges faced on this site is important. The following diagram shows how the site is landlocked by the train tracks to the northwest and Cornwall Avenue bridge and approach on the south east side. Pedestrian connections from downtown are cut off by the limited width of the bridge and the difficulty navigating down the bluff and across lands reserved for rail lines.

3. Opportunities and Constraints

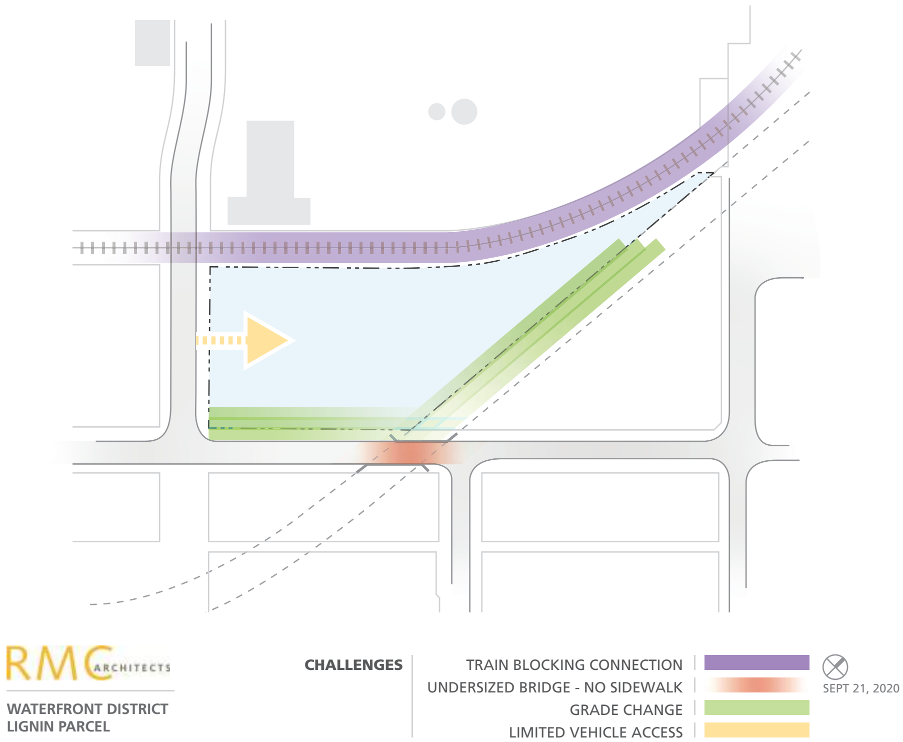


Figure 3.5 Challenges

B. Zoning Regulation Review

The project is located in Area 6 of the City Center Neighborhood. It is subject to the Waterfront District Urban Village regulations per Bellingham Municipal Code (BMC) section 20.37.400. BMC 20.37.400 then designates this site as Downtown Waterfront. See figure 3.6.

Waterfront District Urban Village – Boundary and Land Uses
BMC 20.37.400

Figure 3.6 Waterfront District

Commercial mixed use is the designated land use for this area. BMC 20.37.420 lists residential, day care, eating establishments, offices, retails sales, community centers, schools, manufacturing and assembly, and community public facilities uses as permitted outright.

There are no minimum lot sizes, or yards required. The site doesn't have any required setbacks. Maximum building heights are generally 150' but various view corridors also impact the site. See figure 3.7 below. The base density is Floor Area Ratio (FAR) 3 but that can be increased to FAR 5 with certain bonuses.

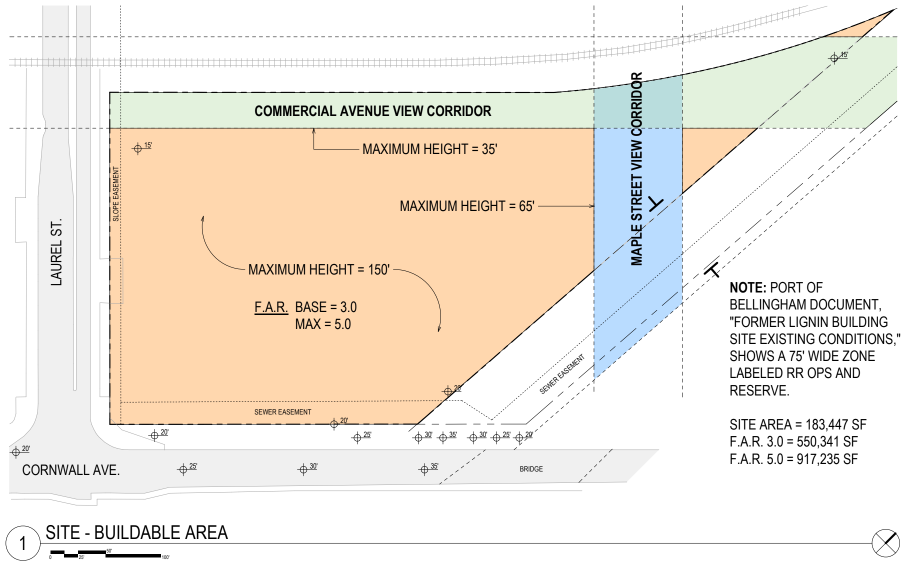


Figure 3.7 Building Area Heights & Easements

Maximum noise levels and sustainability requirements are built into the zoning code. Parking ratios are specified in BMC 20.37.450 along with various options for reductions. The zoning does include robust bike parking requirements to encourage multimodal use of this area.

Also of note is the Waterfront District Sub-Area plan that lays out objectives and design standards to encourage a cohesive mixed-use waterfront district. The project is subject to design review.

See Appendix C for more detail.

C. Affordable Housing Strategies

Mercy Housing considered the site's potential to support affordable housing. Their conclusion was the site can support an 80 unit development serving families at or below 60% Area Median Income (AMI) with the potential inclusion of a community serving space such as an Early Learning Center. The development would be financed using 4% Low Income Housing Tax Credits combined with City of Bellingham Home Funds and State of Washington Housing Trust Fund funding. Cost effective design and on going coordination between stakeholders and financial sources are essential elements to make the project work.

See Appendix D for the full report.

D. Sustainable Design Options

Sustainable design is an important overlay for this project. The zoning regulations contain specific sustainable design requirements including light pollution reduction, native/drought-tolerant landscaping, raw water irrigation systems, energy conservation requirements, recycling facilities, and construction waste requirements. There is also a requirement to use available district specific utilities. We understand heated and cooled district water will be available to the site to use for building heating and cooling. We also understand raw water piping is in place in the roads and that connection to a specific district source is being reviewed.

In terms of how the development can proceed, there are a variety of sustainable design tools available to guide the way depending on preferences of the developers. Figure 3.8 shows a number of programs and corresponding focus areas for each.

The affordable housing component will require compliance with the Evergreen Sustainable Development Standard as a condition of financing. Other areas of focus that align with programmatic goals for the site include energy savings, health and happiness, equity, local economy and social cohesion. We recommend confirming project aspirations then selecting a sustainable design framework that includes those characteristics to serve as a way to guide the project forward.

Sustainable Design Tools

August 11, 2020

	Energy	Water	Place / Habitat / Connections	Resources	Regeneration Restoration	Health / Fitness / Happiness	Equity	Local Economy & Wealth	Resilience	Beauty	Social Cohesion
BMC Sustainability Reqmts	√	√	√	√							
Living Building Challenge	√	√	√	√	√	√	√			√	√
LEED	√	√	√	√		√					
ESDS	√	√	√			√	√				√
Enterprise Green Communities	√	√	√	√	√	√	√	√	√		
Passive House	√										
Energy Star	√										
Net Zero	√										
Net Positive	√				√						
Architecture 2030	√		√		√				√		
ULI Building Healthy Places			√			√					√
Sustainable Sites			√	√							
LEED ND	√	√	√	√			√				√
Well						√	√		√		√
Fitwel						√	√				
Reli	√	√	√						√		√
Front Porch Factor											√

Figure 3.8 Sustainable Design Tools

4. Program and Master Plan

As part of investigating the development potential of the site, we tested it with a possible program that achieved the stated goals of providing affordable housing and public benefit. We were fortunate to have two stakeholder groups interested in these same goals. As a result we considered two distinct but compatible building programs.

The first program focused on the affordable housing component. Based on the Affordable Housing Feasibility Report presented in Section 3 of this report, we developed a program for an 86 unit apartment building geared towards families. An Early Learning Center, community rooms, offices and other support infrastructure were included.

The second program was developed to suite the aspirations of the Whatcom Community Foundation through the Millworks LLC. The program is called a Food Campus and it incorporates a variety of commercial kitchens, warehousing, some retail, an event space and some offices.

A master plan for the site was then produced. It took into account the various opportunities and challenges discussed in Section 3 of this report. It focused on creating public oriented connections through the site from downtown to the waterfront. Overall the master plan is intended not only to mesh the proposed uses on the site but also to shape development at a district level. The plan reinforces the programmatic aspirations of providing a public benefit in an equitable and culturally reinforcing manner. Social infrastructure was considered equally important to the physical infrastructure of the site.

4.A. Multifamily Apartment Building Program

Purpose

Provide approximately 80 units of affordable housing for a variety of family sizes. Include associated support spaces and an Early Learning Center suitable for licensure by the State of Washington. Consider that this project will compete for public financing per the Affordable Housing Feasibility Report provided in Section 3 of this report.

Proposed Components

<u>Residential Units</u>	
39 one bed units in the 550-600 sf range	23,000 sf
20 two bed units in the 850-900 sf range	26,000 sf
17 three bed units in the 1,000 sf-1,100 sf range	18,000 sf
<u>Common Spaces</u>	
Lobbies, vestibules, elevators and machine room	2,094 sf
Community room, pantry, restrooms and storage	2,048 sf
Offices	565 sf
Bike Storage	930 sf
Laundry	950 sf
Garbage and recycle	350 sf
Maintenance shop	375 sf
Custodial	125 sf
Mechanical room	950 sf
Fire sprinkler room	400 sf
Electrical room	200 sf
Telecom and data rooms	200 sf
Circulation and stairs	13,100 sf
<u>Early Learning Center (ELC)</u>	
Two large classrooms	2,000 sf
Two small classrooms	1,200 sf
Lobby, office, restrooms	700 sf
Kitchen, laundry, breakroom	450 sf
Storage, utility	150 sf
Mechanical, Electrical	150 sf

Building Size

4 story wood frame	
Total Building area:	90,000 - 95,000 sf range

Exterior Uses

Entry Plazas	500 sf
ELC Playgrounds	3,150 sf
ELC Pickup / Drop Off	to suit
Vehicle Parking	to suit

4.B. Food Campus Program

Purpose

Provide a multi-faceted campus that features food system components as well as other economic and community assets. Include components such as a food hub, business incubator, shared food processing and production, support for food cart and truck vendors, workforce training, event space and co-located offices.

Proposed Components

Kitchens (including associated restrooms)	
Commercial kitchen	15,000 sf
Central demonstration kitchen	5,250 sf
Shared kitchen	3,880 sf
Food Processing	
Farmer food processing area	800 sf
Warehousing	
Warehouse	5,000 sf
Loading docks	1,500 sf
Offices	
Open / shared	2,760 sf
Dedicated	1,000 sf
Staff area	400 sf
Public Spaces	
Event (includes toilets and catering kitchen)	5,000 sf
Observation deck	200 sf
Classroom	1,000 sf
Grocery	600 sf
Retail	1,000 sf
Roof plaza	2,500 sf
Roof garden	1,700 sf
Support Spaces	
Mechanical	600 sf
Toilet rooms	600 sf
Lobby, elevator & machine room	1,200 sf
Corridors and stairs	750 sf

4.B. Food Campus Program (continued)

Building Size

2 story likely wood framed, perhaps Cross Laminated Timber	
Total Building area:	50,000 - 52,000 sf range

Exterior Uses

Front Plaza / Event Space	1,000 sf
Loading Area / Food Truck Event Space	400 sf
Vehicle Parking	to suit

4.C. Development Master Plan

A master plan for the development was prepared based on the previous two programs. The master plan was conceived as a test fit of the program to the site. Doing so helped answer the question of what is possible and desirable for development. At a higher level, the master plan delves further into the aspirations of the two potential developers involved in the process.

Organizing features of the master plan include:

- Access and circulation for vehicles
- Pedestrian oriented community spaces
- Parking requirements
- Best uses adjacent to public right-of-way
- Best use adjacent to rail line
- Respond to Cornwall Avenue Bridge and approach
- Sewer easement
- Outdoor programed activity
- Building massing
- Solar access
- Views

Figures 4.1 through 4.7 illustrate the master plan in detail.

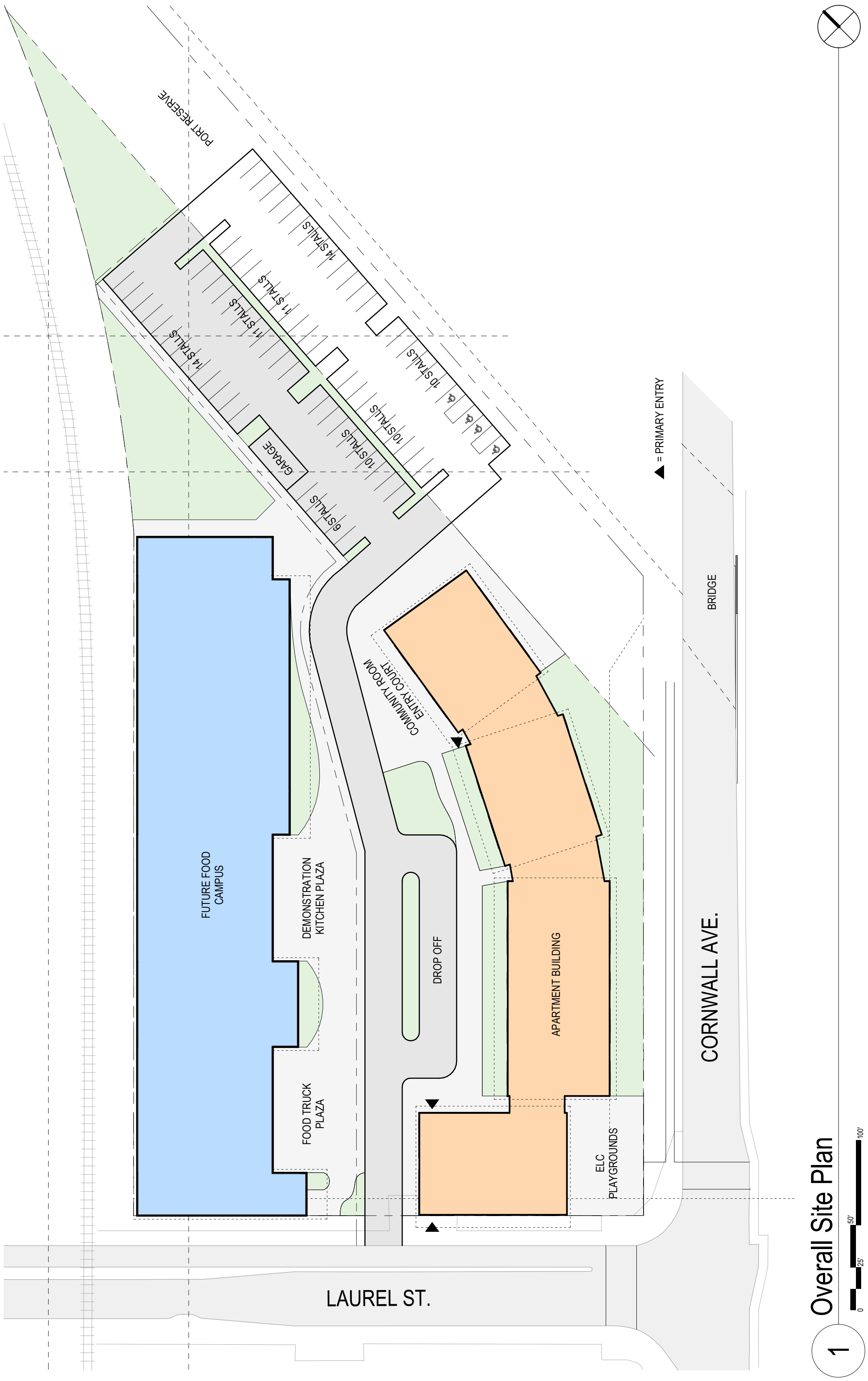

PORT RESERVE
14 STALLS
11 STALLS
11 STALLS
14 STALLS
10 STALLS
10 STALLS
10 STALLS
GARAGE
6 STALLS
= PRIMARY ENTRY
BRIDGE
COMMUNITY ROOM
ENTRY COURT
FUTURE FOOD CAMPUS
DEMONSTRATION KITCHEN PLAZA
DROP OFF
APARTMENT BUILDING
CORNWALL AVE.
FOOD TRUCK PLAZA
ELC PLAYGROUNDS
LAUREL ST.
1
Overall Site Plan
0
25'
50'
100'

Figure 4.1

4. Program and Master Plan

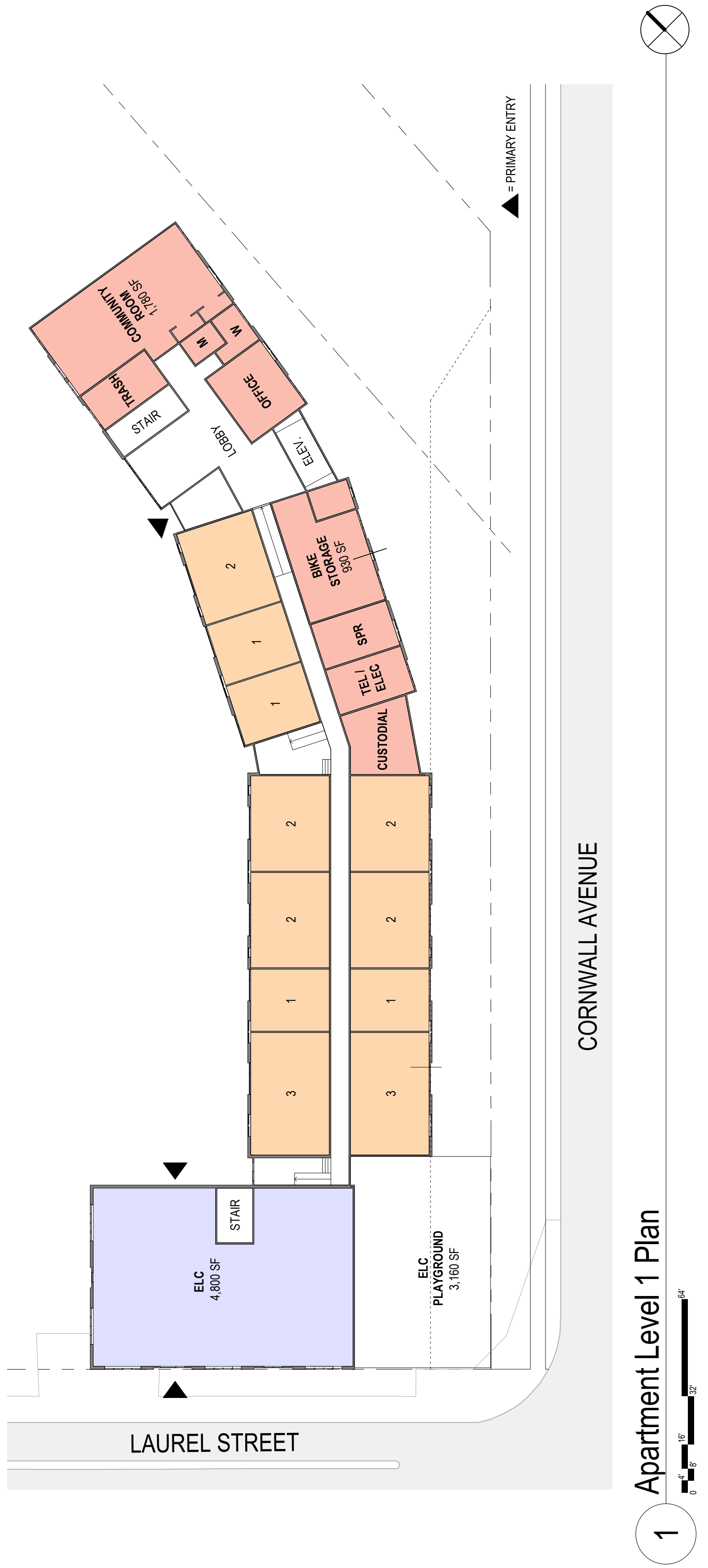
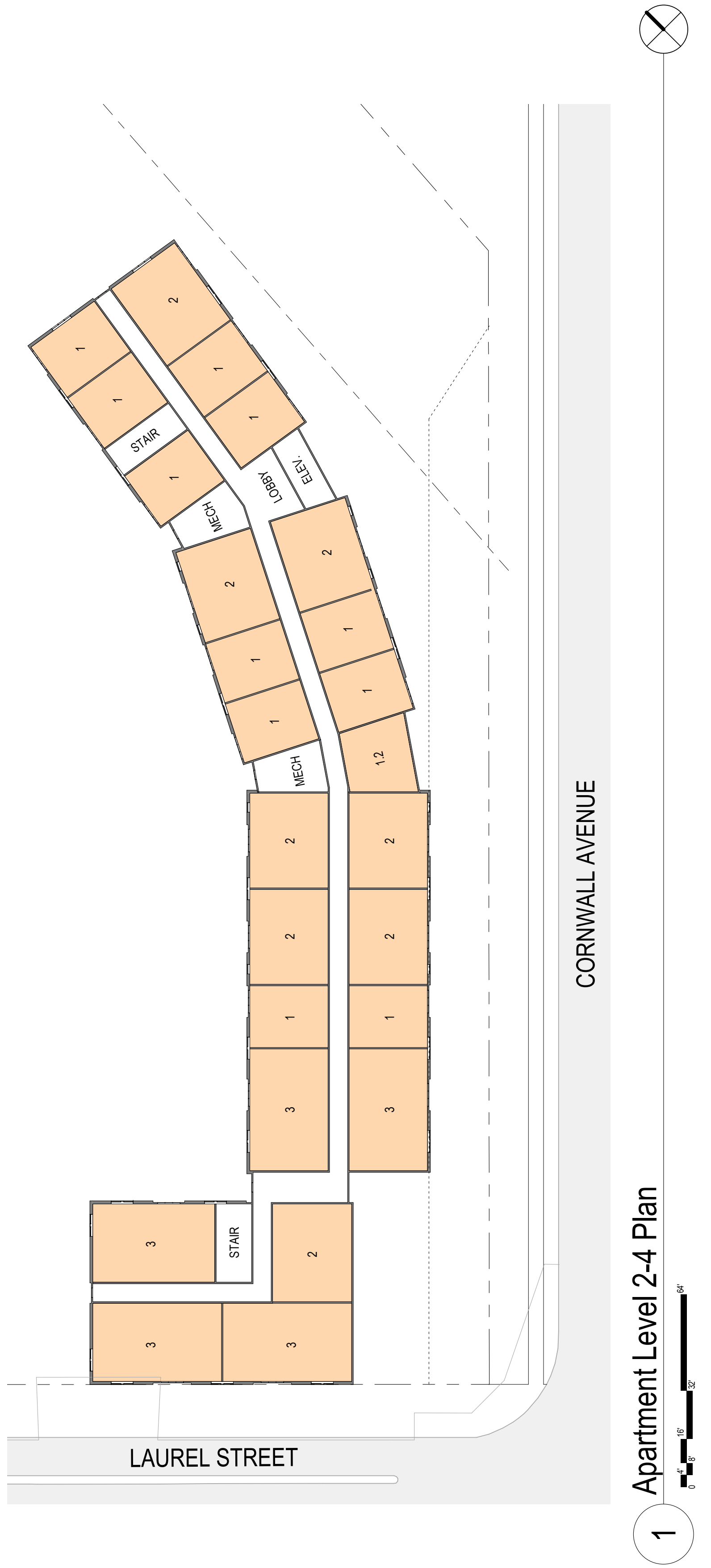


Figure 4.2


1
1
STAIR
1
2
1
1
LOBBY
ELEV.
MECH
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MECH
1,2
2
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1
3
2
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1
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3
STAIR
2
3
3
CORNWALL AVENUE
LAUREL STREET
Apartment Level 2-4 Plan
1

Figure 4.3

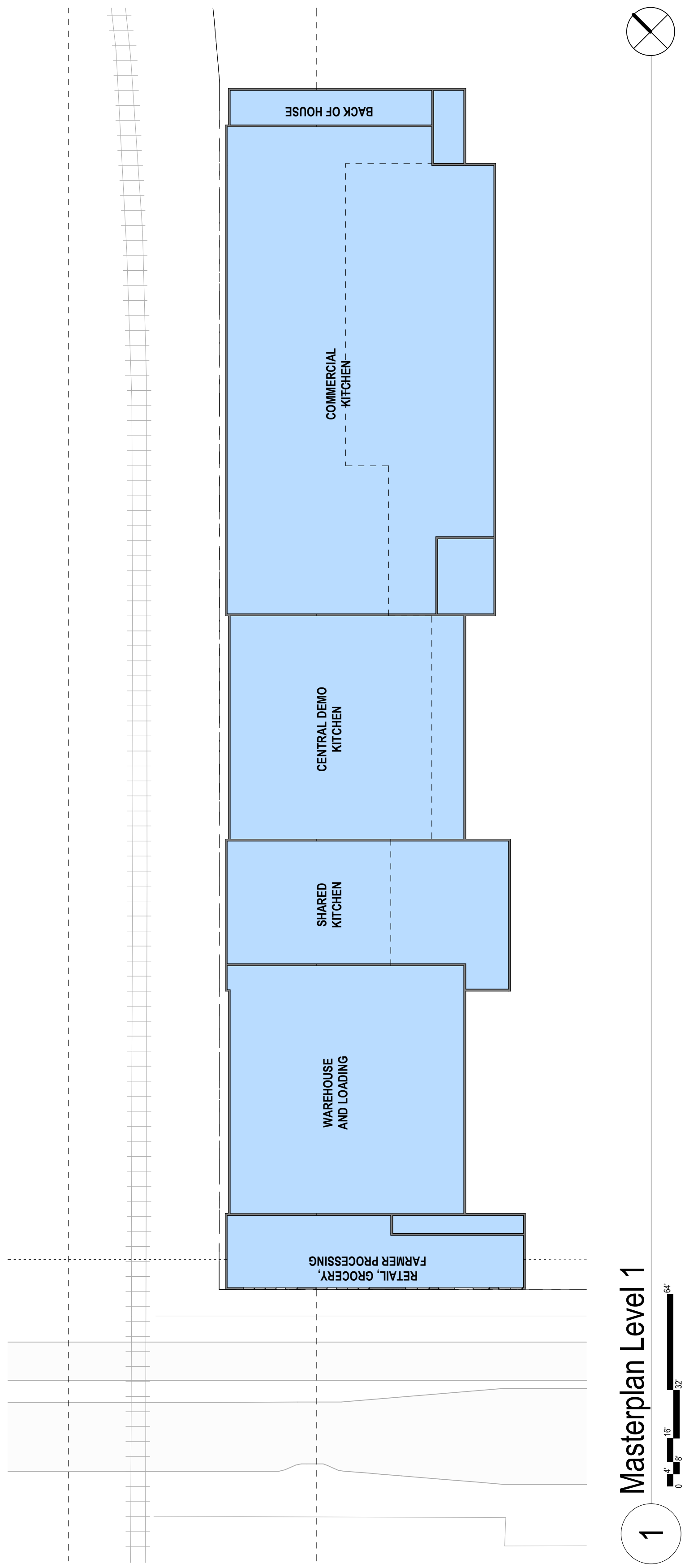
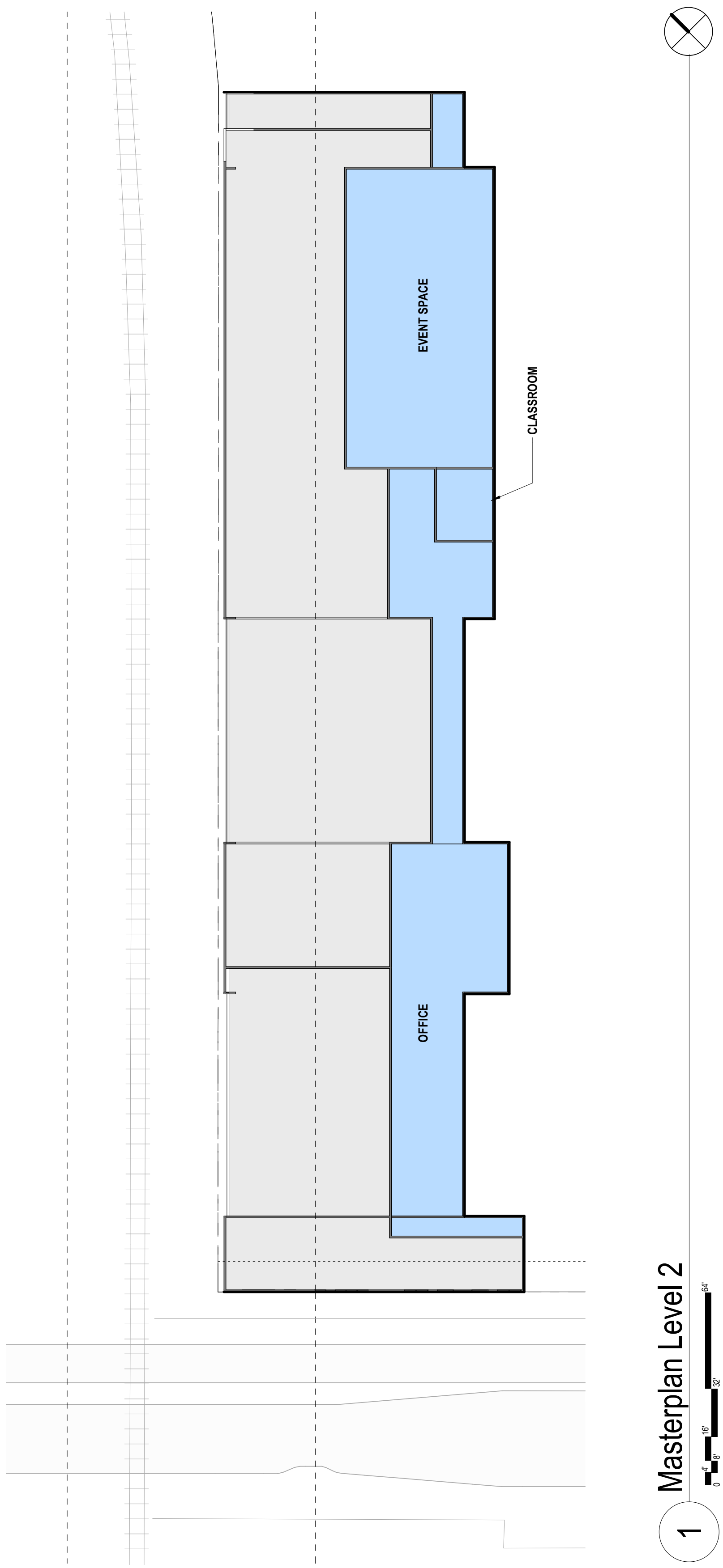

BACK OF HOUSE
COMMERCIAL KITCHEN
CENTRAL DEMO KITCHEN
SHARED KITCHEN
WAREHOUSE AND LOADING
RETAIL, GROCERY, FARMER PROCESSING
Masterplan Level 1
1
0
4'
8'
16'
32'
64'

Figure 4.4


EVENT SPACE
CLASSROOM
OFFICE
Masterplan Level 2
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8'
16'
32'
64'

Figure 4.5

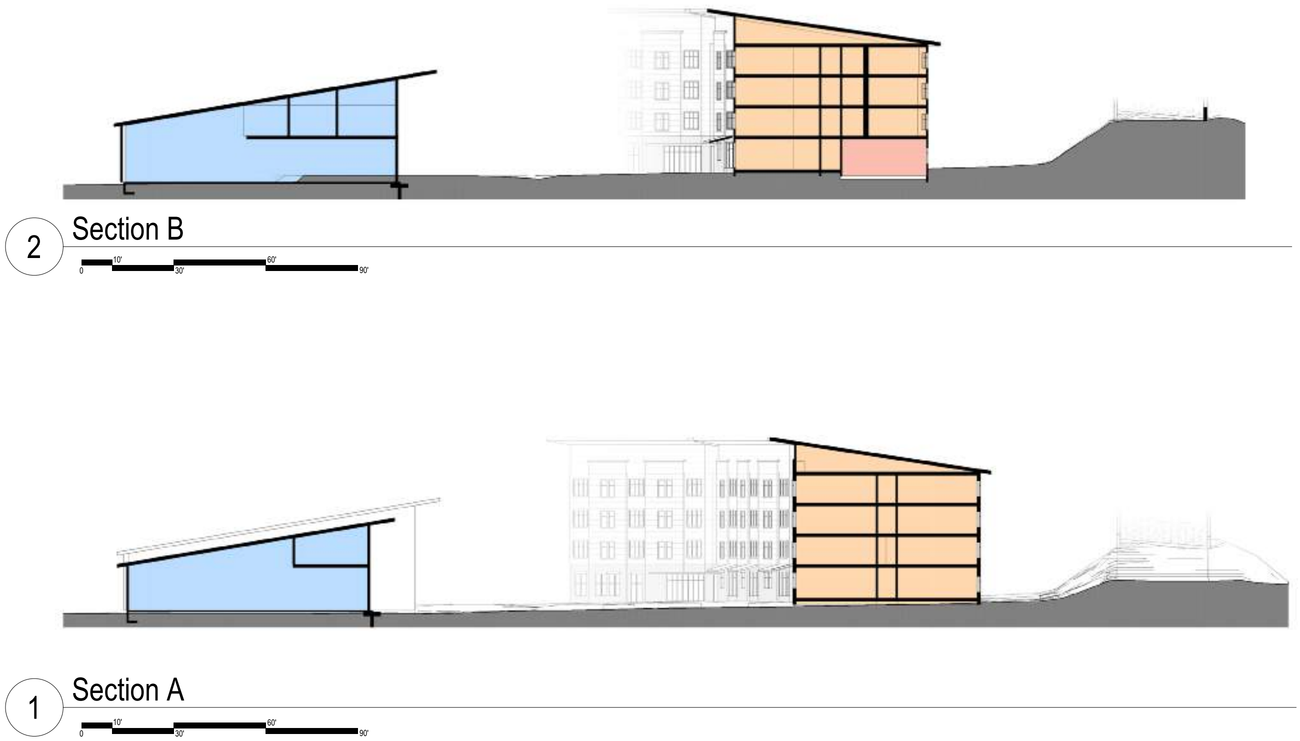


Figure 4.6

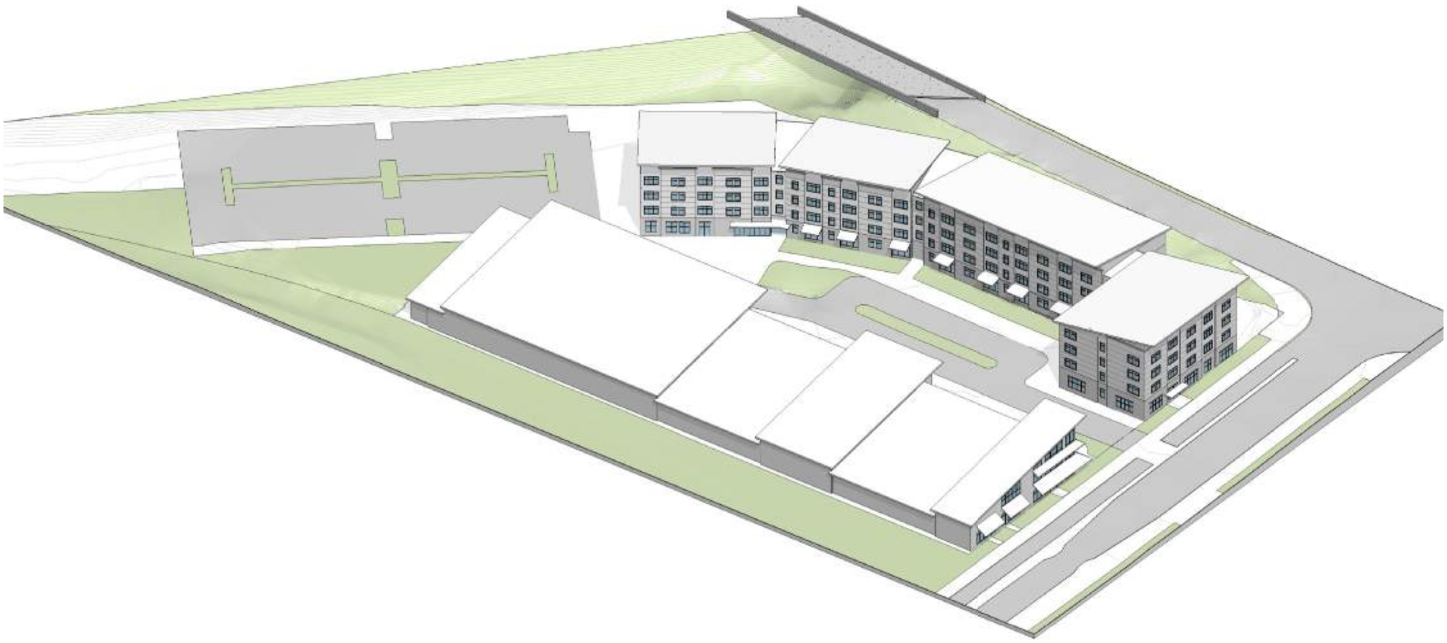


Figure 4.7

5. Community Engagement

The Integrated Planning Grant process involved multiple levels of community engagement starting with regular meetings of a core group of stakeholders and expanding into the larger community by engaging groups like the Lummi Nation, City representatives, business groups, service organizations, and possible funders.

In addition, the project has been discussed at Port of Bellingham Commission meetings a number of times.

Bi-weekly Stakeholder meetings include:

- Port of Bellingham
- Millworks LLC
- Mercy Housing
- Consultant Team

2021.01.05 Port of Bellingham Commission Meeting

2021.06.10 Community Charrette Event

2021.06.11 Charrette follow up with Stakeholders

2021.08.10 Stakeholder Charrette.

See Appendix E for Community Charrette agenda, content and follow up notes

6. Conclusion & Next Steps

As stated at the outset of this report, the task was to have environmental analysis, geotechnical investigation, programming and planning activities completed for the Lignin Parcel - the goal being to facilitate property redevelopment to include a mix of affordable housing and other public benefit uses while providing an opportunity for job creation. Along the way multiple stakeholders were consulted in a robust community engagement process.

As we can see by the contents of this report, the process has been a success. We are pleased to report the property is suitable for a combination of affordable housing and other commonly beneficial uses. Mitigation strategies for unsuitable soils have been identified and sample building programs have been tested. The process has gone one step further by pairing the site with two development entities that are eager to take the development of the site to the next level. Mercy Housing is contemplating construction of an 86 unit affordable housing with an Early Learning Center. Millworks LLC is planning a food campus project that will serve as a hub for locally sourced food, will provide educational programs regarding local foods, will produce meals for various community groups, and will provide a community gathering space.

Next Steps

We recommend the following steps to ensure the project moves forward:

- Identify cleanup process, funding and timing
- Identify funding sources for the affordable housing project and begin application process
- Identify funding sources for the food campus
- Continue with Masterplan development
- Break site from overall binding Site Plan
- Determine property line locations to subdivide site into two parcels
- Consult with City of Bellingham in more detail about Land-Use Permits
- Consult with district utilities provider to understand utility availability and time frame
- Continue community engagement

APPENDICES

A. Site Survey

B. Environmental & Geotechnical Report

C. Lignin Parcel Zoning Report

D. Affordable Housing Feasibility Study

E. Millworks Design Charrette

APPENDIX A: SITE SURVEY

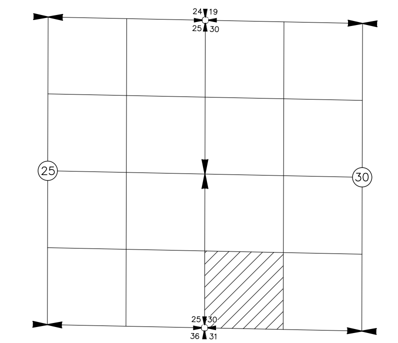
In preparation for the consultant work, Wilson Survey issued the following site survey. The survey was prepared for Integrated Planning Grand (IPG) purposes only. Contours were derived from a combination of conventional survey and Unnamed Aerial Vehicle (UAV) methodologies. Utility locates were not used and any utilities shown should be verified in future surveys. In addition, an updated Title Report was not commissioned. The level of detail shown on the attached survey was adequate for the purposes of the IPG. Further surveying is required prior to actual design and development of the property.

See also Surveyor Notes on Sheet 1 of the survey.

RMC ARCHITECTS

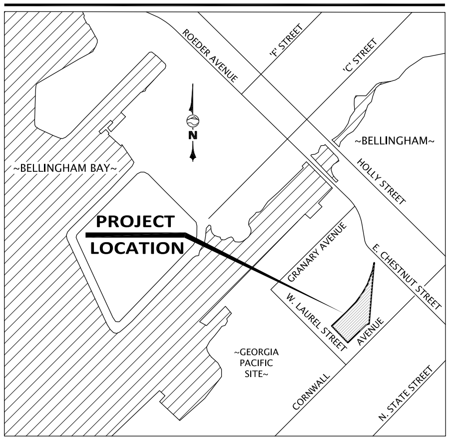
LIGNIN PLANT UAV SURVEY
W.A.C. 332-130 COMPLIANCE SHEET

SECTIONAL INDEX DATA



SW QTR - SW QTR, SEC. 30, TWNSHP 38 NORTH, R 03 EAST, W.M.

VICINITY MAP - NOT TO SCALE



INDEX TO DRAWINGS

NAVD88 DATUM

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NOTICE TO USER

EFFECTIVE JANUARY 13, 2019, ALL TOPOGRAPHIC MAPS PREPARED BY A LICENSED SURVEYOR IN THE STATE OF WASHINGTON, AND SUBJECT TO THE LICENSURE AND PRACTICE REQUIREMENTS ESTABLISHED BY THE WASHINGTON STATE BOARD OF REGISTRATION FOR ENGINEERS AND LAND SURVEYORS, MUST INCLUDE THE DESCRIPTIVE NOTES AND METADATA ENUMERATED UNDER W.A.C 332-130-145 AND ITS APPURTENANT SECTIONS OF 332-130. THIS EXHIBIT IS INTENDED TO ADDRESS THE STATUTORY REQUIREMENTS STIPULATED BY THIS W.A.C DIRECTIVE.

W.A.C. 332-130-145 REQUIRED DATA

1.E: THIS SURVEY WAS PREPARED UNDER THE DIRECT SUPERVISION OF:

J. THOMAS BREWSTER, WA PLS #44335
SURVEY MANAGER / PRINCIPAL
WILSON ENGINEERING LLC
805 DUPONT STREET, SUITE 7
BELLINGHAM, WA 98225
360-733-6100 (EXT. 231)
tbrewster@wilsonengineering.com

2.A: BASIS OF ELEVATIONS: ELEVATION VALUES AND CONTOURS DEPICTED ON THIS SURVEY ARE BASED UPON HOLDING AS FIXED THE NAVD88 DATUM, PER BENCHMARK NO.593, ACCORDING TO THE CITY OF BELLINGHAM WATERFRONT VERTICAL CONTROL NETWORK (ROS AFN. 2080302393).

2.B: PURPOSE OF SURVEY: WILSON ENGINEERING PERFORMED THIS SURVEY DURING MAY OF 2020, AT THE REQUEST OF RMC ARCHITECTS PURSUANT TO PRELIMINARY BUILDING AND PLANNING DESIGN. MUCH OF THE DATA FOR THIS PROJECT WAS ACQUIRED USING UAV TECHNIQUES, PER CLIENT REQUEST, AND MAY NOT MEET ACCURACY STANDARDS ORDINARILY ASSOCIATED WITH TOPOGRAPHIC SURVEYS. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT. THE DEPICTED PARCEL BOUNDARY SHOULD BE CONSIDERED AUTHORITATIVE, BUT ADDITIONAL ENCUMBRANCES MAY EXIST, WHICH A CURRENT TITLE REPORT MIGHT HAVE REVEALED, THAT ARE NOT DEPICTED.

2.C: SOURCE OF CONTOURS: THE CONTOURS DEPICTED ON THIS SURVEY WERE DERIVED BASED ON FIELD OBSERVATIONS ACQUIRED USING A MIX OF CONVENTIONAL SURVEY AND UAV-BASED METHODOLOGIES.

2.D: CONTOUR INTERVAL LABELING: MAJOR CONTOURS AT 5-FOOT INTERVALS HAVE BEEN EXPLICITLY LABELED.

2.E: DESCRIPTION OF BENCHMARKS SET PURSUANT TO THIS SURVEY: REFER TO THE ACCOMPANYING "CONTROL TABLE" FOR COORDINATES, ELEVATION, AND DESCRIPTION OF ON-SITE CONTROL SET PURSUANT TO THIS SURVEY.

2.F: ELEVATION AND/OR CONTOUR ACCURACY: IF CONTOURS HAVE BEEN DEPICTED ON THE FACE OF THIS SURVEY, IT IS ANTICIPATED THAT 90% OF ANY MEASURED ELEVATION VALUE, IF OBSERVED RELATIVE TO THE CONTROL POINTS SPECIFICALLY ENUMERATED IN THE ACCOMPANYING CONTROL TABLE, WILL BE, IN FACT, WITHIN ONE-HALF OF THE MINOR-CONTOUR INTERVAL DEPICTED HEREON. SPECIFIC ELEVATIONS DEPICTED HEREON, IF ANY, ARE EXPECTED TO BE WITHIN ONE INTEGRAL VALUE OF THE FINAL DEPICTED SIGNIFICANT FIGURE. THAT IS, 90% OF ELEVATIONS EXPRESSED TO THE TENTH-FOOT, SHOULD BE WITHIN 0.1 FEET OF THAT VALUE, IF OBSERVED RELATIVE TO THE SURVEY CONTROL SPECIFICALLY ENUMERATED IN THE ACCOMPANYING CONTROL TABLE. IF OFF-SITE CONTROL IS EMPLOYED, EVEN CONTROL PURPORTING TO BE ON THE SAME DATUM OR BASED ON THE SAME OFF-SITE BENCHMARK, THEN NO ABSOLUTE STATEMENT REGARDING THE ACCURACY OF THE DEPICTED POINTS CAN BE MADE, AND VALUES SO OBSERVED ARE OUTSIDE OF THIS SURVEY'S AUTHORITY OR INTEREST. ADDITIONAL ERROR PROPAGATION AND/OR INTRINSIC ERROR GREATER THAN STANDARD SHOULD BE EXPECTED FOR ALL DATA ACQUIRED USING UAV METHODOLOGIES. ANY DATA SO ACQUIRED MAY EXCEED 0.5' IN TOTAL PROPAGATED ERROR.

2.G: STATEMENT OF USE: AS NOTED IN SECTION 2.B, THIS SURVEY WAS PREPARED FOR THE SPECIFIC PURPOSE SITE AND BUILDING PRE-PLANNING AND DESIGN. AT THE DIRECTION OF RMC, NO OUTSIDE EXPERT WAS CONSULTED PURSUANT TO THE ACQUISITION OF UNDERGROUND UTILITY MARKING SERVICES. THE DEPICTION OF SAME SHOULD NOT BE CONSIDERED AUTHORITATIVE. ALSO, AT THE DIRECTION OF RMC, NO CURRENT TITLE REPORT WAS ACQUIRED PURSUANT TO THIS EFFORT. WITHOUT A CURRENT TITLE REPORT, SIGNIFICANT ENCUMBRANCES TO THE DEPICTED PARCEL MAY EXIST WITHIN THE PUBLIC RECORD WHICH ARE NOT HEREON DEPICTED, LACKING SAID REPORT.

2.H: SOURCE OF CONTROLLING BOUNDARY INFORMATION: THE OWNERSHIP BOUNDARIES DEPICTED ON THIS SURVEY ARE BASED UPON SOME, OR ALL, OF THE DOCUMENTS ENUMERATED IN THE ACCOMPANYING "REFERENCE DOCUMENTS" AS THEREIN CHARACTERIZED. BEARINGS HAVE NOT BEEN TRANSLATED AND/OR ROTATED FROM THE RECORD VALUES.

3.A: SOURCE OF DEPICTED UTILITY INFORMATION: UTILITY LINES DEPICTED ON THIS SURVEY, IF ANY, ARE BASED UPON PAINT MARKS SET BY UTILITY-LOCATE PROFESSIONALS AS EVIDENT AT THE TIME OF SURVEY.

3.B: ACCURACY OF DEPICTED UTILITY INFORMATION: WILSON ENGINEERING DOES NOT PROVIDE FOR-HIRE UTILITY LOCATION AND/OR MARKING SERVICES, AND CAN NOT INDEPENDENTLY ASCERTAIN THE ACCURACY OF ANY DEPICTED UTILITY THAT WAS NOT DIRECTLY OBSERVED IN THE COURSE OF THIS SURVEY.

3.C: STATEMENT OF LIMITATIONS REGARDING UTILITY-DEPICTION ACCURACY: RMC HAS BEEN NOTIFIED THAT WILSON CAN NOT, AND DOES NOT, GUARANTEE THE ACCURACY, AT ANY LEVEL, OF DEPICTED UTILITIES BASED ON THIRD-PARTY PAINT MARKS OR RECORD INFORMATION.

CONTROL NOTES

HORIZONTAL DATUM:
NAD83/1998 PER CITY OF BELLINGHAM CONTROL NETWORK, PER THE RECORD OF SURVEY OF THE BELLINGHAM WATERFRONT CADASTRAL SURVEY NETWORK, PER THE MAP THEREOF AS RECORDED UNDER WHATCOM COUNTY AFN 2080302393.

BASIS OF COORDINATES: COORDINATION AND MENSURATION ARE LOCAL GROUND VALUES, BASED UPON HOLDING THE BRONZE DISC MONUMENT AT THE SOUTH SIDE OF THE INTERSECTION OF CORNWALL AVENUE AND LAUREL STREET, PUBLISHED AS CITY OF BELLINGHAM CONTROL POINT #592. SAID MONUMENT HAS THE FOLLOWING PUBLISHED POSITION:

NORTHING = 641,439.91 USFT
EASTING = 1,242,247.10 USFT

BASIS OF BEARINGS: BEARINGS ARE NAD83/1998, BASED UPON HOLDING THE PUBLISHED POSITIONS MONUMENTED BY CITY OF BELLINGHAM CONTROL POINTS #592 AND #593, BEING A BRONZE DISC MONUMENT AT THE CENTERLINE INTERSECTION OF CORNWALL AVENUE WITH W. MAPLE STREET.

THE DERIVED INVERSE BETWEEN SAID MONUMENTS #592 AND #593 IS NORTH 45° 41' 00" EAST, AT A DISTANCE OF 520.58 USFT. THE PUBLISHED POSITION FOR THE CITY OF BELLINGHAM MONUMENT #593 IS:

NORTHING = 641, 803.60 USFT
EASTING = 1,242,619.57 USFT

VERTICAL DATUM:
NAVD88 DATUM PER CITY OF BELLINGHAM WATERFRONT VERTICAL CONTROL NETWORK. (ROS AFN. 2080302393)

BASIS OF ELEVATIONS: ELEVATIONS ARE NAVD88 VALUES, BASED UPON HOLDING THE PUBLISHED ELEVATION FOR CITY OF BELLINGHAM CONTROL POINT #593, BEING THE BRONZE DISK SURFACE MONUMENT AT THE CENTERLINE INTERSECTION OF CORNWALL AVENUE AND W. MAPLE STREET. SAID MONUMENT HAS THE FOLLOWING PUBLISHED ELEVATION VALUE:
NAVD88-DATUM ELEVATION = 39.30 FEET

ON-SITE SURVEY CONTROL TABLE

WSE PNT. #	NORTHING	EASTING	ELEVATION	DESCRIPTION
170	641884.03	1242127.30	14.69	WSE SURVEY SPIKE
178	641428.38	1242269.20	20.54	WSE SURVEY NAIL
179	641768.05	1241896.49	14.52	WSE SURVEY SPIKE
592	641439.91	1242247.10	N/A	BSM COB NO 592 BOC
593	641803.60	1242619.57	39.30	BSM COB NO 593 BM
802	641522.21	1242269.56	18.77	WSE SURVEY NAIL
803	641664.21	1242244.90	16.88	WSE SURVEY NAIL
806	642167.89	1242484.87	14.94	WSE SURVEY NAIL
807	641781.75	1242524.86	17.37	WSE SURVEY REBAR + CAP
808	642498.48	1242580.62	17.24	WSE SURVEY REBAR + CAP

REFERENCE DOCUMENTS

1. WATERFRONT GENERAL BINDING SITE PLAN-- WHATCOM CO. AFN 2017-0801912
2. WATERFRONT SPECIFIC BINDING SITE PLAN NO. 1-- WHATCOM CO.AFN 2018-0201342
3. CITY OF BELLINGHAM WATERFRONT CADASTRAL SURVEY-- WHATCOM CO. AFN 2080302393

SURVEYOR'S NOTES

1. ANGULAR AND LINEAR MEASUREMENTS WERE COLLECTED USING A TRIMBLE S6 ROBOTIC TOTAL STATION. PAINTED UTILITY LOCATION MARKS WERE MEASURED USING A TRIMBLE R7 SURVEY-GRADE GNSS RECEIVER OPERATING IN NETWORKED RTK MODE. ADDITIONAL TOPO DATA WAS ACQUIRED USING UAV-BASED DATA ACQUISITION. INTRINSIC ERROR FOR DATA SO ACQUIRED SHOULD ONLY BE CONSIDERED ACCURATE TO THE NOMINAL +/- 0.5' LEVEL OF CERTAINTY IN UNOBSTRUCTED, AND NO ERROR ESTIMATE CAN OR WILL BE PROVIDED FOR UAV DATA ACQUIRED IN OBSTRUCTED OR VEGETATED AREAS.
2. ELEVATIONS OF WILSON CONTROL POINTS SHOWN IN THE ACCOMPANYING SURVEY CONTROL TABLE WERE ESTABLISHED BY CLOSED-LOOP DIFFERENTIAL LEVELS.
3. PROCEDURES IN THIS SURVEY MEET OR EXCEED STANDARDS SET FORTH BY WAC 332-130-090.
4. AT THE DIRECTION OF RMC, NO OUTSIDE CONSULTANT HAS PROVIDED A CURRENT, AUTHORITATIVE LOCATION FOR THE THE DEPICTED UNDERGROUND UTILITIES.
5. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A CURRENT TITLE REPORT, AND SOME ENCUMBRANCES OF RECORD MAY NOT BE DEPICTED, WHICH MIGHT HAVE BEN HAD A CURRENT TITLE REPORT BEEN PROVIDED.
6. THE VACATED RIGHTS-OF-WAY FOR COMMERCIAL AVENUE AND MAPLE STREET ARE DEPICTED ON THIS SURVEY. THE ORDINANCE (CITY OF BELLINGHAM ORD. 4840) WHICH VACATED THESE TWO STREETS IN THIS AREA SPECIFICALLY RETAINED TO THE CITY THE RIGHT TO CONSTRUCT UTILITIES WITHIN THE VACATED RIGHTS-OF-WAY. THE EXTENT TO WHICH THESE RETAINED RIGHTS STILL APPLY HAS NOT BEEN DETERMINED BY THIS SURVEY.
7. EXISTING SEGMENTS OF RAILROAD SPUR-LINES MAY EXIST WITHIN THE SUBJECT PARCEL. PER AFN 1246846, AFN 937904, AND AFN 524087, ALL INTEREST IN ANY FRAGMENTARY RAILROAD SPURS HAS BEEN ABANDONED BY THE GREAT NORTHERN RAILROAD COMPANY, THE PREDECESSOR-IN-INTEREST TO THE BURLINGTON-NORTHERN SANTA FE (BNSF) RAILROAD.

ABBREVIATIONS USED

AGL	= ABOVE NOMINAL GROUND LEVEL
AFN	= AUDITOR'S FILE NUMBER
℄	= CENTERLINE
CONC	= CONCRETE
CPP	= CORRUGATED POLYETHYLENE PIPE
E	= EAST
ELEV	= ELEVATION
INV	= INVERT
L/S	= LANDSCAPING
MON	= MONUMENT
N	= NORTH
NE	= NORTHEAST
NW	= NORTHWEST
S	= SOUTH
SE	= SOUTHEAST
SW	= SOUTHWEST
TYP	= TYPICAL
VAC	= VACATED R/W (MAY INCLUDE RETAINED UTILITY RIGHTS)
W	= WEST
WAC	= WASHINGTON CODE
WSE	= WILSON SURVEY/ENGINEERING

LEGEND - SIZE & SCALE MAY VARY

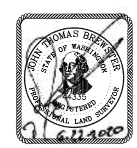
- 100 = MAJOR CONTOUR
- = MINOR CONTOUR
- = RIGHT-OF-WAY
- = RIGHT-OF-WAY CENTERLINE
- = PROPERTY BOUNDARY
- = CALC SECTION LINE
- = EASEMENT
- = EXISTING GRAVEL EDGE
- = EXISTING ASPHALT EDGE
- = EXISTING CONCRETE EDGE
- S S = EXISTING SANITARY SEWER
- G G = EXISTING GAS
- = STRIPING AND LANE DELINEATION
- X X = EXISTING FENCE
- = EXISTING HAND RAILING
- = EXISTING BUILDING
- = FOUND PROPERTY CORNER
- = EXISTING STORM DRAIN CATCH BASIN
- = EXISTING SANITARY SEWER MANHOLE

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT I AM A LICENSED LAND SURVEYOR IN THE STATE OF WASHINGTON, THAT THIS MAP IS BASED ON AN ACTUAL FIELD SURVEY DONE BY ME OR UNDER MY DIRECT SUPERVISION AND THAT ALL DATA SHOWN HEREON ACTUALLY EXISTS IN THE LOCATIONS SHOWN AT THE TIME OF THIS SURVEY. THIS TOPOGRAPHIC MAP WAS DONE AT THE REQUEST OF RMC ARCHITECTS IN 2020.

6-22-2020

JOHN THOMAS BREWSTER, P.L.S. NO. 44335 DATE



WILSON ENGINEERING
WILSONENGINEERING.COM

DESIGNED BY	DRAWN BY JGS/JTB	CHECKED BY JTB

RMC ARCHITECTS

LIGNIN PLANT UAV SURVEY

W.A.C. 332-130 COMPLIANCE SHEET

BELLINGHAM WASHINGTON

DATE	6-22-2020
SCALE	AS SHOWN
JOB NUMBER	2020-039
SHEET	1
PAGE	1 OF 3

PLOT SETTINGS: Adobe PDF, 22x34, Portrait, 1:1, WE APWA_UNSCREENED.ctb
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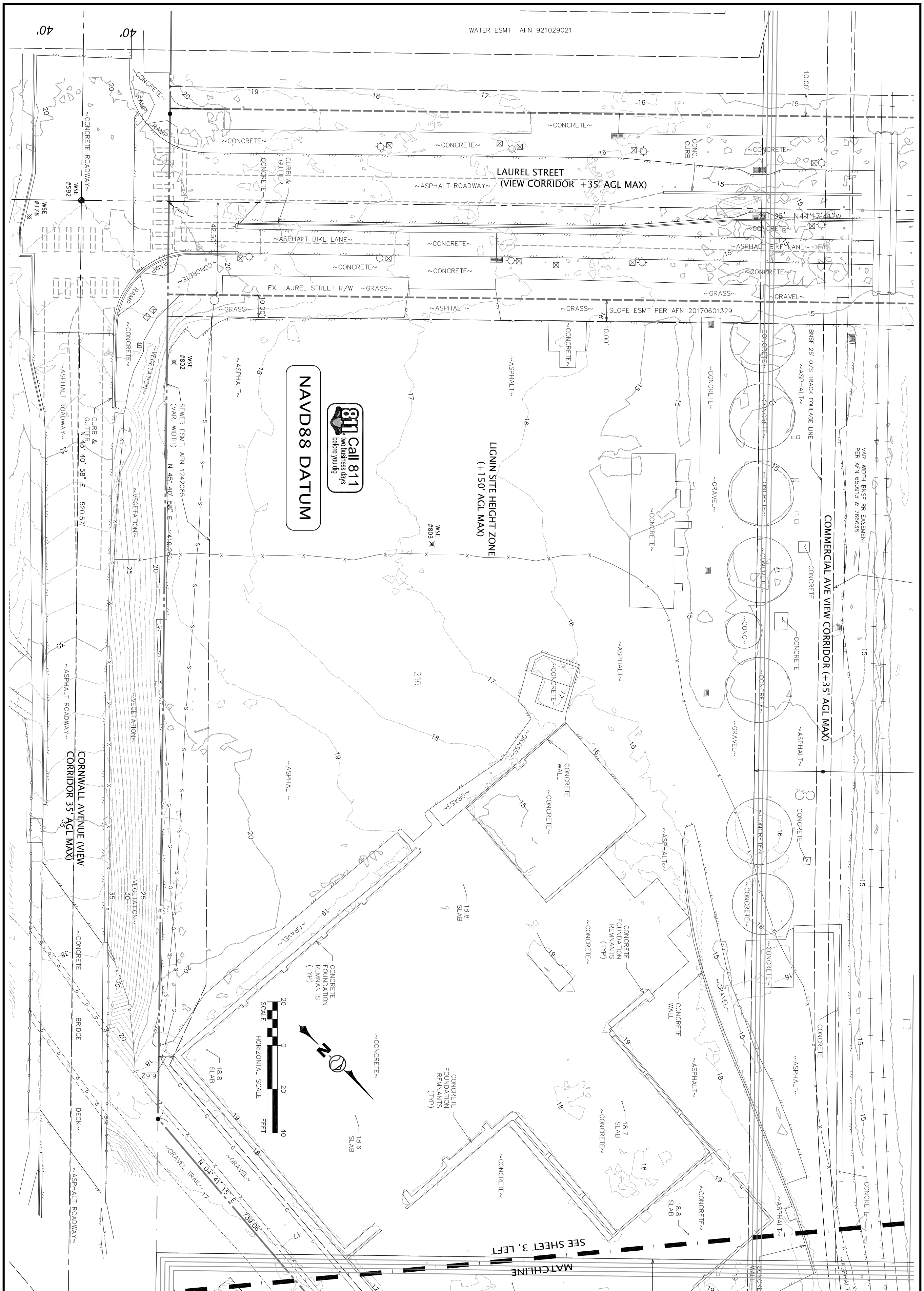
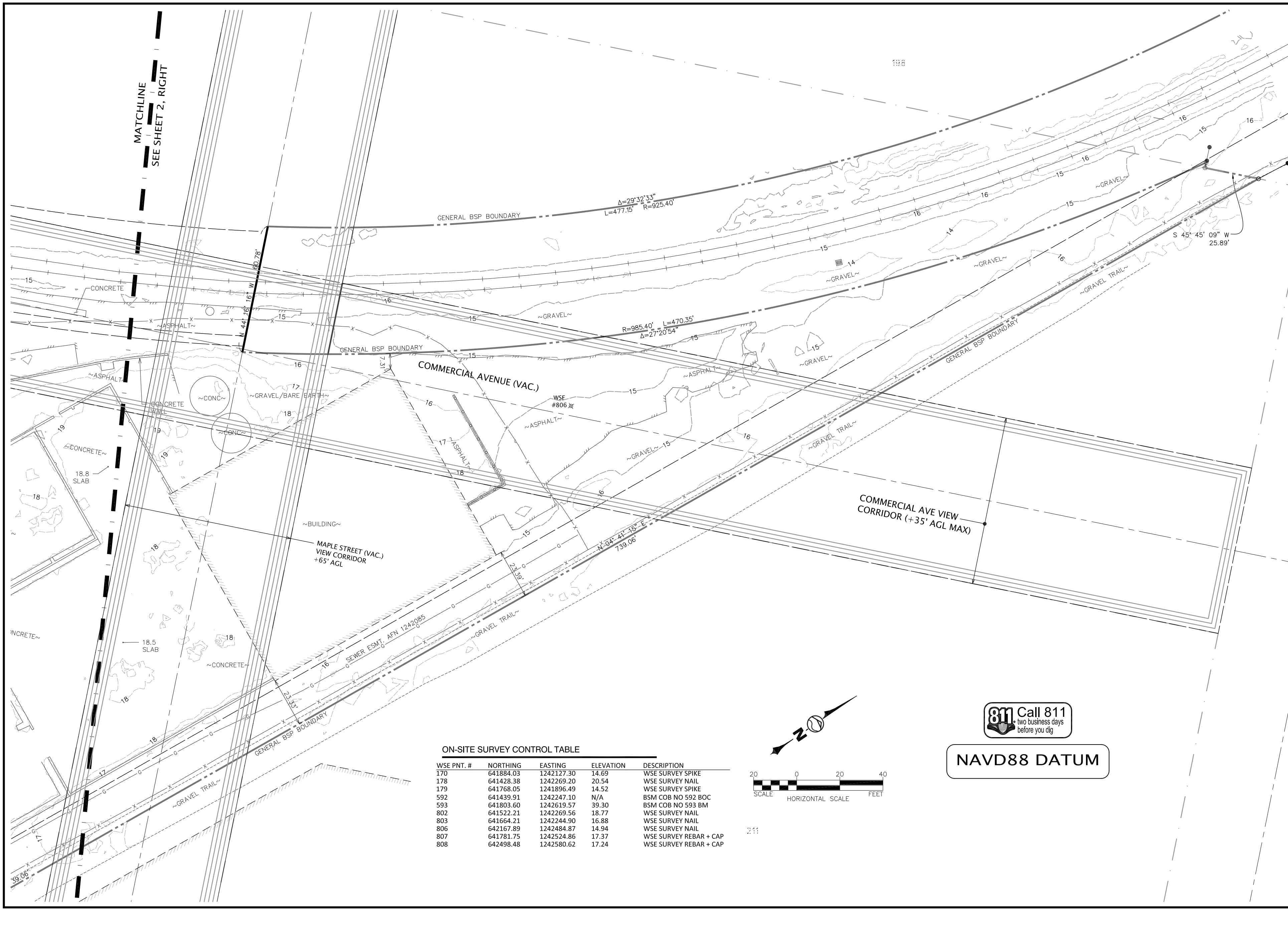
PLOT SETTINGS: Adobe PDF, 22x34, Portrait, 1:1, WE APWA_UNSCREENED.ctb
W:\2020\2020-039 RMC LIGNIN SITE SURVEY_JTB\DWG\20039SV00_VER2019.DWG - 6/23/2020 11:06 AM - Jeff Smith



SHEET	DATE	RMC ARCHITECTS	DESIGNED BY		
2	6-22-2020				WILSON ENGINEERING
	SCALE	BELLINGHAM WASHINGTON	DRAWN BY		
PAGE	AS SHOWN	LIGNIN PLANT SURVEY	JGS/JTB		
2 OF 3	JOB NUMBER		CHECKED BY		
	2020-039	PLAN SHEET 1	JTB		WILSONENGINEERING.COM

JOHN THOMAS BREWSTER
STATE OF WASHINGTON
44335
REGISTERED
PROFESSIONAL LAND SURVEYOR



Call 811 two business days before you dig

NAVD88 DATUM

ON-SITE SURVEY CONTROL TABLE

WSE PNT. #	NORTHING	EASTING	ELEVATION	DESCRIPTION
170	641884.03	1242127.30	14.69	WSE SURVEY SPIKE
178	641428.38	1242269.20	20.54	WSE SURVEY NAIL
179	641768.05	1241896.49	14.52	WSE SURVEY SPIKE
592	641439.91	1242247.10	N/A	BSM COB NO 592 BOC
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802	641522.21	1242269.56	18.77	WSE SURVEY NAIL
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807	641781.75	1242524.86	17.37	WSE SURVEY REBAR + CAP
808	642498.48	1242580.62	17.24	WSE SURVEY REBAR + CAP

WILSON ENGINEERING
WILSONENGINEERING.COM

JOHN THOMAS BREWSTER
STATE OF WASHINGTON
PROFESSIONAL LAND SURVEYOR

DESIGNED BY	DRAWN BY	CHECKED BY
	JGS/JTB	JTB

RMC ARCHITECTS
LIGNIN PLANT SURVEY
BELLINGHAM WASHINGTON
PLAN SHEET 2

DATE	SCALE	JOB NUMBER
6-22-2020	AS SHOWN	2020-039

SHEET 3
PAGE 3 OF 3

APPENDIX B: ENVIRONMENTAL AND GEOTECHNICAL REPORT OF FINDINGS

ENVIRONMENTAL AND GEOTECHNICAL ASSESSMENT REPORT OF FINDINGS

Lignin Parcel, GP West Site
Bellingham, Washington

Prepared for: RMC Architects LLC and Port of Bellingham

earth + water

Project No. 190239-001-1.4 • November 24, 2020 FINAL

Prepared under Integrated Planning Grant Agreement No. TCPIPG-1921-BellPo-00001

Aspect CONSULTING

Aspect CONSULTING

ENVIRONMENTAL AND GEOTECHNICAL ASSESSMENT REPORT OF FINDINGS

Lignin Parcel, GP West Site
Bellingham, Washington

Prepared for: RMC Architects LLC and Port of Bellingham

Project No. 190239-001-1.4 • November 24, 2020 FINAL

Aspect Consulting, LLC

Steve J. Germiat

November 24, 2020

November 24, 2020

Steve Germiat, LHG, CGWP
Principal Hydrogeologist
sgermiat@aspectconsulting.com

Erik Andersen, PE
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eandersen@aspectconsulting.com

V:\190239 Port of Bellingham Millworks Project\Deliverables\Report of Findings_Lignin Parcel\POB MIllworks Report of Findings Env_Geotech_Final.docx

Contents

List of Tables

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List of Appendices

Project Contacts

This Report of Findings is prepared in accordance with Integrated Planning Grant Agreement No. TCPIPG-1921-BellPo-00001 between the Washington State Department of Ecology and the Port of Bellingham. Contacts for the Integrated Planning Grant Project are as follows:

- Port of Bellingham Project Manager: Brian Gouran
- Port of Bellingham Billing Contact: Alan Birdsall
- Department of Ecology Project Manager: Margo Thompson
- Department of Ecology Financial Manager: Lydia Lindwall
- Department of Ecology Technical Advisor: Ali Furmall
- Department of Ecology GP West Site Manager: John Guenther

1 Project Overview and Goal for Assessment

In early 2019, the Washington State Department of Ecology (Ecology) selected the Port of Bellingham (Port) as a recipient of a Toxics Cleanup Healthy Housing Integrated Planning Grant (IPG) to fund early project planning efforts for the approximately 3-acre Lignin Parcel located at the corner of Cornwall and Laurel Streets within the Bellingham Waterfront District (Figure 1). The Lignin Parcel is part of the former Georgia-Pacific mill property, which is now the Georgia-Pacific West (GP West) cleanup site (Site) that requires remediation under the Model Toxics Control Act (MTCA) prior to redevelopment. The Port has been conducting environmental investigation and remediation at the Site since 2009 under legal agreements with Ecology.

For the past year, the Port has been working with a local development partner (Millworks, LLC) to evaluate the feasibility of a food campus and affordable/workforce housing at the Lignin Parcel. The Millworks group envisions a campus setting that includes food retail, processing and manufacturing, aggregation and distribution as well as commercial kitchen space supporting catering and artisanal food companies. Also anticipated on the Parcel is a multi-story mixed-use building with offices, classrooms, community event space, and workforce affordable housing. The project fits with the overall community goals of reactivation of the Site while providing much needed affordable housing.

The Port is using the IPG to advance the Millworks redevelopment concept by completing focused environmental investigations, site surveys, coordination with development partners and community stakeholders, and parcel layout/programming.

Task 1 of the IPG included focused environmental assessment, geotechnical/geophysical investigation, and Parcel-specific survey with the goal of advancing environmental and geotechnical characterization of the Lignin Parcel in preparation for redevelopment for affordable housing and other intended uses. A Work Plan for the Environmental and Geotechnical Assessment (Work Plan; Aspect Consulting [Aspect], 2020) was reviewed and approved by Ecology and describes the scope work for the Task 1 environmental and geotechnical assessments completed.

The subsequent sections of this Report are as follows:

- **Section 2** – Background for Lignin Parcel
- **Section 3** – Environmental Assessment Findings
- **Section 4** – Geotechnical Assessment Findings
- **Section 5** – References cited in this Report

2 Background for Lignin Parcel

The approximately 3-acre Lignin Parcel is located within the 36-acre Chlor-Alkali Remedial Action Unit (RAU) of the GP West cleanup Site. The 3 acres is part of the Reserve Tract of the Waterfront Binding Site Plan and is currently not an independent tax parcel; however, the Port may create a parcel or parcels encompassing the area on a subsequent Specific Binding Site Plan, and the term Lignin Parcel is applied to the subject property in this Report. Figure 2 shows the extents of the Lignin Parcel, including the former Lignin Warehouse structure that was demolished in May 2020, along with the subsurface explorations relied upon for the environmental and geotechnical assessments in this Report.

2.1 Industrial History

In 1926, the San Juan Pulp Company opened the first pulp mill on 5 acres of filled tideland adjacent to Bellingham Bay. It was designed to make use of pulp logs and fiber leftovers from a local wood box plant and several lumber mills. Three years later, the business was reorganized as the Puget Sound Pulp and Timber Company. In 1958, Puget Sound Pulp and Timber acquired the adjacent tissue manufacturing operations of Pacific Coast Paper Mills. In 1963, the company merged with the Georgia-Pacific Corporation who owned and operated the mill until the Port acquired it in 2005. Georgia-Pacific operated the pulp mill until 2001 and, under lease to the Port, operated the tissue mill until 2007.

The Georgia-Pacific mill manufactured bleached sulfite pulp for internal production of tissue and toweling, and for sale as market pulp. The mill contained six individual plants producing primarily sulfite pulp, Permachem pulp, sulfuric acid, chlorine, sodium hydroxide, alcohol, and lignosulfonate products. Lignin materials produced as biproducts in the pulping process were converted through various production steps into commercial products including chromium-containing oil-well drilling mud thinners, vanilla flavoring, animal feeds, adhesives, pharmaceuticals, dust retardants, fuel pellets, solvents, ferromagnetic liquids, and many other products.

On the Lignin Parcel, the lignin warehouse[1] (warehouse) was used for storage of the manufactured lignin-containing products. Waste liquors from the lignin processes were stored in a series of above-ground storage tanks ranging size from 30,000 to 150,000 gallons located on the western portion of the Parcel. Although materials containing hexavalent chromium were used in manufacture of lignin-based drilling mud products, all handling of those materials occurred within the Lignin Plant area north of the BNSF railroad (Aspect, 2004); there is no evidence for storage of materials containing hexavalent chromium on the Lignin Parcel, and the existing environmental sampling and analysis data from the Parcel (described below) are consistent with that.

[1] The lignin warehouse was demolished in May 2020.

2.2 Previous Subsurface Investigations

2.2.1 Prior Environmental Investigation

Prior to the Port's purchase of the entire Site, Georgia-Pacific completed a Phase 2 Environmental Site Assessment (ESA) for the Pulp and Tissue Mill portion of the Site. The Phase 2 ESA included soil and groundwater sampling and analysis on the Lignin Parcel[2] to evaluate potential impacts associated with the spillage of dry lignin products and/or waste liquor during historical loading of rail cars and/or release of lignin products from the overhead conveyor between the warehouse and rail spur (Aspect, 2004).

The 2004 characterization of the Lignin Parcel included drilling soil borings to a depth of approximately 15 feet with soil sampling to a maximum depth of 8 feet at five locations, and collection of four surface soil samples. These explorations were designated LW-SB01 through LW-SB06 (soil borings), LW-MW01 (monitoring well), and LW-SS01 through LW-SS04 (surface samples) at the locations shown on Figure 2. Boring LW-MW01 was located within the waste liquor tank area and was also completed as a groundwater monitoring well positioned near the downgradient (western) edge of the Parcel. Boring LW-SB01 was located south of the warehouse, and LW-SB02 was located adjacent to its western entrance. Borings LW-SB03 and LW-SB04 were located adjacent to the warehouse's northwestern and northern edges, in the vicinity of the conveyor and dry product storage tanks. Surface soil samples LW-SS01, LW-SS02, and LW-SS03 were collected along the rail spur located west of the warehouse (spillage of dry products was reported in this area by former Georgia-Pacific employees), and surface soil sample LW-SS04 was collected in the northeastern corner rail entrance (Figure 1).

In total, 14 soil samples were analyzed for total metals including hexavalent chromium, and semivolatile organic compounds (SVOCs) including polycyclic aromatic hydrocarbons (PAHs). One sample from each boring and the four surface soil samples were also analyzed for formaldehyde. Had field evidence of hydrocarbon or volatile organic compound (VOC) contamination been observed during soil sample collection, the corresponding soil samples would have been also tested for total petroleum hydrocarbons (TPH, in the gasoline, diesel, and oil ranges), VOCs, and, if heavy oil was suspected, for polychlorinated biphenyls (PCBs). No field screening indications of hydrocarbons/VOCs was observed during the sampling, so these additional analyses were not performed (Aspect, 2004). Table 1 includes the 2004 soil quality data.

The 2004 characterization also included installation and groundwater sampling of monitoring well LW-MW01. The groundwater sample was analyzed for metals, SVOCs including PAHs, VOCs, PCBs, and a range of conventional parameters. Following the Port's acquisition of the property from Georgia-Pacific in 2005, groundwater samples were collected from well LW-MW01 for metals analysis in September 2009 and March 2010 as part of the Port's Remedial Investigation (RI) for the Site. Table 2 presents the groundwater quality data for the Lignin Parcel.

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[2] Termed the Lignin Warehouse site (Mill B) in Aspect (2004).

2.2.2 Prior Geotechnical Investigation

A geotechnical engineering study (GeoEngineers, 2007) was completed in support of a potential relocation of the BNSF railroad main line traversing the Site along the western edge of the Lignin Parcel. As part of that study, three geotechnical soil borings—designated BB-1, BRR-1, and BRR-2 (Figure 2)—were drilled on the Lignin Parcel. These borings encountered, from the surface down: fill, beach/intertidal deposits, and Chuckanut formation (bedrock). The geologically unconsolidated fill and beach/intertidal deposits are generally unsuitable for foundation support for a new building; the underlying Chuckanut formation is competent and suitable for foundation support. The reported depths below ground surface to the top of the Chuckanut formation varied from 20.5, 29, and 46.5 feet, in BRR-1, BRR-2, and BB-1, respectively.

2.3 Subsurface Conditions

This section describes the current understanding of the geologic and groundwater conditions underlying the Lignin Parcel based on the prior and current investigations.

2.3.1 Geology

Material underlying the Lignin Parcel is characterized by fill placed over a wedge of unconsolidated materials all overlying the generally southward-sloping bedrock surface, as described below.

Fill

Geologic mapping of the Site indicate it is underlain by artificial fill (Lapen, 2000). The entirety of the Site including the Lignin Parcel was built on land formed by historical filling of a tidal flat area of the Whatcom Creek Delta starting in the early 1900s. The fill material comprising the Lignin Parcel primarily includes dredge fill placed hydraulically during 1912 and 1913 by the U.S. Army Corps of Engineers.

Fill material observed during the exploration activities consists primarily of silty sand (SM) with variable gravel and fines contents. Fragments of debris consisting of woody material or bricks were commonly encountered within the fill. The collective explorations indicate fill material extending to depths of about 5 to 12 feet below the ground surface (bgs) across the Parcel, corresponding to approximate elevation 8 to 13 feet above the North American Vertical Datum of 1988 (NAVD88).

The fill material has low shear strength, high compressibility, moderate hydraulic conductivity, and is susceptible to liquefaction.

Beach/Intertidal Deposits

Underlying the fill is a sequence of native marine beach/intertidal deposits ranging from about 10 to more than 35 feet thick. The beach/intertidal deposits generally consist of very loose to loose, sand (SP) or silty sand (SM) and commonly stratified with clay, sandy clay, or gravelly clay (CL). Our current assessment’s 15-foot-deep explorations terminated in these deposits.

Beach/Intertidal deposits have low shear strength, moderate compressibility, low to moderate hydraulic conductivity, and are susceptible to liquefaction.

Chuckanut Formation Bedrock

The unconsolidated soil units pinch out to the north and east of the Lignin Parcel to bedrock of the Chuckanut formation consisting of sandstone, shale, conglomerate, and coal (GeoEngineers, 2007; Lapen, 2000). Bedrock was not encountered by the termination depth (15-feet bgs) during the current assessment exploration activities.

GeoEngineers (2007) describes the Chuckanut formation bedrock encountered within the vicinity of the Lignin Parcel to consist of weathered sandstone that varied from friable decomposed rock to a less decomposed, sound rock. GeoEngineers (2007) stated that the bedrock could be drilled with a mud-rotary tri-cone bit; however, it was difficult to penetrate using a hollow-stem-auger drill rig. To our knowledge, rock-coring methods of explorations have not been conducted in the vicinity of the Lignin Parcel.

Bedrock surface elevations were estimated across the Lignin Parcel based on previous mapping by W.D. Purnell and Associates (1977) and supplemented by boring data from GeoEngineers (2007). Figure 3 presents the currently estimated bedrock surface elevation contours for the Lignin Parcel area using the collective information. The bedrock surface is estimated to be at a maximum elevation of around -5 feet NAVD88 in the northern portion of the Site and a minimum elevation of around -40 feet NAVD88 in the southern portion of the Parcel. These elevations correspond to depths of about 20 feet bgs in the northern portion and about 50 feet bgs in the southern portion of the Parcel, indicating a steep southwestward-sloping bedrock surface. Purnell (1977) maps the bedrock surface diving to an elevation below -120 feet NAVD88 (depths of 140+ feet bgs) approximately 400 to 500 feet southwest of the Lignin Parcel.

The Chuckanut formation typically has little primary porosity and limited groundwater movement through fractures. Chuckanut formation bedrock has high shear strength, very low compressibility, and is not susceptible to liquefaction.

2.3.2 Groundwater Conditions

Across the broader Site, the three hydrostratigraphic units of primary interest include, from surface down: the Fill Unit, a low-permeability Aquitard representing the historical tide flat surface that fill was placed upon, and a deeper sand unit under artesian conditions referred to as the Lower Sand Unit (Aspect, 2013). Within the Lignin Parcel, the Beach-Intertidal deposits lacked a consistent silty (low-permeability) horizon and it does not appear that an aquitard unit exists beneath the fill across the entire Parcel.

During the current exploration activities in early August 2020 (dry season), groundwater was measured at depths ranging from about 3 to 10 feet bgs, representing a water table elevation of about 10 to 13 feet NAVD88. At monitoring well LW-MW01, located along the western boundary of the Lignin Parcel (Figure 2), depth to the water table ranged between 4.2 and 5.6 feet bgs (elevations 9.9 to 11.3 feet NAVD88) when measured in 2004, 2009, and 2010. During the August 2020 field data collection, depth to water was measured at 6.5 feet bgs in LW-MW01 (elevation 9.0 feet NAVD88), confirming the dry-season condition. The water table depth is expected to be shallower along the eastern and northeastern sides of the Parcel. Groundwater in the Fill Unit and underlying unconsolidated deposits flows generally westward with discharge to the Whatcom Waterway.

3 Environmental Assessment Findings

This section describes the supplemental environmental soil sampling and analysis conducted under the IPG and then, integrating the new and prior data, the updated understanding of contaminant conditions for Lignin Parcel soil and groundwater.

3.1 Supplemental Sampling and Analysis Conducted

In accordance with the Work Plan, supplemental soil sampling and analysis was conducted from six direct-push soil borings to a depth of 15 feet on August 3, 2020. No groundwater sampling was conducted in this environmental assessment, with the expectation that groundwater monitored natural attenuation (MNA) performance monitoring will be conducted for the Lignin Parcel in accordance with a monitoring plan to be developed and approved by Ecology following finalization of the Chlor-Alkali RAU CAP.

The assessment's six new soil borings (LW-SB101 through LW-SB106) included two advanced through the floor slab of the former warehouse and four outside of it at locations depicted on Figure 2. The soil borings were completed by a state-licensed resource-protection well driller from Cascade Drilling of Woodinville, Washington. A state-licensed geologist from Aspect conducted geologic logging and soil sampling for the borings. In accordance with the Work Plan's Inadvertent Discovery Plan (IDP), Aspect's geologist watched for indications of potential archaeological materials during logging of the soil cores. No such materials were observed. Appendix A includes boring logs for the six new borings.

At each of the six boring locations, a surface soil sample was collected from the upper 1-foot interval beneath pavement/floor slab grade. There were no field screening[3] indications of contamination in any of the borings; therefore, deeper soil samples were collected from each boring from just below the water table observed during drilling and at a depth approximately 3 to 4 feet below the water table.

The soil samples were submitted to OnSite Environmental in Redmond, Washington, an Ecology-accredited analytical laboratory, for analysis of the following constituents that had exceedances of cleanup levels in soil during the prior sampling on the Parcel:

- Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc)
- Polycyclic aromatic hydrocarbons (PAHs)
- Diesel-/oil-range total petroleum hydrocarbons (TPH)

The environmental sampling and analysis were performed in accordance with the Work Plan's Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) (Aspect, 2020). Aspect's field geologist also conducted the field work in accordance with

[3] Visual and olfactory observations, and photoionization detector (PID) readings, as described in the Work Plan's Sampling and Analysis Plan (Appendix A in Aspect, 2020).

Aspect's site-specific Health and Safety Plan that included hygiene and social distancing protocols specific to COVID-19.

3.2 Soil Quality within Lignin Parcel

The Lignin Parcel soil contaminant conditions are evaluated relative to soil cleanup levels established in Ecology's Draft Cleanup Action Plan (DCAP) for the Chlor-Alkali RAU that encompasses the Parcel (Ecology, 2020). The soil cleanup levels are for an unrestricted land use, which assume a residential child lifetime direct contact exposure and account for contaminant leaching to groundwater. Table 1 presents the collective Parcel soil data compared against cleanup levels, with shading of detected concentrations exceeding cleanup levels. The DCAP has yet to go through public comment and be finalized, and there is a small chance that the cleanup levels could change in that process.

Contaminants exceeding cleanup levels in Lignin Parcel soil include carcinogenic polycyclic aromatic hydrocarbons (cPAHs), selected metals, and, in shallow soil at the LW-SB01 location, soil pH. Concentrations of semivolatile organic compounds (SVOCs) other than cPAHs and of formaldehyde were less than respective soil cleanup levels in each of the 15 historical soil samples collected.

Diesel- and oil-range TPH concentrations were also below the cleanup level in each of the 18 soil samples collected in August 2020 (Table 1). However, TPH was detected in surface soil samples at three of the six boring locations—LW-SB102 (801 mg/kg[4]), LW-SB104 (199 mg/kg), and LW-SB104 (76 mg/kg)—and in the 10-foot soil sample collected from boring LW-SB104 (95 mg/kg), which would restrict options for potential reuse of the soil if excavated as per Ecology guidance (Ecology, 2016).

Figure 4 shows the spatial distribution of locations with detected cPAH and metals concentrations exceeding soil cleanup levels, as described briefly below.

3.2.1 cPAHs

Total cPAH (TEQ[5]) concentrations exceeding the cleanup level were detected in soil samples collected around the former warehouse on the west and north sides (0.8 to 29 mg/kg) and on the south side (0.47 mg/kg). cPAH concentrations in soils collected beneath the former warehouse floor slab were less than the cleanup level. Based on the current data, Figure 4 depicts the estimated extent of cPAH-contaminated soils within the Lignin Parcel.

The highest cPAH concentrations occur in shallow soils adjacent to the former railroad spur on the west side of the former warehouse and are attributable to creosote-treated railroad ties on the spur. The only sample location for which cPAHs exceeded the soil

[4] Reported TPH concentrations are the summation of diesel- and oil-range concentrations in accordance with Ecology policy.
[5] Total toxic equivalent concentration of benzo(a)pyrene calculated in accordance with MTCA (WAC 173-340-708(e)).

cleanup level at a depth greater than 4 feet was LW-SB03 located near the northwest corner of the former warehouse (1.0 mg/kg in the 4-to-8-foot-depth sample; Table 1).

The soil cleanup level for total cPAHs (TEQ) (0.19 mg/kg) in unsaturated and saturated soils[6] is based on human direct contact with soils.[7] The detected cPAHs in some soil samples also exceed higher concentrations predicted to pose a risk via leaching to groundwater (6.2 mg/kg for unsaturated soil, 0.31 mg/kg for saturated soil; Aspect, 2013). However, cPAHs are hydrophobic compounds with low solubility and mobility in the environment, particularly in soils with relatively high organic carbon content as exist beneath the Lignin Parcel. Consistent with those characteristics, cPAHs were not detected in the groundwater samples collected from monitoring well LW-MW01 located along the Parcel's western boundary (Table 2), suggesting that the cPAH concentrations in soil are protective of groundwater in accordance with MTCA (WAC 173-340-747(9)).

3.2.2 Metals

The heavy metals[8] cadmium, chromium, copper, lead, nickel, and zinc were detected in one or more soil samples at concentrations exceeding respective soil cleanup levels, all of which are based on soil leaching to groundwater (not direct contact[9]). Most locations sampled have an exceedance of one or more metals as indicated on Figure 4. Of the various metals, copper and zinc have the most widespread exceedances. Concentrations of copper and zinc are commonly elevated in urban soils as a result of vehicle traffic (copper in brake pads, zinc in tires) as well as building materials (copper in plumbing and wiring, zinc in galvanized metal).

Copper concentrations exceeding the 36 mg/kg soil cleanup level were detected at 10 of the 14 sample locations. Copper concentrations greater than two times the cleanup level (72 mg/kg) were limited to surface soils at two locations: LW-SS02 on the west side of the former warehouse (88 mg/kg) and LW-SB106 within its footprint (650 mg/kg).

Zinc concentrations exceeding soil cleanup levels (100 mg/kg for unsaturated soil; 85 mg/kg for saturated soil) were detected at 7 of the 14 sample locations, with concentrations greater than 200 mg/kg limited to shallow soils (Table 1). The maximum concentration (1,450 mg/kg) occurred in surface soil at LW-SS04 located adjacent to the former warehouse's northern edge (Figure 4).

The other soil metals exceedances—cadmium, chromium, nickel, and lead—are collocated with copper and/or zinc exceedances in shallow soil, except for the cadmium exceedance (11 mg/kg) in shallow soil at the LW-MW01 location (Table 1).

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[6] Unsaturated and saturated soils occur above and below, respectively, the groundwater table.
[7] Soil cleanup levels based on direct contact apply to a depth of 15 feet as per MTCA.
[8] The soil metals analyses were run by EPA Method 6010 whereas the Work Plan Quality Assurance Project Plan indicated EPA Method 200.8 as the method. Method 200.8 is for water matrices and was an error in the Work Plan.
[9] Soil concentrations protective of groundwater for the metals cadmium, hexavalent chromium, copper, nickel and zinc (saturated soil only) are calculated/predicted to be below natural background soil concentrations and thus are set at natural background in accordance with MTCA.

As stated above, all of the soil cleanup levels for metals are based on soil leaching to groundwater. As discussed in Section 3.3, chromium was the only metal detected in Lignin Parcel groundwater at concentrations exceeding groundwater cleanup levels during the GP West Site RI sampling (Aspect, 2013), suggesting that the concentrations of metals other than chromium in Lignin Parcel soil are protective of groundwater in accordance with MTCA (WAC 173-340-747(9)).

3.3 Groundwater Quality within the Lignin Parcel

During the 2004 groundwater sampling of well LW-MW01, TPH, PAHs, other SVOCs, VOCs, PCBs were generally not detected, and the concentrations detected were less than screening levels applied in the RI (Aspect, 2013). However, each of the heavy metals analyzed in the groundwater sample exceeded cleanup levels.[10] The 2009-2010 groundwater data from well LW-MW01 showed substantial improvement in metals concentrations relative to 2004; however, total chromium exceedances persisted (Table 2).

Groundwater pH at LW-MW01 also showed a substantial decline between 2004 and 2009-2010, but the 2010 measurement (pH = 8.9) was slightly above the pH 8.5 cleanup level. The slightly higher dissolved oxygen and lower temperature measured at the well in Spring 2010 versus Fall 2009 is likely indicative of cooler, more oxygen-rich recharge infiltrating to the Fill Unit groundwater during the intervening wet season (Table 2).

3.4 Cleanup Action Planning for the Lignin Parcel

Ecology's DCAP for the Chlor-Alkali RAU includes a cleanup action that addresses the full 36 acres including the 3-acre Lignin Parcel (Ecology, 2020). The DCAP focuses on the RAU's primary contaminant of concern—highly concentrated mercury in the area of Georgia-Pacific's historical chlorine plant located more than 1,000 feet south of the Lignin Parcel. The Lignin Parcel has not been impacted by mercury contamination from the former chlorine plant operations.

The DCAP's selected cleanup action for the Lignin Parcel currently includes two primary elements:

- Capping (containment) of the cPAH-contaminated soil on the west side of the former warehouse
- Groundwater monitoring in well LW-MW01 to document performance for the natural attenuation of residual alkaline pH and associated dissolved metals concentrations in achieving cleanup levels

Because the proposed cleanup action would contain contaminated materials throughout the RAU, an environmental covenant would be placed on the RAU including the Lignin Parcel. The covenant, similar to that in place now on the Pulp and Tissue Mill RAU

[10] The reporting limit for hexavalent chromium was elevated (Aspect, 2004), but subsequent samples collected in 2009 and 2010 confirmed no concentrations above the cleanup level (Table 2).

immediately to the northwest of the Parcel, would require inspection and maintenance of the environmental cap in perpetuity.

At the time the DCAP was originally developed, there was not a defined project in the vicinity of the Lignin Parcel. Now that planning for a mixed use redevelopment of the Lignin Parcel, including residential use, is in process, the Port and Ecology can formulate a parcel-specific strategy for integrating cleanup and redevelopment of the Lignin Parcel, to optimize protectiveness for the future use and cost-effectiveness. For example, depending on the earthwork concepts for the redevelopment, it may prove to be more practicable to remove the cPAH-contaminated soils, which occur at shallow depth, during redevelopment instead of capping it as currently contemplated under the RAU's DCAP. Removal of contaminated soil could be accomplished most cost effectively when the redevelopment earthwork is occurring, so that efficiencies with site excavation, backfill, and final grading could be realized. Removing instead of capping the contaminated soils would increase the permanence of the RAU's cleanup remedy and have an added benefit of limiting long-term institutional controls on the Lignin Parcel. However, changing from soil containment to removal would represent a change to the RAU's current DCAP and thus would require close coordination with Ecology as the redevelopment project's planning progresses. It would also require design-level soil sampling to more precisely delineate the extent of cPAH-contaminated soils.

At the time of this Report, Ecology is preparing the DCAP for public comment in accordance with MTCA. Ecology will then address public comments and issue a final CAP. Thereafter, the Port will conduct remedial design for the selected cleanup action, including pre-remedial design investigations (PRDI) to refine design parameters and inform constructability for cleanup of the mercury-contaminated areas of the RAU. The design process will involve preparation of PRDI Work Plan(s), PRDI Data Report(s), Engineering Design Report(s), and Construction Plans and Specifications for the Port's competitive bidding and contracting of the construction elements of the selected cleanup action, which may be divided into multiple projects for contracting and execution. The remedial design is anticipated to be a multi-year process culminating in a Consent Decree between Ecology and the Port that requires completion of the final cleanup action design.

It may be possible to complete remediation of the Lignin Parcel with a process separate from the more involved mercury cleanup activities within the Chlor-Alkali RAU. This potentially could include defining the Lignin Parcel as its own RAU within the GP West Site, subject to agreement with Ecology and appropriate legal documentation.

4 Geotechnical Assessment Findings

This section presents preliminary geotechnical design and construction considerations for the redevelopment concept. Our main conclusions and recommendations include:

- The Site is underlain by weak and compressible fill and beach deposits that range between 20 and 47 feet in thickness where explored. These weak and compressible deposits are underlain by competent Chuckanut formation bedrock. Below the groundwater level, the loose fill and beach deposits are susceptible to liquefaction-triggered strength loss and associated permanent ground deformation during a design-level earthquake. To mitigate these hazards, we recommend the new buildings either be supported on deep foundations that penetrate the fill and beach deposits and reach the underlying bedrock or be constructed over improved ground. Depending on serviceability requirements, at-grade floor slabs may also need to be structurally supported or built over improved ground.

- We understand that building concepts do not presently include below-grade parking or basement areas, but this could change. If basements are to be added, the design would need to consider the relatively shallow depth to groundwater (approximately 5 feet). A relatively water-tight basement could be constructed utilizing with interlocking steel sheet piling basement walls with welded interlocking joints, and a buoyancy-compensated concrete floor slab with waterproofing admixtures. Temporary shoring and dewatering would be needed during construction.

4.1 Seismic Hazards

The Site is located in a seismically active region and will experience strong ground shaking during earthquakes. New buildings will be designed to account for the effects of earthquake ground shaking in accordance with the current applicable codes.

4.1.1 Liquefaction

Liquefaction occurs when loose, saturated, and relatively cohesionless soil deposits temporarily lose strength and stiffness as a result of earthquake shaking. Primary factors controlling the triggering of liquefaction include intensity and duration of strong ground motion, characteristics of subsurface soils, *in situ* stress conditions, and the depth to groundwater.

The loose, saturated granular deposits underlying this Site could liquefy during a design-level earthquake. Potential effects of soil liquefaction include temporary reduction of shallow foundation bearing capacity, downdrag loads on deep foundations, vertical ground settlement, and permanent lateral ground movement. Liquefaction-induced permanent ground deformation could range from several inches to a couple of feet and would vary across the Site due to the varying thickness of the liquefiable fill and beach deposits. This hazard will need to be fully evaluated during the detailed building design phase.

4.1.2 Ground Response

Based on the presence of potentially liquefiable soils, we preliminarily designate the Site as seismic Site Class F in accordance with the 2018 International Building Code (IBC; ICC, 2018) and American Society of Civil Engineers (ASCE) 7-16, *Minimum Design Loads for Buildings and Other Structures Loads* (ASCE, 2017). For a Site Class F site, a site-specific ground response analysis is required. However, if a building on a Site Class F site has a fundamental period less than 0.5 seconds, the code allows for a Site Class E designation in lieu of a site-specific ground response analysis.

Our recent experience is that buildings greater than five stories tall may have fundamental periods of vibration greater than 0.5 seconds. If ground improvement below a building is used to mitigate liquefaction triggering, then the Site can be designated Site Class D. Geotechnical and structural engineering coordination will be needed to assess seismic risk during the detailed design phase of the project.

4.2 Building Foundations and Floor Slabs

The loose fill and beach deposits underlying the Site are compressible and susceptible to liquefaction. Grade-supported buildings over these soils will have a high potential for settlement under static loads and would likely sustain significant damage (or could even collapse) due to soil liquefaction during design-level earthquake ground shaking. Multi-story (three or more levels) buildings should be supported on deep foundations. Single- to two-story buildings could be supported similarly, or on rafted structural slabs combined with ground improvement.

The suitability of deep foundations vs. shallow foundations over improved ground will depend on building loads and performance requirements.

4.2.1 Deep Foundations

Deep foundations that bypass the fill and beach deposits and transfer loads to the underlying bedrock can be utilized to support new buildings. Deep foundations will not mitigate liquefaction triggering, but rather they will mitigate the effects of liquefaction (building settlement). The deep foundation design would need to consider liquefaction-induced downdrag loads imposed on the foundations by the surrounding settling soil.

In our opinion, there are several types of deep foundation systems that may be suitable for the Site considering the anticipated building sizes. These systems include driven piles, driven grout piles, and auger-cast piles.

Suitable types of driven piles include open or closed-end steel pipe piles or driven H-piles. Two benefits of driven piles are that they do not produce spoils and their capacities can be measured in the field during driving. Closed-end pipe piles can also be inspected for damage during or following driving. One potential disadvantage of displacement piles (such as closed-end steel pipe piles) at this Site is that pile driving “refusal” conditions will likely develop within about one or two pile diameters of the top of the Chuckanut formation. Where the depth to bedrock is less than about 25 feet, displacement piles may not be deep enough to develop lateral fixity. Open-end pipe piles will develop a soil plug that will tend to act like a closed end; however, a drilling and driving technique can be employed to disturb soil ahead of the pile tip to make for easier driving, and to remove soil and prevent a plug from developing. Low-displacement H-piles will develop a greater embedment depth into the Chuckanut formation. Pile driving will generate noise and vibrations, which we do not anticipate to be a major concern at this Site.

Driven grout piles are proprietary ‘hybrid’ deep foundation system installed by a regional contractor. Driven grout piles are installed by 1) driving a displacement mandrel through the subsurface to the design depth or specified driving resistance and 2) retracting the mandrel while pumping grout to create a grout-filled shaft. Reinforcement (typically a rebar cage) is then wet-set into the freshly grouted shaft. Similar to a driven displacement pile, driven grout piles will likely meet with “refusal” conditions very close to the top of the Chuckanut formation.

Auger-cast piles are constructed by rotating a continuous flight of hollow-stem auger to a specified depth. Once the specified depth is reached, grout is pumped through the hollow stem as the auger is slowly withdrawn, creating a column of grout. Steel reinforcement is then wet-set into the freshly grouted column. One advantage of auger-cast piles is that the auger will likely achieve greater penetration into the Chuckanut formation, compared to displacement piles. Potential disadvantages of auger-cast piles are 1) they will produce spoils that will have to be dealt with; 2) their axial compressive capacities cannot be verified during installation; and 3) their quality is highly dependent on the skill and experience of the contractor.

For planning purposes, we estimate that deep foundation lengths will vary between about 25 and 50 feet in length, with pile lengths increasing from northeast to southwest across the Site. A summary of the advantages and disadvantages of the deep foundations discussed above are presented in Table 3 below.

Table 3. Advantages and Disadvantages of Various Deep Foundation Systems

Deep Foundation System	Advantages	Disadvantages
Driven displacement piles (i.e., closed-end steel pipe piles)	Densifies soil during driving; spoils are not produced; pile capacity can be verified during driving; piles can be inspected for damage	We likely meet with driving refusal at the top of the Chuckanut formation; pile driving produces noise and vibration
Driven open-end steel pipe piles	Open ended pipe piles can be socketed into the Chuckanut formation with a drill-and-drive operation; pile capacity can be verified during driving	Drill and drive operation will produce spoils; pile driving produces noise and vibration
Driven H-piles	Can potentially penetrate into Chuckanut formation; spoils are not produced; pile capacity can be verified during driving	Pile driving produces noise and vibration
Driven Grout Piles	Densifies soil during driving; spoils are not produced; pile capacity can be verified during driving	Will likely meet driving refusal at the top of the Chuckanut formation; pile driving produces noise and vibration
Auger-cast piles	Auger can be advanced into the Chuckanut formation	Produces spoils; quality is dependent on contractor skill and experience; capacity cannot be verified during installation

4.2.2 Ground Improvement

Shallow foundations and/or rafted slabs combined with ground improvement will be feasible for lighter buildings (1 or 2 stories) at the Site. Ground improvement consists of modifying weak or marginal *in-situ* soils to create a stiffer soil mass with improved engineering characteristics, such as higher bearing capacity, lower compressibility under loads, and reduced liquefaction susceptibility. Ground improvement is typically achieved through densification and/or replacing a portion of the *in-situ* soils with stiffer materials. In our opinion, the subsurface conditions may be suitable for ground improvement using stone columns or rammed aggregate piers (RAPs).

Stone columns and RAPs consist of columns of compacted angular crushed rock installed within a soil mass. The stone columns/RAPs are typically 20 to 36 inches in diameter and are installed by vibrating a mandrel or probe through the subsurface to the desired depth. Once the desired depth is reached, the mandrel/probe is retracted as crushed rock is injected and compacted in lifts.

If installed on close enough spacing, the stone columns/RAPs can effectively mitigate liquefaction triggering because 1) they densify the surrounding soil; 2) the columns themselves are not liquefiable; and 3) the columns are free draining and provide a path for pore water pressures generated in the surrounding soils during earthquake shaking to dissipate. When the stone columns/RAPs are installed below shallow foundations, their high stiffness relative to the surrounding weak soil attract most of the applied foundation loads, thereby reducing the loads imposed on the surrounding weak soil and reducing settlement.

With ground improvement, liquefaction triggering will be substantially mitigated but some ground deformation could still occur during an earthquake. Therefore, where ground improvement is utilized, it may be necessary to support buildings on heavily reinforced mat foundations to help distribute the building loads, improve building performance, and mitigate structural damage.

Our conceptual ground improvement below buildings (where deemed feasible) consists of 30-inch diameter (minimum) stone columns/RAPs spaced in a 6- to7-foot triangular grid pattern below a mat foundation. The stone columns/RAPs would extend at least 10 feet beyond the edges of the mat foundation and would extend to the top of the bedrock between 25 and 50 feet bgs. With this concept, we expect the mat foundation can be designed for an allowable bearing pressure on the order of 3 to 4 kips per square foot (ksf).

Aspect will be available to support the design team with a critical cost/benefit evaluation of this alternative compared with deep foundations.

4.2.3 Floor Slabs

Where building serviceability requirements will not allow for differential slab settlement and associated cracking (such as where heavy forklifts would operate), concrete floor slabs will need to be structurally designed as pile supported or as rafted structural mats over improved ground. In non-critical areas, conventional slab-on-grade construction would be feasible.

4.3 Temporary Shoring and Construction Dewatering

In the event that building concepts evolve to include permanent basements, this section provides general recommendations for temporary shoring and construction dewatering.

Excavations deeper than about 5 feet bgs will encounter groundwater and saturated soil conditions. Therefore, we recommend a relatively watertight shoring system consisting of interlocking steel sheet piling.

This system would utilize interlocking steel sheet piling augmented with internal bracing or external ground anchors (tieback anchors) for lateral support, if necessary. Construction dewatering would be completed using a well point or deep well system and excavation would be accomplished "in the dry." The elements of this system and likely construction sequence, are described below.

1. Heavy walled Z-section steel sheet piling would be installed using either vibratory or press-in methods to the required depth for stability and groundwater control. We expect the tips of the sheet piles would extend approximately 20 feet below the bottom of the excavation.
2. The dewatering system would be installed around the interior perimeter of the sheet piling, within the corrugated pockets (i.e., fluting) of the sheets.
3. Excavation would begin and the dewatering system would be put into operation as the excavation comes within a few feet above the groundwater level.
4. The excavation would continue down to the planned bottom. One or more levels of internal bracing or tieback anchors, if required, would be installed as the excavation is advanced.
5. Once the excavation has reached the target depth, a thick concrete slab (tremie slab) would be placed. The thickness of the slab needs to be sufficient to counteract upward buoyant forces on the floor slab.
6. Dewatering would continue until the permanent basement walls and floor are completed. Minor leakage would be managed using interior sumps and submersible pumps. Groundwater collected by the dewatering system would require treatment to meet water quality standards prior to discharge.

A shoring deformation monitoring program will need to be undertaken during construction to monitor shoring wall performance and deformation of adjacent sidewalks, streets, and the adjacent BNSF railroad.

4.4 Permanent Subsurface Drainage

For buildings constructed entirely above grade, we expect that conventional subsurface drainage consisting of perimeter footing drains will be feasible. For buildings with basements extending below groundwater, we recommend they be designed and constructed with a relatively watertight basement system as described above. Minor leakage into the basement would be managed using interior sumps and pumps.

4.5 Earthwork Considerations

4.5.1 General

In our opinion, the couple feet of remedial excavation that will be necessary to clean up the Site can be accomplished with conventional tracked excavators and dozers. The same is true for excavations that extend deeper, such as for a basement. However, due to the Site history, it should be expected that unknown or relic buried structures, foundations, and utilities will be encountered during construction.

Site earthwork must consider environmental factors and be accomplished in a manner that satisfies the environmental requirements for site development.

4.5.2 Reuse of On-Site Soil

The on-site soils have appreciable fines (soil particles passing the No. 200 sieve), which makes them susceptible to disturbance from construction traffic and difficult to compact, especially during wet weather. In our opinion, the on-site soils are not suitable for reuse as structural fill beneath and around foundations, slabs, pavements, or walls. Environmental factors are also expected to limit their suitability for reuse.

For planning purposes, all excavated soil should be exported from the Site and all structural fill that is required should be clean imported granular soil.

4.6 Recommendations for Further Study

The preliminary conclusions and recommendations presented in this report are based on limited data from existing environmental explorations completed at the Site, and our experience with similar redevelopment projects. Additional geotechnical explorations and laboratory testing will be necessary to verify and further characterize the subsurface conditions, inform foundation and/or ground improvement design, and to further evaluate groundwater conditions and construction dewatering (if required). Depending on the selected foundation systems and building characteristics (i.e., fundamental periods), a site-specific ground response analysis may be required to develop seismic design response spectra.

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Limitations

Work for this project was performed for RMC Architects Inc. (Client), and this report was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This report does not represent a legal opinion. No other warranty, expressed or implied, is made.

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TABLES

Table 1. Soil Quality Data for Lignin Parcel

Project 190239, Lignin Parcel, GP West Site, Bellingham, Washington

				Current Explorations													Current Explorations				
			Location	LW-SB101	LW-SB101	LW-SB101	LW-SB102	LW-SB102	LW-SB102	LW-SB103	LW-SB103	LW-SB103	LW-SB104	LW-SB104	LW-SB104	LW-SB105	LW-SB105	LW-SB105	LW-SB106	LW-SB106	LW-SB106
			Depth	1 ft	10.5 ft	13.5 ft	1 ft	8 ft	11 ft	1 ft	7.3 ft	11 ft	1.5 ft	5 ft	10 ft	1.5 ft	7 ft	12 ft	2 ft	8 ft	11.5 ft
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
			Date	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020
Analyte	Unit	Unsaturated Soil Cleanup Level	Saturated Soil Cleanup Level																		
Metals																					
Arsenic	mg/kg	20	20	10 U	12 U	12 U	11 U	12 U	13 U	11 U	12 U	12 U	11 U	13 U	15 U	11 U	13 U	13 U	14 U	13 U	12 U
Cadmium	mg/kg	1	1	0.52 U	0.62 U	0.60 U	0.54 U	0.61 U	0.64 U	0.53 U	0.60 U	0.60 U	0.56 U	0.63 U	0.75 U	0.54 U	0.65 U	0.65 U	0.68 U	0.63 U	0.60 U
Chromium	mg/kg	5200	260	21	17	29	31	13	17	14	17	26	58	16	38	19	26	15	150	17	14
Chromium (VI)	mg/kg	48	48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	mg/kg	36	36	24	10	25	34	5.8	6.4	23	14	16	30	7	35	16	49	10	650	7.7	13
Lead	mg/kg	250	81	120	6.2 U	6.0 U	74	6.1 U	6.4 U	5.3 U	6.0 U	6.0 U	18	6.3 U	19	5.4 U	66	6.5 U	140	6.3 U	6.0 U
Mercury	mg/kg	24	24	0.26 U	0.31 U	0.30 U	1.2	0.30 U	0.32 U	0.26 U	0.30 U	0.30 U	0.28 U	0.31 U	0.37 U	0.27 U	0.33 U	0.33 U	0.34 U	0.32 U	0.30 U
Nickel	mg/kg	48	48	18	22	34	34	14	17	17	24	23	32	15	42	25	33	22	28	17	21
Zinc	mg/kg	100	85	130	36	44	65	16	21	51	63	34	55	18	75	26	110	22	230	22	28
Total Petroleum Hydrocarbons (TPH)																					
Diesel Range Organics	mg/kg			26 U	31 U	30 U	31 J	31 U	32 U	26 U	30 U	30 U	29	31 U	37 U	27 U	33 U	33 U	34 U	32 U	30 U
Oil Range Organics	mg/kg			120	62 U	60 U	770	61 U	64 U	53 U	61 U	60 U	170	63 U	76	54 U	65 U	65 U	68 U	63 U	60 U
Diesel + Oil Range Organics	mg/kg	2000	2000	133	62 U	60 U	801 J	61 U	64 U	53 U	61 U	60 U	199	63 U	95	54 U	65 U	65 U	68 U	63 U	60 U
Polycyclic Aromatic Hydrocarbons (PAHs)																					
1-Methylnaphthalene	mg/kg	35	35	0.035 U	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.03	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.079	0.0084 U	0.0080 U
2-Methylnaphthalene	mg/kg	320	320	0.035 U	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.054	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.089	0.0084 U	0.0080 U
Acenaphthene	mg/kg	5.2	0.26	0.05	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.069	0.0087	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U
Acenaphthylene	mg/kg			0.074	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.0075 U	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U
Anthracene	mg/kg	71	3.5	0.14	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.013	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.04	0.0084 U	0.0080 U
Benzo(g,h,i)perylene	mg/kg			0.24	0.0083 U	0.0080 U	0.04	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.011	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U
Fluoranthene	mg/kg	52	2.6	0.57	0.0083 U	0.0080 U	0.14	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.043	0.0083 U	0.010 U	0.0072 U	0.019	0.0087 U	0.027	0.0084 U	0.0080 U
Fluorene	mg/kg	7.4	0.37	0.065	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.014	0.0075 U	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.033	0.0084 U	0.0080 U
Naphthalene	mg/kg	3.5	0.17	0.06	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.014	0.041	0.0083 U	0.013	0.0072 U	0.058	0.0087 U	0.24	0.015	0.0080 U
Phenanthrene	mg/kg			0.45	0.0083 U	0.0080 U	0.089	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.072	0.0083 U	0.010 U	0.0072 U	0.027	0.0087 U	0.13	0.0084 U	0.0080 U
Pyrene	mg/kg	330	16	0.59	0.0083 U	0.0080 U	0.17	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.042	0.0083 U	0.010 U	0.0072 U	0.02	0.0087 U	0.021	0.0084 U	0.0080 U
Benz(a)anthracene	mg/kg			0.32	0.0083 U	0.0080 U	0.044	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.016	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U
Benzo(a)pyrene	mg/kg			0.33	0.0083 U	0.0080 U	0.051	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.012	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U
Benzo(b)fluoranthene	mg/kg			0.64	0.0083 U	0.0080 U	0.07	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.02	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U
Benzo(j,k)fluoranthene	mg/kg			0.16	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.0075 U	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U
Benzo(k)fluoranthene	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	mg/kg			0.48	0.0083 U	0.0080 U	0.058	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.024	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.014	0.0084 U	0.0080 U
Dibenzo(a,h)anthracene	mg/kg			0.046	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.0075 U	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U
Indeno(1,2,3-cd)pyrene	mg/kg			0.23	0.0083 U	0.0080 U	0.036 U	0.0081 U	0.0085 U	0.0070 U	0.0081 U	0.0080 U	0.01	0.0083 U	0.010 U	0.0072 U	0.0087 U	0.0087 U	0.0091 U	0.0084 U	0.0080 U
Total cPAHs TEQ	mg/kg	0.19	0.19	0.47	0.0063 U	0.0060 U	0.068	0.0061 U	0.0064 U	0.0053 U	0.0061 U	0.0060 U	0.018	0.0063 U	0.0076 U	0.0054 U	0.0066 U	0.0066 U	0.0070	0.0063 U	0.0060 U
Other Semivolatile Organic Compounds (SVOCs)																					
1,2,4-Trichlorobenzene	mg/kg	0.26	0.013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	mg/kg	0.77	0.039	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	mg/kg	1	0.051	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	mg/kg	1900	93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	mg/kg	0.3	0.015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	mg/kg	3.8	0.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	mg/kg	14	0.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	mg/kg	5.6	0.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	mg/kg	0.12	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	mg/kg	80	3500	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	mg/kg	6400	6400	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	mg/kg	4.8	0.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylphenol	mg/kg	4000	4000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline	mg/kg	800	800	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Nitrophenol	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	mg/kg	0.47	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3-Nitroaniline	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl phenyl ether	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	mg/kg	5	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 1. Soil Quality Data for Lignin Parcel
Project 190239, Lignin Parcel, GP West Site, Bellingham, Washington

				Current Explorations													Current Explorations				
			Location	LW-SB101	LW-SB101	LW-SB101	LW-SB102	LW-SB102	LW-SB102	LW-SB103	LW-SB103	LW-SB103	LW-SB104	LW-SB104	LW-SB104	LW-SB105	LW-SB105	LW-SB105	LW-SB106	LW-SB106	LW-SB106
			Depth	1 ft	10.5 ft	13.5 ft	1 ft	8 ft	11 ft	1 ft	7.3 ft	11 ft	1.5 ft	5 ft	10 ft	1.5 ft	7 ft	12 ft	2 ft	8 ft	11.5 ft
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
			Date	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020	08/03/2020
Analyte	Unit	Unsaturated Soil Cleanup Level	Saturated Soil Cleanup Level																		
4-Chlorophenyl phenyl ether	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	mg/kg	400	400	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzoic acid	mg/kg	320000	320000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzyl alcohol	mg/kg	8000	8000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzyl butyl phthalate	mg/kg	1.6	0.079	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis(2-chloro-1-methylethyl) ether	mg/kg	14	14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis(2-chloroethoxy)methane	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis(2-chloroethyl) ether	mg/kg	0.015	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	mg/kg	35	1.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	mg/kg	80	80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethyl phthalate	mg/kg	22	1.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	mg/kg	72	3.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	mg/kg	5300	270	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	mg/kg	0.63	0.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	mg/kg	3.5	0.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	mg/kg	480	480	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	mg/kg	1.9	0.096	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	mg/kg	11	0.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	mg/kg	29	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitroso-di-n-propylamine	mg/kg	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	mg/kg	1.6	0.079	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	mg/kg	0.58	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	mg/kg	2900	160	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conventionals (including other metals)																					
Formaldehyde	mg/kg	16000	16000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	mg/kg	56000	56000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	mg/kg	11000	11000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	pH units	2.5 - 11	2.5 - 11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
Bold - detected. Blue Shaded - Detected result exceeded cleanup level
U - Analyte not detected at or above Reporting Limit (RL) shown. J - Estimated value
Sample Type: N - Normal sample. FD - Field duplicate sample.

Table 1. Soil Quality Data for Lignin Parcel

Project 190239, Lignin Parcel, GP West Site, Bellingham, Washington

				Prior Explorations								Prior Explorations						
			Location	LW-MW01	LW-MW01	LW-SB01	LW-SB01	LW-SB02	LW-SB02	LW-SB03	LW-SB03	LW-SB04	LW-SB04	LW-SS01	LW-SS01	LW-SS02	LW-SS03	LW-SS04
			Depth	2.5 - 4 ft	5 - 6.5 ft	0 - 4 ft	4 - 8 ft	0 - 4 ft	4 - 8 ft	0 - 4 ft	4 - 8 ft	0 - 4 ft	4 - 8 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N
			Date	07/16/2004	07/16/2004	07/21/2004	07/21/2004	07/21/2004	07/21/2004	07/23/2004	07/23/2004	07/22/2004	07/22/2004	07/20/2004	07/20/2004	07/20/2004	07/20/2004	07/20/2004
Analyte	Unit	Unsaturated Soil Cleanup Level	Saturated Soil Cleanup Level															
Metals																		
Arsenic	mg/kg	20	20	30 U	6 U	10 U	6 U	20 U	6 U	6 U	5 U	5 U	6 U	10 U	10 U	10	10 U	10 U
Cadmium	mg/kg	1	1	11 J	0.7 J	0.6 U	0.2 U	0.6 U	0.3 U	0.7	0.2 U	0.2 U	0.3	0.5 U	0.5 U	1	0.6	1.4
Chromium	mg/kg	5200	260	35	25	43	39	48.9	35.3	844	390 J	140 J	60.4 J	24.9	25.9	173	1560	722
Chromium (VI)	mg/kg	48	48	0.12 U	0.132 U	0.6	0.521	0.127 U	0.138 U	0.121 U	0.116 U	0.123 U	0.146 U	0.112 U	0.108 U	0.105 U	0.124 U	0.123
Copper	mg/kg	36	36	31 J	13.7 J	72.7	29.1	49.1	20.8	58	31.3 J	23.4 J	39 J	36.6	35.1	88.4	66.5	53.3
Lead	mg/kg	250	81	40	9	171	16	15	7	97	19 J	5 J	13 J	6	6	54	53	80
Mercury	mg/kg	24	24	0.08	0.06 U	0.25 J	0.08 J	0.23 J	0.08 J	0.27	0.08	0.04	0.06	0.19 J	0.18 J	0.57 J	0.34 J	0.29 J
Nickel	mg/kg	48	48	27	25	46	35	46	25	48	32	28	41	30	34	52	24	36
Zinc	mg/kg	100	85	66	33.5	61 J	61.7 J	74 J	37.6 J	251	81.9 J	91.8 J	58.9 J	71 J	75 J	377 J	489 J	1450 J
Total Petroleum Hydrocarbons (TPH)																		
Diesel Range Organics	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oil Range Organics	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diesel + Oil Range Organics	mg/kg	2000	2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons (PAHs)																		
1-Methylnaphthalene	mg/kg	35	35	0.029	0.0082 U	0.026	0.0084 U	0.046	0.026	0.022 U	0.04	0.009	0.012	0.0068 U	0.0068 U	0.022	0.063	0.0076 U
2-Methylnaphthalene	mg/kg	320	320	0.046	0.0082 U	0.03	0.0084 U	0.08	0.041	0.022 U	0.088	0.019	0.022	0.0068 U	0.0068 U	0.042	0.14	0.015
Acenaphthene	mg/kg	5.2	0.26	0.0092 U	0.0082 U	0.0082 U	0.0084 U	0.0089 U	0.0084 U	0.066	0.1	0.0073 U	0.0092 U	0.0068 U	0.0068 U	0.24	2.4	0.0091
Acenaphthylene	mg/kg			0.0092 U	0.0082 U	0.0082 U	0.0084 U	0.0089 U	0.0084 U	0.022 U	0.0076 U	0.0073 U	0.0092 U	0.0068 U	0.0068 U	0.039	0.049	0.015
Anthracene	mg/kg	71	3.5	0.0092 U	0.0082 U	0.016	0.0084 U	0.0089 U	0.0084 U	0.067	0.18	0.0073 U	0.0092 U	0.0068 U	0.0068 U	0.3	2.4	0.046
Benzo(g,h,i)perylene	mg/kg			0.012	0.0082 U	0.0082 U	0.0084 U	0.0089 U	0.0084 U	0.2	0.23	0.0073 U	0.0092 U	0.0068 U	0.0068 U	0.57	15	0.022
Fluoranthene	mg/kg	52	2.6	0.048	0.015	0.037	0.03	0.037	0.012	0.68	0.9	0.0073 U	0.0092 U	0.016	0.011	2.7	22	0.11
Fluorene	mg/kg	7.4	0.37	0.0092 U	0.0082 U	0.0082 U	0.0084 U	0.0089 U	0.0084 U	0.024	0.069	0.0073 U	0.0092 U	0.0068 U	0.0068 U	0.082	0.57	0.011
Naphthalene	mg/kg	3.5	0.17	0.02	0.0091	0.012	0.0093	0.025	0.011	0.022 U	0.3	0.0073 U	0.0092 U	0.0068 U	0.0068 U	0.048	0.17	0.014
Phenanthrene	mg/kg			0.066	0.014	0.09	0.048	0.053	0.024	0.24	0.63	0.0073 U	0.0092 U	0.018	0.012	1.1	8.8	0.084
Pyrene	mg/kg	330	16	0.071	0.018	0.08	0.054	0.05	0.016	0.52	0.81	0.025	0.0092 U	0.012	0.0081	2.3	20	0.085
Benz(a)anthracene	mg/kg			0.024	0.0082 U	0.027	0.012	0.016	0.0084 U	0.41	0.71	0.0073 U	0.0092 U	0.0068 U	0.0068 U	1.8	17	0.038
Benzo(a)pyrene	mg/kg			0.026	0.0082 U	0.025	0.012	0.022	0.011	0.63	0.76	0.0073 U	0.0092 U	0.0068 U	0.0068 U	2.4	22	0.049
Benzo(b)fluoranthene	mg/kg			0.03	0.0082 U	0.026	0.012	0.036	0.016	0.62	0.59	0.0073 U	0.0092 U	0.0068 U	0.0068 U	2.2	20	0.073
Benzo(j,k)fluoranthene	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	mg/kg			0.03	0.0082 U	0.02	0.0093	0.036	0.016	0.53	0.72	0.0073 U	0.0092 U	0.0068 U	0.0068 U	2.1	16	0.073
Chrysene	mg/kg			0.059	0.0082 U	0.048	0.018	0.046	0.023	0.42	0.69	0.027	0.0092 U	0.01	0.0068 U	1.9	17	0.053
Dibenzo(a,h)anthracene	mg/kg			0.0092 U	0.0082 U	0.0082 U	0.0084 U	0.0089 U	0.0084 U	0.058	0.081	0.0073 U	0.0092 U	0.0068 U	0.0068 U	0.25	1.5	0.0076 U
Indeno(1,2,3-cd)pyrene	mg/kg			0.0092 U	0.0082 U	0.0082 U	0.0084 U	0.0089 U	0.0084 U	0.18	0.24	0.0073 U	0.0092 U	0.0068 U	0.0068 U	0.56	13	0.02
Total cPAHs TEQ	mg/kg	0.19	0.19	0.0373	0.00742 U	0.0336	0.0164	0.0322	0.0157	0.81	1.00	0.00575	0.0083 U	0.0052	0.0061 U	3.11	28.95	0.0703
Other Semivolatile Organic Compounds (SVOCs)																		
1,2,4-Trichlorobenzene	mg/kg	0.26	0.013	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
1,2-Dichlorobenzene	mg/kg	0.77	0.039	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
1,3-Dichlorobenzene	mg/kg			0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
1,4-Dichlorobenzene	mg/kg	1	0.051	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
2,4,5-Trichlorophenol	mg/kg	1900	93	0.46 U	2.5 U	0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
2,4,6-Trichlorophenol	mg/kg	0.3	0.015	0.46 U	2.5 U	0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
2,4-Dichlorophenol	mg/kg	3.8	0.2	0.28 U	1.5 U	0.24 U	0.25 U	0.27 U	0.25 U	0.22 U	0.23 U	0.22 U	0.28 U	0.2 U	0.2 U	0.2 U	0.22 U	0.23 U
2,4-Dimethylphenol	mg/kg	14	0.73	0.28 U	1.5 U	0.24 U	0.25 U	0.27 U	0.25 U	0.22 U	0.23 U	0.22 U	0.28 U	0.2 U	0.2 U	0.2 U	0.22 U	0.23 U
2,4-Dinitrophenol	mg/kg	5.6	0.4	0.92 U	4.9 U	0.82 U	0.85 U	0.89 U	0.84 U	0.73 U	0.75 U	0.73 U	0.92 U	0.68 U	0.68 U	0.68 U	0.73 U	0.75 U
2,4-Dinitrotoluene	mg/kg	0.12	0.01	0.46 U	2.5 U	0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
2,6-Dinitrotoluene	mg/kg	80	3500	0.46 U	2.5 U	0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
2-Chloronaphthalene	mg/kg	6400	6400	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
2-Chlorophenol	mg/kg	4.8	0.24	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
2-Methylphenol	mg/kg	4000	4000	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
2-Nitroaniline	mg/kg	800	800	0.46 U	2.5 U	0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
2-Nitrophenol	mg/kg			0.46 U	2.5 U	0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
3,3'-Dichlorobenzidine	mg/kg	0.47	0.1	0.46 U	2.5 U	0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
3-Nitroaniline	mg/kg			0.55 U	3 U	0.49 U	0.51 U	0.53 U	0.51 U	0.44 U	0.45 U	0.44 U	0.55 U	0.41 U	0.41 U	0.41 U	0.44 U	0.45 U
4,6-Dinitro-2-methylphenol	mg/kg			0.92 U	4.9 U	0.82 U	0.85 U	0.89 U	0.84 U	0.73 U	0.75 U	0.73 U	0.92 U	0.68 U	0.68 U	0.68 U	0.73 U	0.75 U
4-Bromophenyl phenyl ether	mg/kg			0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
4-Chloro-3-methylphenol	mg/kg			0.18 U	0.98 U	0.16 U	0.17 U	0.18 U	0.17 U	0.15 U	0.15 U	0.15 U	0.18 U	0.14 U	0.14 U	0.14 U	0.15 U	0.15 U
4-Chloroaniline	mg/kg	5	5	0.28 U	1.5 U	0.24 U	0.25 U	0.27 U	0.25 U	0.22 U	0.23 U	0.22 U	0.28 U	0.2 U	0.2 U	0.2 U	0.22 U	0.23 U

Table 1. Soil Quality Data for Lignin Parcel

Project 190239, Lignin Parcel, GP West Site, Bellingham, Washington

				Prior Explorations								Prior Explorations						
			Location	LW-MW01	LW-MW01	LW-SB01	LW-SB01	LW-SB02	LW-SB02	LW-SB03	LW-SB03	LW-SB04	LW-SB04	LW-SS01	LW-SS01	LW-SS02	LW-SS03	LW-SS04
			Depth	2.5 - 4 ft	5 - 6.5 ft	0 - 4 ft	4 - 8 ft	0 - 4 ft	4 - 8 ft	0 - 4 ft	4 - 8 ft	0 - 4 ft	4 - 8 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N
			Date	07/16/2004	07/16/2004	07/21/2004	07/21/2004	07/21/2004	07/21/2004	07/23/2004	07/23/2004	07/22/2004	07/22/2004	07/20/2004	07/20/2004	07/20/2004	07/20/2004	07/20/2004
Analyte	Unit	Unsaturated Soil Cleanup Level	Saturated Soil Cleanup Level															
4-Chlorophenyl phenyl ether	mg/kg			0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
4-Methylphenol	mg/kg	400	400	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
4-Nitroaniline	mg/kg			0.46 U	2.5 U	0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
4-Nitrophenol	mg/kg			0.46 U	2.5 U	0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
Benzoic acid	mg/kg	320000	320000	0.92 U	4.9 U	0.82 U	0.85 U	0.89 U	0.84 U	0.73 U	0.75 U	0.73 U	0.92 U	0.68 U	0.68 U	0.68 U	0.73 U	0.75 U
Benzyl alcohol	mg/kg	8000	8000	0.46 U	2.5 U	0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
Benzyl butyl phthalate	mg/kg	1.6	0.079	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Bis(2-chloro-1-methylethyl) ether	mg/kg	14	14	--	--	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Bis(2-chloroethoxy)methane	mg/kg			0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Bis(2-chloroethyl) ether	mg/kg	0.015	0.01	0.18 U	0.98 U	0.16 U	0.17 U	0.18 U	0.17 U	0.15 U	0.15 U	0.15 U	0.18 U	0.14 U	0.14 U	0.14 U	0.15 U	0.15 U
Bis(2-ethylhexyl) phthalate	mg/kg	35	1.8	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	**1.0**	**0.98**	0.073 U	0.092 U	0.068 U	0.068 U	**0.36**	**1.4**	**0.14**
Carbazole	mg/kg			0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	**0.14**	**1.1**	0.075 U
Dibenzofuran	mg/kg	80	80	0.0092 U	0.0082 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	**0.22**	0.075 U
Diethyl phthalate	mg/kg	22	1.2	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Dimethyl phthalate	mg/kg			0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	**0.37**	0.073 U	0.075 U
Di-n-butyl phthalate	mg/kg	72	3.6	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Di-n-octyl phthalate	mg/kg	5300	270	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Hexachlorobenzene	mg/kg	0.63	0.26	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Hexachlorobutadiene	mg/kg	3.5	0.17	0.18 U	0.98 U	0.16 U	0.17 U	0.18 U	0.17 U	0.15 U	0.15 U	0.15 U	0.18 U	0.14 U	0.14 U	0.14 U	0.15 U	0.15 U
Hexachlorocyclopentadiene	mg/kg	480	480	0.46 U	2.5 U	0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
Hexachloroethane	mg/kg	1.9	0.096	0.18 U	0.98 U	0.16 U	0.17 U	0.18 U	0.17 U	0.15 U	0.15 U	0.15 U	0.18 U	0.14 U	0.14 U	0.14 U	0.15 U	0.15 U
Isophorone	mg/kg	11	0.62	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Nitrobenzene	mg/kg	29	1.5	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
N-Nitroso-di-n-propylamine	mg/kg	0.01	0.01	0.18 U	0.98 U	0.16 U	0.17 U	0.18 U	0.17 U	0.15 U	0.15 U	0.15 U	0.18 U	0.14 U	0.14 U	0.14 U	0.15 U	0.15 U
N-Nitrosodiphenylamine	mg/kg	1.6	0.079	0.092 U	0.49 U	0.082 U	0.085 U	0.089 U	0.084 U	0.073 U	0.075 U	0.073 U	0.092 U	0.068 U	0.068 U	0.068 U	0.073 U	0.075 U
Pentachlorophenol	mg/kg	0.58	0.1	0.46 U	2.5 U	0.41 U	0.42 U	0.44 U	0.42 U	0.37 U	0.38 U	0.37 U	0.46 U	0.34 U	0.34 U	0.34 U	0.37 U	0.38 U
Phenol	mg/kg	2900	160	0.18 U	0.98 U	0.16 U	0.17 U	0.18 U	0.17 U	0.15 U	0.15 U	0.15 U	0.18 U	0.14 U	0.14 U	0.14 U	0.15 U	0.15 U
Conventionals (including other metals)																		
Formaldehyde	mg/kg	16000	16000	--	**261**	**6.51**	--	--	**36.4**	**19.7**	--	--	**150 J**	**9.26**	**11.1**	**18.1**	**15.8**	**11.7**
Iron	mg/kg	56000	56000	**11500**	**13900**	**18400**	**20300**	**32800**	**16100**	**26000**	**20300**	**18600**	**26600**	**25600**	**28500**	**39500**	**42400**	**29500**
Manganese	mg/kg	11000	11000	**265**	**174**	**2780**	**611**	**481**	**286**	**585**	**450**	**318**	**518**	**452**	**500**	**544**	**461**	**468**
pH	pH units	2.5 - 11	2.5 - 11	**8.51**	**7.67**	**11.85**	**10.38**	**8.06**	**8.05**	**7.45**	**10.36**	**7.58**	**8.44**	**7**	**6.85**	**7.49**	**5.21**	**7.76**

Notes:

Bold - detected. Blue Shaded - Detected result exceeded cleanup level

U - Analyte not detected at or above Reporting Limit (RL) shown. J - Estimated value

Sample Type: N - Normal sample. FD - Field duplicate sample.

Table 2. Groundwater Quality Data for Lignin Parcel

Project 190239, Lignin Parcel, GP West Site, Bellingham, Washington

		Location	LW-MW01	LW-MW01	LW-MW01	LW-MW01
		Sample Type	N	FD	N	N
		Date	7/27/2004	7/27/2004	10/1/2009	3/30/2010
Analyte	Unit	Groundwater Cleanup Level				
Dissolved Metals						
Arsenic	ug/L	8	17	17.0	3.95	2.3
Cadmium	ug/L	7.9	12	11.1	0.074	0.047
Chromium	ug/L	260	1,170	1,110	633	792
Chromium (VI)	ug/L	50	224 U	224 U	50 U	50 U
Copper	ug/L	3.1	75	78	3.08	2.99
Lead	ug/L	8.1	34	32	0.132	0.133
Mercury	ug/L	0.059	0.3	0.2	0.00197	0.00225
Nickel	ug/L	8.2	64	63	5.53	5.11
Zinc	ug/L	81	110	100	4.4	3.3
Total Petroleum Hydrocarbons (TPH)						
Gasoline Range Organics	ug/L	1000	250 UJ	250 UJ		
Diesel Range Organics	ug/L		250 U	250 U		
Oil Range Organics	ug/L		500 U	500 U		
Diesel + Oil Range Organics	ug/L	500	500 U	500 U		
Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	ug/L	3.3	0.10 U	0.10 U		
Acenaphthylene	ug/L		0.10 U	0.10 U		
Anthracene	ug/L	9.6	0.10	0.10 U		
Benzo(g,h,i)perylene	ug/L		0.10 U	0.10 U		
Fluoranthene	ug/L	3.3	0.10 U	0.10 U		
Fluorene	ug/L	3	0.15	0.10 U		
Phenanthrene	ug/L		0.10 U	0.10 U		
Pyrene	ug/L	15	0.10 U	0.10 U		
1-Methylnaphthalene	ug/L		0.10 U	0.10 U		
2-Methylnaphthalene	ug/L		0.11	0.10 U		
Naphthalene	ug/L	1.4	0.10 U	0.10 U		
Benz(a)anthracene	ug/L		0.10 U	0.10 U		
Benzo(a)pyrene	ug/L		0.10 U	0.10 U		
Benzo(b)fluoranthene	ug/L		0.10 U	0.10 U		
Benzo(k)fluoranthene	ug/L		0.10 U	0.10 U		
Chrysene	ug/L		0.10 U	0.10 U		
Dibenzo(a,h)anthracene	ug/L		0.10 U	0.10 U		
Indeno(1,2,3-cd)pyrene	ug/L		0.10 U	0.10 U		
Total cPAHs TEQ	ug/L	0.02	0.15 U	0.15 U		
Other Semivolatile Organic Compounds (SVOCs)						
1,2,4-Trichlorobenzene	ug/L		1.0 U	1.0 U		
1,2-Dichlorobenzene	ug/L		1.0 U	1.0 U		
1,3-Dichlorobenzene	ug/L		1.0 U	1.0 U		
1,4-Dichlorobenzene	ug/L		1.0 U	1.0 U		
2,4,5-Trichlorophenol	ug/L		5.0 U	5.0 U		
2,4,6-Trichlorophenol	ug/L		5.0 U	5.0 U		
2,4-Dichlorophenol	ug/L		3.0 U	3.0 U		
2,4-Dimethylphenol	ug/L		3.0 U	3.0 U		
2,4-Dinitrophenol	ug/L		25 U	25 U		
2-Chloronaphthalene	ug/L		1.0 U	1.0 U		
2-Chlorophenol	ug/L		1.0 U	1.0 U		
2-Methylphenol	ug/L		1.0 U	1.0 U		
2-Nitroaniline	ug/L		5.0 U	5.0 U		
2-Nitrophenol	ug/L		5.0 U	5.0 U		

Table 2. Groundwater Quality Data for Lignin Parcel

Project 190239, Lignin Parcel, GP West Site, Bellingham, Washington

		Location	LW-MW01	LW-MW01	LW-MW01	LW-MW01
		Sample Type	N	FD	N	N
		Date	7/27/2004	7/27/2004	10/1/2009	3/30/2010
Analyte	Unit	Groundwater Cleanup Level				
2,4-Dinitrotoluene	ug/L		5.0 U	5.0 U		
2,6-Dinitrotoluene	ug/L		5.0 U	5.0 U		
3,3'-Dichlorobenzidine	ug/L		5.0 U	5.0 U		
3-Nitroaniline	ug/L		6.0 U	6.0 U		
4,6-Dinitro-2-methylphenol	ug/L		15 U	15 U		
4-Bromophenyl phenyl ether	ug/L		1.0 U	1.0 U		
4-Chloro-3-methylphenol	ug/L		2.0 U	2.0 U		
4-Chloroaniline	ug/L		3.0 U	3.0 U		
4-Chlorophenyl phenyl ether	ug/L		1.0 U	1.0 U		
4-Methylphenol	ug/L		8.1	7.2		
4-Nitroaniline	ug/L		5.0 U	5.0 U		
4-Nitrophenol	ug/L		5.0 U	5.0 U		
Benzoic acid	ug/L		11	10 U		
Benzyl alcohol	ug/L		5.0 U	5.0 U		
Benzyl butyl phthalate	ug/L		1.0 U	1.0 U		
Bis(2-chloro-1-methylethyl) ether	ug/L		1.0 U	1.0 U		
Bis(2-chloroethoxy)methane	ug/L		1.0 U	1.0 U		
Bis(2-chloroethyl) ether	ug/L		2.0 U	2.0 U		
Bis(2-ethylhexyl) phthalate	ug/L		1.0 U	1.1 U		
Carbazole	ug/L		1.0 U	1.0 U		
Dibenzofuran	ug/L		1.0 U	1.0 U		
Diethyl phthalate	ug/L		1.0 U	1.0 U		
Dimethyl phthalate	ug/L		1.0 U	1.0 U		
Di-n-butyl phthalate	ug/L		1.0 U	1.0 U		
Di-n-octyl phthalate	ug/L		1.0 U	1.0 U		
Hexachlorobenzene	ug/L		1.0 U	1.0 U		
Hexachlorobutadiene	ug/L		2.0 U	2.0 U		
Hexachlorocyclopentadiene	ug/L		5.0 U	5.0 U		
Hexachloroethane	ug/L		2.0 U	2.0 U		
Isophorone	ug/L		1.0 U	1.0 U		
Nitrobenzene	ug/L		1.0 U	1.0 U		
N-Nitroso-di-n-propylamine	ug/L		2.0 U	2.0 U		
N-Nitrosodiphenylamine	ug/L		1.0 U	1.0 U		
Pentachlorophenol	ug/L		2.6 J	2.6 J		
Phenol	ug/L		28	26		
Volatile Organic Compounds (VOCs)						
1,1,1,2-Tetrachloroethane	ug/L		5.0 UJ	5.0 UJ		
1,1,1-Trichloroethane	ug/L		5.0 UJ	5.0 UJ		
1,1,2 - Trichlorotrifluoroethane	ug/L		10 UJ	10 UJ		
1,1,2,2-Tetrachloroethane	ug/L		5.0 UJ	5.0 UJ		
1,1,2-Trichloroethane	ug/L		5.0 UJ	5.0 UJ		
1,1-Dichloroethane	ug/L		5.0 UJ	5.0 UJ		
1,1-Dichloroethene	ug/L		5.0 UJ	5.0 UJ		
1,1-Dichloropropene	ug/L		5.0 UJ	5.0 UJ		
1,2,3-Trichlorobenzene	ug/L		25 UJ	25 UJ		
1,2,3-Trichloropropane	ug/L		15 UJ	15 UJ		
1,2,4-Trichlorobenzene	ug/L		25 UJ	25 UJ		
1,2,4-Trimethylbenzene	ug/L		5.0 UJ	5.0 UJ		
1,2-Dibromo-3-chloropropane	ug/L		25 UJ	25 UJ		
1,2-Dibromoethane (EDB)	ug/L		5.0 UJ	5.0 UJ		
1,2-Dichlorobenzene	ug/L		5.0 UJ	5.0 UJ		

Table 2. Groundwater Quality Data for Lignin Parcel

Project 190239, Lignin Parcel, GP West Site, Bellingham, Washington

		Location	LW-MW01	LW-MW01	LW-MW01	LW-MW01
		Sample Type	N	FD	N	N
		Date	7/27/2004	7/27/2004	10/1/2009	3/30/2010
Analyte	Unit	Groundwater Cleanup Level				
1,2-Dichloroethane (EDC)	ug/L		5.0 UJ	5.0 UJ		
1,2-Dichloropropane	ug/L		5.0 UJ	5.0 UJ		
1,3,5-Trimethylbenzene	ug/L		5.0 UJ	5.0 UJ		
1,3-Dichlorobenzene	ug/L		5.0 UJ	5.0 UJ		
1,3-Dichloropropane	ug/L		5.0 UJ	5.0 UJ		
1,4-Dichloro-2-Butene	ug/L		25 UJ	25 UJ		
1,4-Dichlorobenzene	ug/L		5.0 UJ	5.0 UJ		
2,2-Dichloropropane	ug/L		5.0 UJ	5.0 UJ		
2-Butanone	ug/L		25 UJ	25 UJ		
2-Chloroethyl Vinyl Ether	ug/L		25 UJ	25 UJ		
2-Chlorotoluene	ug/L		5.0 UJ	5.0 UJ		
2-Hexanone	ug/L		25 UJ	25 UJ		
4-Chlorotoluene	ug/L		5.0 UJ	5.0 UJ		
4-Methyl-2-pentanone	ug/L		25 UJ	25 UJ		
Acetone	ug/L		55 J	51 J		
Acrolein	ug/L		250 UJ	250 UJ		
Acrylonitrile	ug/L		5.0 UJ	5.0 UJ		
Benzene	ug/L		5.0 UJ	5.0 UJ		
Bromobenzene	ug/L		5.0 UJ	5.0 UJ		
Bromochloromethane	ug/L		5.0 UJ	5.0 UJ		
Bromodichloromethane	ug/L		5.0 UJ	5.0 UJ		
Bromoethane	ug/L		10 UJ	10 UJ		
Bromoform	ug/L		5.0 UJ	5.0 UJ		
Bromomethane	ug/L		5.0 UJ	5.0 UJ		
Carbon disulfide	ug/L		5.0 UJ	5.0 UJ		
Carbon tetrachloride	ug/L		5.0 UJ	5.0 UJ		
Chlorobenzene	ug/L		5.0 UJ	5.0 UJ		
Chloroethane	ug/L		5.0 UJ	5.0 UJ		
Chloroform	ug/L		5.0 UJ	5.0 UJ		
Chloromethane	ug/L		5.0 UJ	5.0 UJ		
cis-1,2-Dichloroethene (DCE)	ug/L		5.0 UJ	5.0 UJ		
cis-1,3-Dichloropropene	ug/L		5.0 UJ	5.0 UJ		
Dibromochloromethane	ug/L		5.0 UJ	5.0 UJ		
Dibromomethane	ug/L		5.0 UJ	5.0 UJ		
Ethylbenzene	ug/L		5.0 UJ	5.0 UJ		
Hexachlorobutadiene	ug/L		25 UJ	25 UJ		
Isopropylbenzene	ug/L		5.0 UJ	5.0 UJ		
Methylene chloride	ug/L		10 UJ	10 UJ		
Methyliodide	ug/L		5.0 UJ	5.0 UJ		
n-Butylbenzene	ug/L		5.0 UJ	5.0 UJ		
n-Propylbenzene	ug/L		5.0 UJ	5.0 UJ		
p-Isopropyltoluene	ug/L		5.0 UJ	5.0 UJ		
sec-Butylbenzene	ug/L		5.0 UJ	5.0 UJ		
Styrene	ug/L		5.0 UJ	5.0 UJ		
tert-Butylbenzene	ug/L		5.0 UJ	5.0 UJ		
Tetrachloroethene (PCE)	ug/L		5.0 UJ	5.0 UJ		
Toluene	ug/L		5.0 UJ	5.0 UJ		
trans-1,2-Dichloroethene	ug/L		5.0 UJ	5.0 UJ		
trans-1,3-Dichloropropene	ug/L		5.0 UJ	5.0 UJ		
Trichloroethene (TCE)	ug/L		5.0 UJ	5.0 UJ		
Trichlorofluoromethane	ug/L		5.0 UJ	5.0 UJ		

Table 2. Groundwater Quality Data for Lignin Parcel

Project 190239, Lignin Parcel, GP West Site, Bellingham, Washington

		Location	LW-MW01	LW-MW01	LW-MW01	LW-MW01
		Sample Type	N	FD	N	N
		Date	7/27/2004	7/27/2004	10/1/2009	3/30/2010
Analyte	Unit	Groundwater Cleanup Level				
Vinyl acetate	ug/L		25 UJ	25 UJ		
Vinyl chloride	ug/L		5.0 UJ	5.0 UJ		
Xylenes (total)	ug/L		5.0 UJ	5.0 UJ		
Naphthalene	ug/L	1.4	25 UJ	25 UJ		
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	ug/L		0.10 UJ	0.10 UJ		
Aroclor 1221	ug/L		0.10 UJ	0.10 UJ		
Aroclor 1232	ug/L		0.10 UJ	0.10 UJ		
Aroclor 1242	ug/L		0.10 UJ	0.10 UJ		
Aroclor 1248	ug/L		0.10 UJ	0.10 UJ		
Aroclor 1254	ug/L		0.10 UJ	0.10 UJ		
Aroclor 1260	ug/L		0.10 UJ	0.10 UJ		
Total PCBs	ug/L		0.10 UJ	0.10 UJ		
Conventional Chemistry Parameters (including other dissolved metals)						
Calcium	mg/L				55.9	
Iron	mg/L		19.8	20.4	0.311	
Magnesium	mg/L				5.49	
Manganese	mg/L		0.381	0.404	0.141	
Potassium	mg/L				7.25	
Sodium	mg/L				308	
Formaldehyde	ug/L		6 U	7 U		
Nitrate + Nitrite	mg/L		0.500 U	0.500 U		
Nitrate as Nitrogen	mg/L		0.500 U	0.500 U		
Nitrite as Nitrogen	mg/L		0.500 U	0.500 U		
Sulfate	mg/L		233	216		
Total Suspended Solids	mg/L		56.2	42.7		
Field Parameters						
Conductivity	us/cm		2,850		1,476	1,175
Dissolved Oxygen	mg/L		1.62		0.43	0.6
ORP	mVolts		-418.3		-365.5	-306.3
pH	pH units	6.2 - 8.5	10.8		8.4	8.9
Practical Salinity (Calculated)	PSU		1.5		0.7	0.6
Temperature	deg C		17.52		18	11.54
Turbidity	NTU		252		10	20

Notes:

Bold - detected. Blue Shaded - Detected result exceeded cleanup level

U - Analyte not detected at or above Reporting Limit (RL) shown. J - Estimated value

Sample Type: N - Normal sample. FD - Field duplicate sample.

FIGURES

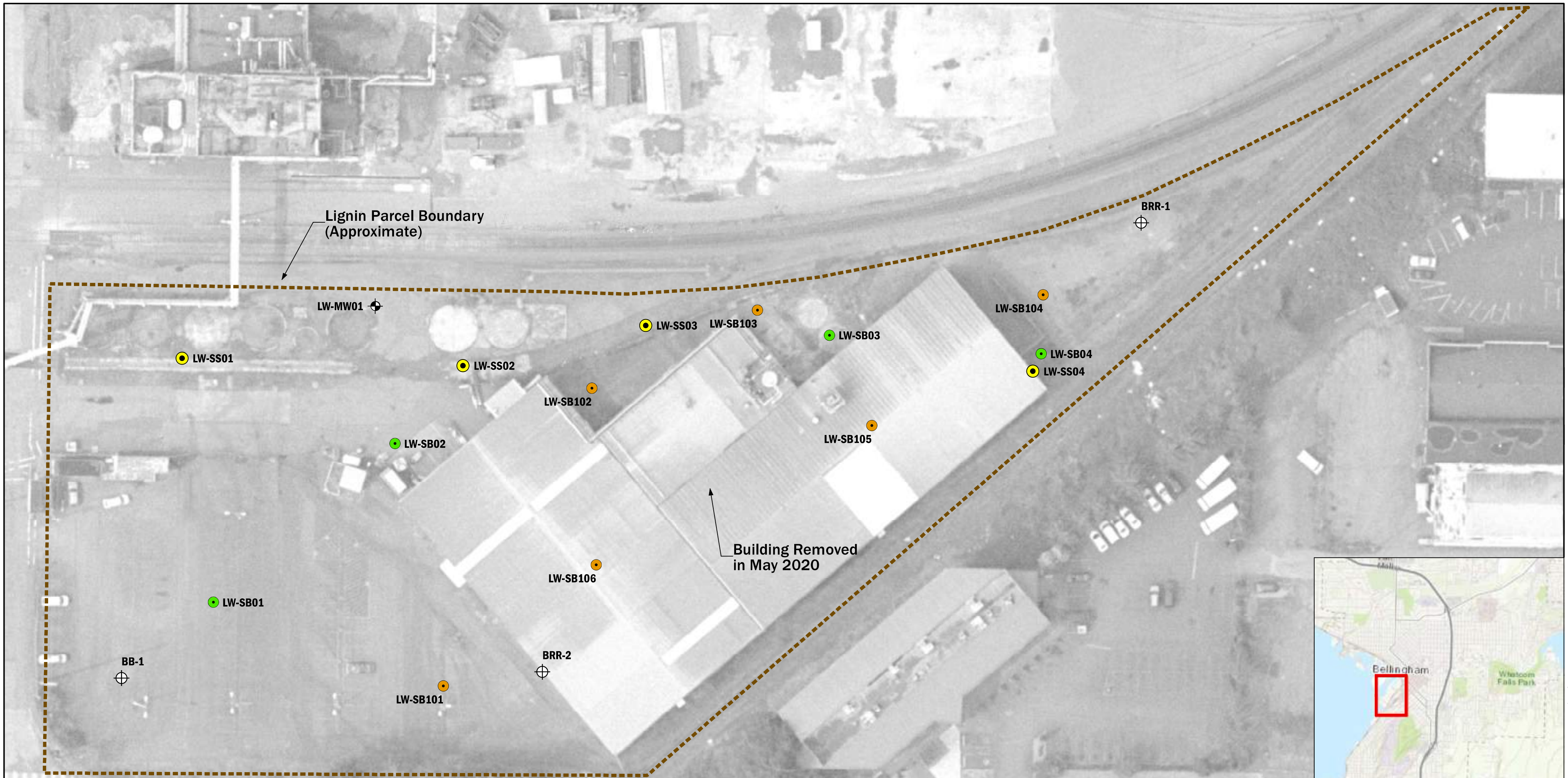
Site Location Map

Millworks Lignin Parcel Integrated Planning - GP West Site
Bellingham, Washington

Aspect CONSULTING	AUG-2020	BY: AAF / SCC	FIGURE NO. 1
	PROJECT NO. 190239	REVISED BY: ---	

Basemap Layer Credits || Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

GIS Path: T:\projects_8\Port_of_Bellingham\Delivered\Lignin Parcel Integrated Planning\SiteLocationMap.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 8/20/2020 || User: scudd || Print Date: 8/20/2020



Current Exploration Phase

- Soil Boring

Prior Explorations

- Geotechnical Soil Boring
- Monitoring Well
- Soil Boring
- Surface Soil Sample

0 30 60 120 Feet

MILL NORTH / TRUE NORTH 45°

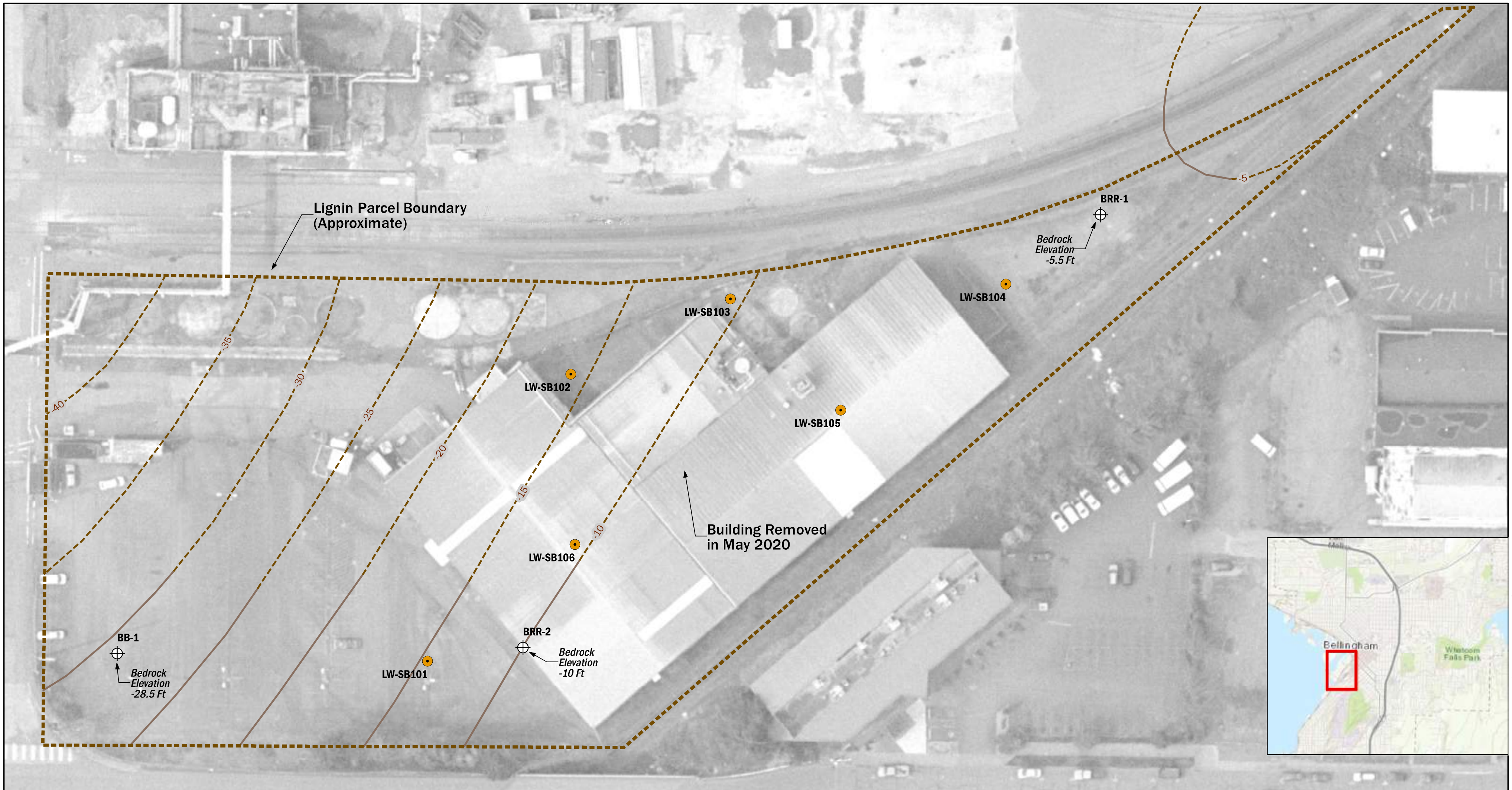
Aspect CONSULTING

Site Exploration Map

Millworks Lignin Parcel Integrated Planning - GP West Site
Bellingham, Washington

DATE: Sep 2020	PROJECT NO. 190239
DESIGNED BY: SJG/AAF	
DRAWN BY: PPW	FIGURE NO. 2
REVISED BY: SCC	

Path: T:\projects_8\Port_of_Bellingham\Delivered\Lignin Parcel Integrated Planning\02 Site Exploration Map.mxd



Current Exploration Phase

Soil Boring

Prior Explorations

Geotechnical Soil Boring (GeoEngineers, 2007)

Estimated Bedrock Elevation (Feet NAVD88)

Presumed Bedrock Elevation (Feet NAVD88)

Note:
Bedrock elevation contours estimated using information from W.D. Purnell and Associates (1977) and supplemented by GeoEngineers (2007) three borings on the Lignin Parcel.

0 30 60 120 Feet

MILL NORTH — TRUE NORTH 45°

Aspect CONSULTING

Bedrock Elevation Contour Map

Millworks Lignin Parcel Integrated Planning - GP West Site
Bellingham, Washington

DATE: Sep 2020	DESIGNED BY: SJG/AAF	DRAWN BY: SCC	REVISED BY: SCC

PROJECT NO. 190239

FIGURE NO. 3

Path: T:\projects_8\Port_of_Bellingham\Delivered\Lignin Parcel Integrated Planning\03 Bedrock Elevation Contour Map.mxd

Note:
Soil cleanup levels for unrestricted use, saturated soil, from Chlor-Alkali RAU Draft Cleanup Action Plan. Refer to Table 1 for soil data and cleanup levels.

Aspect CONSULTING

Distribution of Soil Contaminant Exceedances Map

Millworks Lignin Parcel Integrated Planning - GP West Site
Bellingham, Washington

DATE: Sep 2020	PROJECT NO. 190239
DESIGNED BY: SJG/AAF	
DRAWN BY: PPW	FIGURE NO. 4
REVISED BY: SCC	

Path: T:\projects_8\Port_of_Bellingham\Delivered\Lignin Parcel Integrated Planning\04 Distribution of Soil Contaminant Exceedances Map.mxd

APPENDIX A

Field Exploration Program

A. Field Exploration Program

This Appendix describes the field exploration, sampling, and sample handling protocols conducted for the environmental assessment.

A.1. Direct Push Soil Borings

Aspect subcontracted with Cascade Drilling Inc. of Woodinville, Washington, a state licensed resource protection well driller, to complete the six soil borings using a direct push (i.e., Geoprobe) rig with collection of continuous soil core from which soil samples were collected. The soil core was retrieved from the borehole in 5-foot-long disposable 1.5-inch-diameter plastic liners.

An Aspect geologist oversaw the drilling activities and visually classified the soils in accordance with ASTM Method D2488 and recorded soil descriptions, field screening results, and other relevant details (e.g., staining, debris, odors, etc.) on a boring log form. In addition to visual and olfactory observations, the field representative will screened soil samples using a photoionization detector (PID) to monitor the presence of volatile organic compounds (VOCs). Boring logs for the six new borings are included in this Appendix.

The soil samples selected for chemical analysis based on criteria presented in the Work Plan were removed from the sampler using a stainless-steel spoon and placed in a stainless-steel bowl for homogenization with the stainless-steel spoon. Gravel-sized material greater than approximately 0.5-inch was removed from the sample during mixing. A representative aliquot of the homogenized soil was then placed into certified-clean jars supplied by the analytical laboratory.

Once complete, each soil boring was properly decommissioned with hydrated granular bentonite in accordance with Chapter 173-160 WAC.

Coarse-Grained Soils - More than 50%[1] Retained on No. 200 Sieve	Gravels - More than 50%[1] of Coarse Fraction Retained on No. 4 Sieve	≤5% Fines	**GW**	Well-graded GRAVEL Well-graded GRAVEL WITH SAND
			GP	Poorly-graded GRAVEL Poorly-graded GRAVEL WITH SAND
		≥15% Fines	**GM**	SILTY GRAVEL SILTY GRAVEL WITH SAND
			GC	CLAYEY GRAVEL CLAYEY GRAVEL WITH SAND
	Sands - 50%[1] or More of Coarse Fraction Passes No. 4 Sieve	≤5% Fines	**SW**	Well-graded SAND Well-graded SAND WITH GRAVEL
			SP	Poorly-graded SAND Poorly-graded SAND WITH GRAVEL
		≥15% Fines	**SM**	SILTY SAND SILTY SAND WITH GRAVEL
			SC	CLAYEY SAND CLAYEY SAND WITH GRAVEL
Fine-Grained Soils - 50%[1] or More Passes No. 200 Sieve	Silts and Clays Liquid Limit Less than 50%		**ML**	SILT SANDY or GRAVELLY SILT SILT WITH SAND SILT WITH GRAVEL
			CL	LEAN CLAY SANDY or GRAVELLY LEAN CLAY LEAN CLAY WITH SAND LEAN CLAY WITH GRAVEL
			OL	ORGANIC SILT SANDY or GRAVELLY ORGANIC SILT ORGANIC SILT WITH SAND ORGANIC SILT WITH GRAVEL
	Silts and Clays Liquid Limit 50% or More		**MH**	ELASTIC SILT SANDY or GRAVELLY ELASTIC SILT ELASTIC SILT WITH SAND ELASTIC SILT WITH GRAVEL
			CH	FAT CLAY SANDY or GRAVELLY FAT CLAY FAT CLAY WITH SAND FAT CLAY WITH GRAVEL
			OH	ORGANIC CLAY SANDY or GRAVELLY ORGANIC CLAY ORGANIC CLAY WITH SAND ORGANIC CLAY WITH GRAVEL
Highly Organic Soils			**PT**	PEAT and other mostly organic soils

"WITH SILT" or "WITH CLAY" means 5 to 15% silt and clay, denoted by a "-" in the group name; e.g., SP-SM • "SILTY" or "CLAYEY" means >15% silt and clay • "WITH SAND" or "WITH GRAVEL" means 15 to 30% sand and gravel. • "SANDY" or "GRAVELLY" means >30% sand and gravel. • "Well-graded" means approximately equal amounts of fine to coarse grain sizes • "Poorly graded" means unequal amounts of grain sizes • Group names separated by "/" means soil contains layers of the two soil types; e.g., SM/ML.

Soils were described and identified in the field in general accordance with the methods described in ASTM D2488. Where indicated in the log, soils were classified using ASTM D2487 or other laboratory tests as appropriate. Refer to the report accompanying these exploration logs for details.

1. Estimated or measured percentage by dry weight
2. (SPT) Standard Penetration Test (ASTM D1586)
3. Determined by SPT, DCPT (ASTM STP399) or other field methods. See report text for details.

GEOTECHNICAL LAB TESTS

MC	=	Natural Moisture Content
PS	=	Particle Size Distribution
FC	=	Fines Content (% < 0.075 mm)
GH	=	Hydrometer Test
AL	=	Atterberg Limits
C	=	Consolidation Test
Str	=	Strength Test
OC	=	Organic Content (% Loss by Ignition)
Comp	=	Proctor Test
K	=	Hydraulic Conductivity Test
SG	=	Specific Gravity Test

CHEMICAL LAB TESTS

Organic Chemicals

BTEX	=	Benzene, Toluene, Ethylbenzene, Xylenes
TPH-Dx	=	Diesel and Oil-Range Petroleum Hydrocarbons
TPH-G	=	Gasoline-Range Petroleum Hydrocarbons
VOCs	=	Volatile Organic Compounds
SVOCs	=	Semi-Volatile Organic Compounds
PAHs	=	Polycyclic Aromatic Hydrocarbon Compounds
PCBs	=	Polychlorinated Biphenyls

Metals

RCRA8	=	As, Ba, Cd, Cr, Pb, Hg, Se, Ag, (d = dissolved, t = total)
MTCA5	=	As, Cd, Cr, Hg, Pb (d = dissolved, t = total)
PP-13	=	Ag, As, Be, Cd, Cr, Cu, Hg, Ni, Pb, Sb, Se, Tl, Zn (d=dissolved, t=total)

FIELD TESTS

PID	=	Photoionization Detector
Sheen	=	Oil Sheen Test
SPT[2]	=	Standard Penetration Test
NSPT	=	Non-Standard Penetration Test
DCPT	=	Dynamic Cone Penetration Test

COMPONENT DEFINITIONS

Descriptive Term		***Size Range and Sieve Number***
Boulders	=	Larger than 12 inches
Cobbles	=	3 inches to 12 inches
Coarse Gravel	=	3 inches to 3/4 inches
Fine Gravel	=	3/4 inches to No. 4 (4.75 mm)
Coarse Sand	=	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	=	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	=	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	=	Smaller than No. 200 (0.075 mm)

ESTIMATED[1] PERCENTAGE

% by Weight		***Modifier***	***% by Weight***		***Modifier***
<1	=	Subtrace	15 to 25	=	Little
1 to <5	=	Trace	30 to 45	=	Some
5 to 10	=	Few	>50	=	Mostly

MOISTURE CONTENT

Dry	=	Absence of moisture, dusty, dry to the touch
Slightly Moist	=	Perceptible moisture
Moist	=	Damp but no visible water
Very Moist	=	Water visible but not free draining
Wet	=	Visible free water, usually from below water table

RELATIVE DENSITY

Non-Cohesive or Coarse-Grained Soils

Density[3]		***SPT[2] Blows/Foot***	***Penetration with 1/2" Diameter Rod***
Very Loose	=	0 to 4	≥ 2'
Loose	=	5 to 10	1' to 2'
Medium Dense	=	11 to 30	3" to 1'
Dense	=	31 to 50	1" to 3"
Very Dense	=	> 50	< 1"

CONSISTENCY

Cohesive or Fine-Grained Soils

Consistency[3]		***SPT[2] Blows/Foot***	***Manual Test***
Very Soft	=	0 to 1	Penetrated >1" easily by thumb. Extrudes between thumb & fingers.
Soft	=	2 to 4	Penetrated 1/4" to 1" easily by thumb. Easily molded.
Medium Stiff	=	5 to 8	Penetrated >1/4" with effort by thumb. Molded with strong pressure.
Stiff	=	9 to 15	Indented ~1/4" with effort by thumb.
Very Stiff	=	16 to 30	Indented easily by thumbnail.
Hard	=	> 30	Indented with difficulty by thumbnail.

GEOLOGIC CONTACTS

Observed and Distinct — Observed and Gradual — Inferred

Aspect CONSULTING

Exploration Log Key

Aspect CONSULTING	Millworks Lignin - 190239			Environmental Exploration Log	
	Project Address & Site Specific Location			*Coordinates (Lat,Lon WGS84)*	*Exploration Number*
	300 W Laurel St, See Map			48.7474, -122.4832 (est)	**LW-SB101**
Contractor	*Equipment*	*Sampling Method*		*Ground Surface Elev. (NAVD88)*	
Cascade	Direct push rig	Percussion hammer activated continuous core		20' (est)	
Operator	*Exploration Method(s)*	*Work Start/Completion Dates*		*Top of Casing Elev. (NAVD88)*	*Depth to Water (Below GS)*
	Direct push	8/3/2020		NA	10' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Description	Depth (ft)
0	20				PID=0	**ASPHALT** ASPHALT; 2-inches thick	
		Boring backfilled with bentonite chips and capped at the surface with concrete.	S1	NWTPH-Dx, PAHs 8270D/SIM, Metals		**FILL** SILTY SAND WITH GRAVEL (SM); moist, brown; fine to medium sand; fine, subangular gravel. Gravel obstruction in sampler.	
5	15				PID=0	GRAVEL WITH SAND (GP); moist, variable gray; medium sand; fine to coarse, subangular gravel. Brick debris.	5
						SANDY CLAY WITH GRAVEL (CL); moist, dark brown; high plasticity; medium sand; fine, subrounded gravel. Wood debris. Sandstone cobble obstruction.	
						BEACH/INTERTIDAL DEPOSITS SAND (SP); moist, gray; medium sand.	
10	10	∇ 8/3/2020 Based on soil sample conditions.			PID=0	Becomes wet.	10
			S2	NWTPH-Dx, PAHs 8270D/SIM, Metals		Becomes stratified with CLAY (CL); high plasticity; 1" to 2" thick layers.	
			S3	NWTPH-Dx, PAHs 8270D/SIM, Metals			
15	5					Bottom of exploration at 15 ft. bgs.	15

Legend

Sample Type:
- No Soil Sample Recovery
- Continuous core 1.125" ID
- Grab sample

Water Level:
- ∇ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: EOA

Exploration Log LW-SB101

Sheet 1 of 1

Millworks Lignin - 190239

Environmental Exploration Log

Project Address & Site Specific Location	Coordinates (Lat,Lon WGS84)	Exploration Number
300 W Laurel St, See Map	48.7480, -122.4835 (est)	LW-SB102

Contractor	Equipment	Sampling Method	Ground Surface Elev. (NAVD88)
Cascade	Direct push rig	Percussion hammer activated continuous core	18.5' (est)

Operator	Exploration Method(s)	Work Start/Completion Dates	Top of Casing Elev. (NAVD88)	Depth to Water (Below GS)
	Direct push	8/3/2020	NA	7.6' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Description
0	18.5	Boring backfilled with bentonite chips and capped at the surface with concrete.			PID=0	**ASPHALT** ASPHALT; 6-inches thick.
						FILL SILTY SAND WITH GRAVEL (SM); slightly moist, brown; medium sand; fine to coarse, subrounded to subangular gravel; abundant oxidation mottling.
			S1 (grab)	NWTPH-Dx, PAHs 8270D/SIM, Metals		
						SILTY SAND WITH GRAVEL (SM); slightly moist, gray; medium sand; fine, subrounded gravel.
						SILTY SAND (SM); slightly moist, dark gray; fine sand; few fine, subrounded gravel.
	15		No recovery			
5					PID=0	SILTY SAND WITH GRAVEL (SM); slightly moist, dark gray; medium sand; fine to coarse, subrounded to subangular gravel and cobbles.
						BEACH/INTERTIDAL DEPOSITS SAND (SP); moist, dark gray; fine sand. Becomes wet, gray.
		∇ 8/3/2020 Based on soil sample conditions.				
	10		S2 (grab)	NWTPH-Dx, PAHs 8270D/SIM, Metals		
			No recovery			
10					PID=0	
			S3 (grab)	NWTPH-Dx, PAHs 8270D/SIM, Metals		
						CLAY (CL); wet, gray; high-plasticity.
						SAND WITH SILT (SP-SM); wet, gray; medium to coarse sand; trace fine, subrounded gravel.
	5					
			No recovery			
15						Bottom of exploration at 15 ft. bgs.

Legend

Sample Type:
- No Soil Sample Recovery
- Continuous core 1.125" ID
- Grab sample

Water Level:
- ∇ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: EOA

Exploration Log
LW-SB102
Sheet 1 of 1

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINTW\PROJECTS\190239 - MILLWORKS LIGNIN PARCEL.GPJ September 9, 2020

Review Stage:DRAFT Rev.2

Millworks Lignin - 190239

Environmental Exploration Log

Project Address & Site Specific Location			Coordinates (Lat,Lon WGS84)	Exploration Number
300 W Laurel St, See Map			48.7483, -122.4833 (est)	LW-SB103
Contractor	Equipment	Sampling Method	Ground Surface Elev. (NAVD88)	
Cascade	Direct push rig	Percussion hammer activated continuous core	18' (est)	
Operator	Exploration Method(s)	Work Start/Completion Dates	Top of Casing Elev. (NAVD88)	Depth to Water (Below GS)
	Direct push	8/3/2020	NA	6.5' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Description	Depth (ft)
0	18				PID=0	**ASPHALT** ASPHALT; 4-inches thick.	
		Boring backfilled with bentonite chips and capped at the surface with concrete.	S1 (grab)	NWTPH-Dx, PAHs 8270D/SIM, Metals		**FILL** SAND WITH SILT (SP-SM); moist, brown; medium sand.	
2						SILTY SAND WITH GRAVEL (SM); very moist, dark gray; medium sand; fine to coarse, subrounded gravel and cobbles.	
	15		(No recovery)				
5					PID=0	**BEACH/INTERTIDAL DEPOSITS** SILTY SAND WITH GRAVEL (SM); moist, brown; medium sand; fine, subrounded gravel.	5
						SAND WITH GRAVEL (SP); very moist, dark gray; fine to medium sand; fine, subrounded gravel.	
		▽ 8/3/2020 Based on soil sample conditions.				SAND (SP); wet, dark gray; fine to medium sand.	
			S2 (grab)	NWTPH-Dx, PAHs 8270D/SIM, Metals			
	10		(No recovery)				
10					PID=0		10
			S3 (grab)	NWTPH-Dx, PAHs 8270D/SIM, Metals		Becomes stratified with CLAY (CL) and CLAYEY SAND (SC). Sand becomes coarse.	
	5						
			(No recovery)				
15						Bottom of exploration at 15 ft. bgs.	15

Legend

Sample Type:
- No Soil Sample Recovery
- Continuous core 1.125" ID
- Grab sample

Water Level:
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: EOA

Exploration Log LW-SB103

Sheet 1 of 1

Millworks Lignin - 190239

Environmental Exploration Log

Project Address & Site Specific Location	Coordinates (Lat,Lon WGS84)	Exploration Number
300 W Laurel St, See Map	48.7486, -122.4828 (est)	LW-SB104

Contractor	Equipment	Sampling Method	Ground Surface Elev. (NAVD88)
Cascade	Direct push rig	Percussion hammer activated continuous core	16.5' (est)

Operator	Exploration Method(s)	Work Start/Completion Dates	Top of Casing Elev. (NAVD88)	Depth to Water (Below GS)
	Direct push	8/3/2020	NA	2.8' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Description	Depth (ft)
		Boring backfilled with bentonite chips and capped at the surface with concrete.			PID=0	**ASPHALT** ASPHALT; 4-inches thick.	
	15		S1	NWTPH-Dx, PAHs 8270D/SIM, Metals		**FILL** SILTY GRAVEL WITH SAND (GM); moist, variable brown and gray; medium to coarse sand; fine to coarse, subrounded to angular gravel and cobbles; highly variable.	
		▽ 8/3/2020					
5			S2	NWTPH-Dx, PAHs 8270D/SIM, Metals	PID=0	**BEACH/INTERTIDAL DEPOSITS** SAND (SP); wet, gray; fine sand; trace organic material.	5
	10					CLAY (CL); wet, gray; high-plasticity.	
						SAND (SP); wet, gray; medium sand.	
						GRAVELLY CLAY (CL); wet, gray; high-plasticity; fine, subrounded gravel; few medium sand.	
10			S3	NWTPH-Dx, PAHs 8270D/SIM, Metals	PID=0	SAND WITH GRAVEL (SP); wet, gray; medium to coarse sand; fine to coarse, rounded to subrounded gravel.	10
						SANDY CLAY (CL); wet, gray; high-plasticity; fine sand.	
	5					SAND (SP); wet, gray; fine to medium sand; trace shell material.	
						CLAY (CL); wet, brown; high-plasticity; few fine sand; trace organics (wood debris).	
						SAND (SP); wet, gray; fine to medium sand.	
						Trace shells.	
15						Bottom of exploration at 15 ft. bgs.	15
	0						

Legend

Sample Type:
- No Soil Sample Recovery
- Continuous core 1.125" ID
- Grab sample

Water Level:
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: EOA

Exploration Log LW-SB104

Sheet 1 of 1

Aspect CONSULTING	Millworks Lignin - 190239	Environmental Exploration Log	
	Project Address & Site Specific Location: 300 W Laurel St, See Map	*Coordinates (Lat,Lon WGS84)*: 48.7482, -122.4829 (est)	*Exploration Number*: LW-SB105

Contractor	*Equipment*	*Sampling Method*	*Ground Surface Elev. (NAVD88)*
Cascade	Direct push rig	Percussion hammer activated continuous core	18.5' (est)

Operator	*Exploration Method(s)*	*Work Start/Completion Dates*	*Top of Casing Elev. (NAVD88)*	*Depth to Water (Below GS)*
	Direct push	8/3/2020	NA	5.3' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Description
0	18.5	Boring backfilled with bentonite chips and capped at the surface with concrete.			PID=0	**CONCRETE** CONCRETE; 15-inches thick.
			S1	NWTPH-Dx, PAHs 8270D/SIM, Metals		**FILL** SILTY SAND (SM); slightly moist, brown; medium sand.
						SILTY SAND WITH GRAVEL (SM); slightly moist, dark gray; medium sand, fine, subrounded to subangular gravel. Large rock obstruction
	15					
5		∇ 8/3/2020			PID=0	SILTY SAND WITH GRAVEL (SM); moist, gray; medium sand; fine, subrounded gravel.
						SILTY SAND (SM); moist, gray; medium sand; little organics (wood debris).
			S2	NWTPH-Dx, PAHs 8270D/SIM, Metals		**BEACH/INTERTIDAL DEPOSITS** CLAY (CL); wet, gray; medium-plasticity.
						SAND (SP); wet, gray; fine to medium sand; trace organic material.
	10					
10					PID=0	
						CLAY (CL); wet, gray; high-plasticity.
			S3	NWTPH-Dx, PAHs 8270D/SIM, Metals		SAND (SP); wet, gray; medium to coarse sand.
	5					
15						Bottom of exploration at 15 ft. bgs.

Legend

Sample Type:
- ◯ No Soil Sample Recovery
- Continuous core 1.125" ID
- Grab sample

Water Level:
- ∇ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: EOA

Exploration Log LW-SB105

Sheet 1 of 1

Aspect Consulting	Millworks Lignin - 190239		Environmental Exploration Log	
	Project Address & Site Specific Location: 300 W Laurel St, See Map		Coordinates (Lat,Lon WGS84): 48.7478, -122.4831 (est)	Exploration Number: **LW-SB106**
Contractor: Cascade	Equipment: Direct push rig	Sampling Method: Percussion hammer activated continuous core	Ground Surface Elev. (NAVD88): 18.5' (est)	
Operator:	Exploration Method(s): Direct push	Work Start/Completion Dates: 8/3/2020	Top of Casing Elev. (NAVD88): NA	Depth to Water (Below GS): 7.8' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
0		Boring backfilled with bentonite chips and capped at the surface with concrete.			PID=0		**CONCRETE** CONCRETE; 18-inches thick section. Wood debris.	
							FILL SILTY SAND (SM); slightly moist, gray brown; medium to coarse sand; few fine, subangular gravel.	
			Grab S1	NWTPH-Dx, PAHs 8270D/SIM, Metals			Becomes dark gray.	
	15		No Soil Sample Recovery					
5					PID=0		Becomes dark brown.	5
							BEACH/INTERTIDAL DEPOSITS SAND (SP); moist, dark gray; medium sand.	
		▽ 8/3/2020					SILTY SAND (SM); wet, gray; fine sand.	
	10		Grab S2	NWTPH-Dx, PAHs 8270D/SIM, Metals				
			No Soil Sample Recovery					
10					PID=0		CLAY (CL); wet, dark gray; high-plasticity.	10
							SAND (SP); wet, dark gray; medium sand.	
			Grab S3	NWTPH-Dx, PAHs 8270D/SIM, Metals			CLAY (CL); wet, gray; high-plasticity.	
							SAND (SP); wet, gray; medium to coarse sand.	
	5		No Soil Sample Recovery					
15							Bottom of exploration at 15 ft. bgs.	15

Legend

Sample Type:
- No Soil Sample Recovery
- Continuous core 1.125" ID
- Grab sample

Water Level:
- ▽ Water Level ATD

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: EOA

Exploration Log LW-SB106

Sheet 1 of 1

APPENDIX B

Data Validation Report and Laboratory Data Report

DATA VALIDATION REPORT

Lignin Parcel
Soil Sampling
August 2020
SDG 2008-031

Prepared by:

Aspect Consulting, LLC
710 Second Ave, Suite 550
Seattle, WA 98104

Project No. 190239 • August 2020

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Contents

1 Introduction

This report summarizes the findings of the United States Environmental Protection Agency (USEPA) Stage 2A data validation performed on analytical data for soil samples collected in August 2020 for the Lignin Parcel project. This data quality review is divided into sections by sample delivery group (SDG). A complete list of samples and analyses for each SDG is provided in the Sample Index at the beginning of each section.

Samples were sent to OnSite Environmental in Redmond, Washington. The analytical methods are summarized in Table 1 below:

Table 1. Analytical Methods

Analysis	Method	Lab	Validation Level
Diesel and Heavy Oil	NWTPH-Dx	OnSite Environmental	2A
PAHs	SW8270E-SIM	OnSite Environmental	2A
Metals	SW6010D	OnSite Environmental	2A
Mercury	SW7471B	OnSite Environmental	2A

Data assigned a J/UJ qualifier (estimated) may be used for site evaluation purposes but the reasons for qualification should be considered when interpreting sample concentrations. Values without qualification meet all data measurement quality objectives and are suitable for use.

Data qualifier definitions and a summary table of the qualified data are included in the Qualified Data Summary at the end of this report. Data qualifiers have been incorporated into the project chemistry database to reflect the validation in this report.

2 Data Validation Findings for SDG 2008-031

Samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Table 2. Sample Index

Sample Name	Sample Date	NWTPH-Dx	SW8270E-SIM	SW6010D	SW7471B
LW-SB101-S1-1.0	8/3/2020	X	X	X	X
LW-SB101-S2-10.5	8/3/2020	X	X	X	X
LW-SB101-S3-13.5	8/3/2020	X	X	X	X
LW-SB102-S1-1.0	8/3/2020	X	X	X	X
LW-SB102-S2-8.0	8/3/2020	X	X	X	X
LW-SB102-S3-11.0	8/3/2020	X	X	X	X
LW-SB103-S1-1.0	8/3/2020	X	X	X	X

Sample Name	Sample Date	NWTPH-Dx	SW8270E-SIM	SW6010D	SW7471B
LW-SB103-S2-7.3	8/3/2020	X	X	X	X
LW-SB103-S3-11.0	8/3/2020	X	X	X	X
LW-SB104-S1-1.5	8/3/2020	X	X	X	X
LW-SB104-S2-5.0	8/3/2020	X	X	X	X
LW-SB104-S3-10.0	8/3/2020	X	X	X	X
LW-SB105-S1-1.5	8/3/2020	X	X	X	X
LW-SB105-S2-7.0	8/3/2020	X	X	X	X
LW-SB105-S3-12.0	8/3/2020	X	X	X	X
LW-SB106-S1-2.0	8/3/2020	X	X	X	X
LW-SB106-S2-8.0	8/3/2020	X	X	X	X
LW-SB106-S3-11.5	8/3/2020	X	X	X	X

2.1 Sample Receipt and Preservation

All samples were received in good condition and in the correct containers. Temperature upon receipt was within standard acceptable range.

2.2 Diesel and Heavy Oil (NWTPH-Dx)

2.2.1 Holding Times

Samples were analyzed within the requisite holding time. No qualification or action was needed.

2.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

2.2.3 Surrogates

All surrogate %R values were within laboratory specified control limits. No qualification or action was needed.

2.2.4 Laboratory Control Samples

All LCS and %R were within the laboratory specified control limits. No qualification or action was needed. Note that OnSite does not normally include LCS data for NWTPH-Dx analyses in the report. The lab provided this data via email.

2.2.5 Lab Duplicates

All LD RPD were within the laboratory specified control limits. No qualification or action was needed.

2.2.6 Other

The laboratory flagged the Diesel Range Organics result in sample LW-SB102-S1-1.0 as "N" to indicate that hydrocarbons in the lube oil range are impacting the diesel range result. The result was qualified as estimated (J).

2.2.7 Overall Assessment

Accuracy was acceptable based on the LCS %R. Precision was acceptable based on the LD RPD values. The data are of known quality and are acceptable for use as qualified.

2.3 PAHs (SW8270E-SIM)

2.3.1 Holding Times

Samples were analyzed within the requisite holding time. No qualification or action was needed.

2.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

2.3.3 Surrogates

All surrogate %R values were within laboratory specified control limits. No qualification or action was needed.

2.3.4 Matrix Spikes/Matrix Spike Duplicates

All MS and MSD %R and RPD were within the laboratory specified control limits. No qualification or action was needed.

2.3.5 Overall Assessment

Accuracy was acceptable based on the MS/MSD %R. Precision was acceptable based on the MSD RPD values. The data are of known quality and are acceptable for use as qualified.

2.4 Metals (SW6010D, SW7471B)

2.4.1 Holding Times

Samples were analyzed within the requisite holding time. No qualification or action was needed.

2.4.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

2.4.3 Laboratory Control Samples

All LCS %R were within the laboratory specified control limits. No qualification or action was needed.

2.4.4 Overall Assessment

Accuracy was acceptable based on the LCS %R. The data are of known quality and are acceptable for use as qualified.

3 Qualified Data Summary

Qualified sample results are listed below. Results just flagged non-detect (U) by lab with no further qualification necessary are not listed.

Table 3. Qualified Data Summary

Sample ID	Method	Analyte	Qualifier	Reason
LW-SB102-S1-1.0	NWTPH-Dx	Diesel Range Organics	J	Overlap from lube oil range

Table 4. Data Qualifier Definitions

Data Qualifier	Definition
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
R	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
U	The analyte was analyzed for but was considered not detected at the reporting limit or reported value.
UJ	The analyte was analyzed for, and the associated quantitation limit was an estimated value.

4 Acronyms and Definitions

%D – Percent Difference
%R – Percent Recovery
ASTM – American Standard Test Method
COC – Chain of Custody
EB – Equipment Blank
EPA – Environmental Protection Agency
FB – Field Blank
FD – Field Duplicate
HCID – Hydrocarbon Identification
LCS – Laboratory Control Sample
LCSD – Laboratory Control Sample Duplicate
LD – Laboratory Duplicate
MB – Method Blank
MDL – Method Detection Limit
MS – Matrix Spike
MSD – Matrix Spike Duplicate
NWTPH – Northwest Total Petroleum Hydrocarbon
PCB – Polychlorinated Biphenyl
PFAS – Polyfluoroalkyl Substances
PPCP – Pharmaceuticals and Personal Care Products
QAPP – Quality Assurance Project Plan
QC – Quality Control
RL – Reporting Limit
RPD – Relative Percent Difference
SDG – Sample Delivery Group
SM – Standard Methods
SVOC – Semi-Volatile Organic Compound
SW – Solid Waste
TB – Trip Blank
TCLP – Toxicity Characteristic Leaching Procedure
TPH – Total Petroleum Hydrocarbon
VOC – Volatile Organic Compound

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

August 13, 2020

Steve Germiat
Aspect Consulting
Dexter Horton Building
710 2nd Avenue, Suit 550
Seattle, WA 98104

Re: Analytical Data for Project 190239
Laboratory Reference No. 2008-031

Dear Steve:

Enclosed are the analytical results and associated quality control data for samples submitted on August 5, 2020.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

Case Narrative

Samples were collected on August 3, 2020 and received by the laboratory on August 5, 2020. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB101-S1-1.0**					
Laboratory ID:	08-031-01					
Diesel Range Organics	**ND**	26	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil	**120**	53	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*101*	*50-150*				
Client ID:	**LW-SB101-S2-10.5**					
Laboratory ID:	08-031-02					
Diesel Range Organics	**ND**	31	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil Range Organics	**ND**	62	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*96*	*50-150*				
Client ID:	**LW-SB101-S3-13.5**					
Laboratory ID:	08-031-03					
Diesel Range Organics	**ND**	30	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil Range Organics	**ND**	60	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*98*	*50-150*				
Client ID:	**LW-SB102-S1-1.0**					
Laboratory ID:	08-031-04					
Diesel Range Organics	**31**	27	NWTPH-Dx	8-7-20	8-7-20	N
Lube Oil	**770**	54	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*105*	*50-150*				
Client ID:	**LW-SB102-S2-8.0**					
Laboratory ID:	08-031-05					
Diesel Range Organics	**ND**	31	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil Range Organics	**ND**	61	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*96*	*50-150*				
Client ID:	**LW-SB102-S3-11.0**					
Laboratory ID:	08-031-06					
Diesel Range Organics	**ND**	32	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil Range Organics	**ND**	64	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*92*	*50-150*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB103-S1-1.0**					
Laboratory ID:	08-031-07					
Diesel Range Organics	**ND**	26	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil Range Organics	**ND**	53	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*94*	*50-150*				
Client ID:	**LW-SB103-S2-7.3**					
Laboratory ID:	08-031-08					
Diesel Range Organics	**ND**	30	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil Range Organics	**ND**	61	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*98*	*50-150*				
Client ID:	**LW-SB103-S3-11.0**					
Laboratory ID:	08-031-09					
Diesel Range Organics	**ND**	30	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil Range Organics	**ND**	60	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*84*	*50-150*				
Client ID:	**LW-SB104-S1-1.5**					
Laboratory ID:	08-031-10					
Diesel Range Organics	**29**	28	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil	**170**	56	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*91*	*50-150*				
Client ID:	**LW-SB104-S2-5.0**					
Laboratory ID:	08-031-11					
Diesel Range Organics	**ND**	31	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil Range Organics	**ND**	63	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*91*	*50-150*				
Client ID:	**LW-SB104-S3-10.0**					
Laboratory ID:	08-031-12					
Diesel Range Organics	**ND**	37	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil	**76**	75	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*86*	*50-150*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB105-S1-1.5**					
Laboratory ID:	08-031-13					
Diesel Range Organics	**ND**	27	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil Range Organics	**ND**	54	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*92*	*50-150*				
Client ID:	**LW-SB105-S2-7.0**					
Laboratory ID:	08-031-14					
Diesel Range Organics	**ND**	33	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil Range Organics	**ND**	65	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*91*	*50-150*				
Client ID:	**LW-SB105-S3-12.0**					
Laboratory ID:	08-031-15					
Diesel Range Organics	**ND**	33	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil Range Organics	**ND**	65	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*101*	*50-150*				
Client ID:	**LW-SB106-S1-2.0**					
Laboratory ID:	08-031-16					
Diesel Range Organics	**ND**	34	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil Range Organics	**ND**	68	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*96*	*50-150*				
Client ID:	**LW-SB106-S2-8.0**					
Laboratory ID:	08-031-17					
Diesel Range Organics	**ND**	32	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil Range Organics	**ND**	63	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*97*	*50-150*				
Client ID:	**LW-SB106-S3-11.5**					
Laboratory ID:	08-031-18					
Diesel Range Organics	**ND**	30	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil Range Organics	**ND**	60	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*91*	*50-150*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0807S2					
Diesel Range Organics	**ND**	25	NWTPH-Dx	8-7-20	8-7-20	
Lube Oil Range Organics	**ND**	50	NWTPH-Dx	8-7-20	8-7-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*108*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-031-07										
	ORIG	DUP									
Diesel Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	
Lube Oil Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	
Surrogate:											
o-Terphenyl						*94*	*92*	*50-150*			

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB101-S1-1.0**					
Laboratory ID:	08-031-01					
Naphthalene	**0.060**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**0.074**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**0.050**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**0.065**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**0.45**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**0.14**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**0.57**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**0.59**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**0.32**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**0.48**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**0.64**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**0.16**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**0.33**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**0.23**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**0.046**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**0.24**	0.035	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*73*	*46 - 113*				
Pyrene-d10	*72*	*45 - 114*				
Terphenyl-d14	*78*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB101-S2-10.5**					
Laboratory ID:	08-031-02					
Naphthalene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*73*	*46 - 113*				
Pyrene-d10	*70*	*45 - 114*				
Terphenyl-d14	*70*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB101-S3-13.5**					
Laboratory ID:	08-031-03					
Naphthalene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*67*	*46 - 113*				
Pyrene-d10	*64*	*45 - 114*				
Terphenyl-d14	*70*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB102-S1-1.0**					
Laboratory ID:	08-031-04					
Naphthalene	**ND**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**0.089**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**0.14**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**0.17**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**0.044**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**0.058**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**0.070**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**0.051**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**0.040**	0.036	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*81*	*46 - 113*				
Pyrene-d10	*73*	*45 - 114*				
Terphenyl-d14	*79*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB102-S2-8.0**					
Laboratory ID:	08-031-05					
Naphthalene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*67*	*46 - 113*				
Pyrene-d10	*72*	*45 - 114*				
Terphenyl-d14	*72*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB102-S3-11.0**					
Laboratory ID:	08-031-06					
Naphthalene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.0085	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*70*	*46 - 113*				
Pyrene-d10	*70*	*45 - 114*				
Terphenyl-d14	*78*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB103-S1-1.0**					
Laboratory ID:	08-031-07					
Naphthalene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.0070	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*76*	*46 - 113*				
Pyrene-d10	*74*	*45 - 114*				
Terphenyl-d14	*80*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB103-S2-7.3**					
Laboratory ID:	08-031-08					
Naphthalene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.0081	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*75*	*46 - 113*				
Pyrene-d10	*72*	*45 - 114*				
Terphenyl-d14	*76*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB103-S3-11.0**					
Laboratory ID:	08-031-09					
Naphthalene	**0.014**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**0.069**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**0.014**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*70*	*46 - 113*				
Pyrene-d10	*74*	*45 - 114*				
Terphenyl-d14	*75*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB104-S1-1.5**					
Laboratory ID:	08-031-10					
Naphthalene	**0.041**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**0.054**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**0.030**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**0.0087**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**0.072**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**0.013**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**0.043**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**0.042**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**0.016**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**0.024**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**0.020**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**0.012**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**0.010**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**0.011**	0.0075	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*65*	*46 - 113*				
Pyrene-d10	*62*	*45 - 114*				
Terphenyl-d14	*68*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB104-S2-5.0**					
Laboratory ID:	08-031-11					
Naphthalene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.0083	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*66*	*46 - 113*				
Pyrene-d10	*71*	*45 - 114*				
Terphenyl-d14	*75*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB104-S3-10.0**					
Laboratory ID:	08-031-12					
Naphthalene	**0.013**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.010	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*64*	*46 - 113*				
Pyrene-d10	*63*	*45 - 114*				
Terphenyl-d14	*68*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB105-S1-1.5**					
Laboratory ID:	08-031-13					
Naphthalene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.0072	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*71*	*46 - 113*				
Pyrene-d10	*65*	*45 - 114*				
Terphenyl-d14	*71*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB105-S2-7.0**					
Laboratory ID:	08-031-14					
Naphthalene	**0.058**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**0.027**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**0.019**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**0.020**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*54*	*46 - 113*				
Pyrene-d10	*55*	*45 - 114*				
Terphenyl-d14	*58*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB105-S3-12.0**					
Laboratory ID:	08-031-15					
Naphthalene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.0087	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*73*	*46 - 113*				
Pyrene-d10	*74*	*45 - 114*				
Terphenyl-d14	*76*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB106-S1-2.0**					
Laboratory ID:	08-031-16					
Naphthalene	**0.24**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**0.089**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**0.079**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**0.033**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**0.13**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**0.040**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**0.027**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**0.021**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**0.014**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.0091	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*62*	*46 - 113*				
Pyrene-d10	*63*	*45 - 114*				
Terphenyl-d14	*77*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
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Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB106-S2-8.0**					
Laboratory ID:	08-031-17					
Naphthalene	**0.015**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.0084	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*68*	*46 - 113*				
Pyrene-d10	*68*	*45 - 114*				
Terphenyl-d14	*69*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB106-S3-11.5**					
Laboratory ID:	08-031-18					
Naphthalene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.0080	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*74*	*46 - 113*				
Pyrene-d10	*71*	*45 - 114*				
Terphenyl-d14	*73*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0806S1					
Naphthalene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
2-Methylnaphthalene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
1-Methylnaphthalene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthylene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Acenaphthene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Fluorene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Phenanthrene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Anthracene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Fluoranthene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Pyrene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]anthracene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Chrysene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[b]fluoranthene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo(j,k)fluoranthene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[a]pyrene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Dibenz[a,h]anthracene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Benzo[g,h,i]perylene	**ND**	0.0067	EPA 8270E/SIM	8-6-20	8-6-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*77*	*46 - 113*				
Pyrene-d10	*78*	*45 - 114*				
Terphenyl-d14	*80*	*49 - 121*				

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

PAHs EPA 8270E/SIM
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	08-031-07										
	MS	MSD	MS	MSD		MS	MSD				
Naphthalene	**0.0689**	**0.0737**	0.0833	0.0833	ND	83	88	51 - 115	7	26	
Acenaphthylene	**0.0693**	**0.0730**	0.0833	0.0833	ND	83	88	53 - 121	5	24	
Acenaphthene	**0.0705**	**0.0761**	0.0833	0.0833	ND	85	91	52 - 121	8	25	
Fluorene	**0.0698**	**0.0724**	0.0833	0.0833	ND	84	87	58 - 127	4	23	
Phenanthrene	**0.0712**	**0.0723**	0.0833	0.0833	ND	85	87	46 - 129	2	28	
Anthracene	**0.0729**	**0.0731**	0.0833	0.0833	ND	88	88	57 - 124	0	21	
Fluoranthene	**0.0715**	**0.0700**	0.0833	0.0833	ND	86	84	46 - 136	2	29	
Pyrene	**0.0685**	**0.0676**	0.0833	0.0833	ND	82	81	41 - 136	1	32	
Benzo[a]anthracene	**0.0906**	**0.0857**	0.0833	0.0833	ND	109	103	56 - 136	6	25	
Chrysene	**0.0750**	**0.0767**	0.0833	0.0833	ND	90	92	49 - 130	2	22	
Benzo[b]fluoranthene	**0.0758**	**0.0708**	0.0833	0.0833	ND	91	85	51 - 135	7	26	
Benzo(j,k)fluoranthene	**0.0733**	**0.0726**	0.0833	0.0833	ND	88	87	56 - 124	1	23	
Benzo[a]pyrene	**0.0762**	**0.0758**	0.0833	0.0833	ND	91	91	54 - 133	1	26	
Indeno(1,2,3-c,d)pyrene	**0.0805**	**0.0767**	0.0833	0.0833	ND	97	92	52 - 134	5	20	
Dibenz[a,h]anthracene	**0.0769**	**0.0742**	0.0833	0.0833	ND	92	89	58 - 127	4	17	
Benzo[g,h,i]perylene	**0.0772**	**0.0745**	0.0833	0.0833	ND	93	89	54 - 129	4	21	
Surrogate:											
2-Fluorobiphenyl						*73*	*78*	*46 - 113*			
Pyrene-d10						*74*	*72*	*45 - 114*			
Terphenyl-d14						*78*	*78*	*49 - 121*			

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB101-S1-1.0**					
Laboratory ID:	08-031-01					
Arsenic	**ND**	10	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.52	EPA 6010D	8-5-20	8-5-20	
Chromium	**21**	0.52	EPA 6010D	8-5-20	8-5-20	
Copper	**24**	1.0	EPA 6010D	8-5-20	8-5-20	
Lead	**120**	5.2	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.26	EPA 7471B	8-7-20	8-7-20	
Nickel	**18**	2.6	EPA 6010D	8-5-20	8-5-20	
Zinc	**130**	2.6	EPA 6010D	8-5-20	8-5-20	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB101-S2-10.5**					
Laboratory ID:	08-031-02					
Arsenic	**ND**	12	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.62	EPA 6010D	8-5-20	8-5-20	
Chromium	**17**	0.62	EPA 6010D	8-5-20	8-5-20	
Copper	**10**	1.2	EPA 6010D	8-5-20	8-5-20	
Lead	**ND**	6.2	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.31	EPA 7471B	8-7-20	8-7-20	
Nickel	**22**	3.1	EPA 6010D	8-5-20	8-5-20	
Zinc	**36**	3.1	EPA 6010D	8-5-20	8-5-20	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB101-S3-13.5**					
Laboratory ID:	08-031-03					
Arsenic	**ND**	12	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.60	EPA 6010D	8-5-20	8-5-20	
Chromium	**29**	0.60	EPA 6010D	8-5-20	8-5-20	
Copper	**25**	1.2	EPA 6010D	8-5-20	8-5-20	
Lead	**ND**	6.0	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.30	EPA 7471B	8-7-20	8-7-20	
Nickel	**34**	3.0	EPA 6010D	8-5-20	8-5-20	
Zinc	**44**	3.0	EPA 6010D	8-5-20	8-5-20	

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB102-S1-1.0**					
Laboratory ID:	08-031-04					
Arsenic	**ND**	11	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.54	EPA 6010D	8-5-20	8-5-20	
Chromium	**31**	0.54	EPA 6010D	8-5-20	8-5-20	
Copper	**34**	1.1	EPA 6010D	8-5-20	8-5-20	
Lead	**74**	5.4	EPA 6010D	8-5-20	8-5-20	
Mercury	**1.2**	0.54	EPA 7471B	8-7-20	8-7-20	
Nickel	**34**	2.7	EPA 6010D	8-5-20	8-5-20	
Zinc	**65**	2.7	EPA 6010D	8-5-20	8-5-20	
Client ID:	**LW-SB102-S2-8.0**					
Laboratory ID:	08-031-05					
Arsenic	**ND**	12	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.61	EPA 6010D	8-5-20	8-5-20	
Chromium	**13**	0.61	EPA 6010D	8-5-20	8-5-20	
Copper	**5.8**	1.2	EPA 6010D	8-5-20	8-5-20	
Lead	**ND**	6.1	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.30	EPA 7471B	8-7-20	8-7-20	
Nickel	**14**	3.0	EPA 6010D	8-5-20	8-5-20	
Zinc	**16**	3.0	EPA 6010D	8-5-20	8-5-20	
Client ID:	**LW-SB102-S3-11.0**					
Laboratory ID:	08-031-06					
Arsenic	**ND**	13	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.64	EPA 6010D	8-5-20	8-5-20	
Chromium	**17**	0.64	EPA 6010D	8-5-20	8-5-20	
Copper	**6.4**	1.3	EPA 6010D	8-5-20	8-5-20	
Lead	**ND**	6.4	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.32	EPA 7471B	8-7-20	8-7-20	
Nickel	**17**	3.2	EPA 6010D	8-5-20	8-5-20	
Zinc	**21**	3.2	EPA 6010D	8-5-20	8-5-20	

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB103-S1-1.0**					
Laboratory ID:	08-031-07					
Arsenic	**ND**	11	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.53	EPA 6010D	8-5-20	8-5-20	
Chromium	**14**	0.53	EPA 6010D	8-5-20	8-5-20	
Copper	**23**	1.1	EPA 6010D	8-5-20	8-5-20	
Lead	**ND**	5.3	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.26	EPA 7471B	8-7-20	8-7-20	
Nickel	**17**	2.6	EPA 6010D	8-5-20	8-5-20	
Zinc	**51**	2.6	EPA 6010D	8-5-20	8-5-20	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB103-S2-7.3**					
Laboratory ID:	08-031-08					
Arsenic	**ND**	12	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.60	EPA 6010D	8-5-20	8-5-20	
Chromium	**17**	0.60	EPA 6010D	8-5-20	8-5-20	
Copper	**14**	1.2	EPA 6010D	8-5-20	8-5-20	
Lead	**ND**	6.0	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.30	EPA 7471B	8-7-20	8-7-20	
Nickel	**24**	3.0	EPA 6010D	8-5-20	8-5-20	
Zinc	**63**	3.0	EPA 6010D	8-5-20	8-5-20	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB103-S3-11.0**					
Laboratory ID:	08-031-09					
Arsenic	**ND**	12	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.60	EPA 6010D	8-5-20	8-5-20	
Chromium	**26**	0.60	EPA 6010D	8-5-20	8-5-20	
Copper	**16**	1.2	EPA 6010D	8-5-20	8-5-20	
Lead	**ND**	6.0	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.30	EPA 7471B	8-7-20	8-7-20	
Nickel	**23**	3.0	EPA 6010D	8-5-20	8-5-20	
Zinc	**34**	3.0	EPA 6010D	8-5-20	8-5-20	

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB104-S1-1.5**					
Laboratory ID:	08-031-10					
Arsenic	**ND**	11	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.56	EPA 6010D	8-5-20	8-5-20	
Chromium	**58**	0.56	EPA 6010D	8-5-20	8-5-20	
Copper	**30**	1.1	EPA 6010D	8-5-20	8-5-20	
Lead	**18**	5.6	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.28	EPA 7471B	8-7-20	8-7-20	
Nickel	**32**	2.8	EPA 6010D	8-5-20	8-5-20	
Zinc	**55**	2.8	EPA 6010D	8-5-20	8-5-20	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB104-S2-5.0**					
Laboratory ID:	08-031-11					
Arsenic	**ND**	13	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.63	EPA 6010D	8-5-20	8-5-20	
Chromium	**16**	0.63	EPA 6010D	8-5-20	8-5-20	
Copper	**7.0**	1.3	EPA 6010D	8-5-20	8-5-20	
Lead	**ND**	6.3	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.31	EPA 7471B	8-7-20	8-7-20	
Nickel	**15**	3.1	EPA 6010D	8-5-20	8-5-20	
Zinc	**18**	3.1	EPA 6010D	8-5-20	8-5-20	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB104-S3-10.0**					
Laboratory ID:	08-031-12					
Arsenic	**ND**	15	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.75	EPA 6010D	8-5-20	8-5-20	
Chromium	**38**	0.75	EPA 6010D	8-5-20	8-5-20	
Copper	**35**	1.5	EPA 6010D	8-5-20	8-5-20	
Lead	**19**	7.5	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.37	EPA 7471B	8-7-20	8-7-20	
Nickel	**42**	3.7	EPA 6010D	8-5-20	8-5-20	
Zinc	**75**	3.7	EPA 6010D	8-5-20	8-5-20	

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB105-S1-1.5**					
Laboratory ID:	08-031-13					
Arsenic	**ND**	11	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.54	EPA 6010D	8-5-20	8-5-20	
Chromium	**19**	0.54	EPA 6010D	8-5-20	8-5-20	
Copper	**16**	1.1	EPA 6010D	8-5-20	8-5-20	
Lead	**ND**	5.4	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.27	EPA 7471B	8-7-20	8-7-20	
Nickel	**25**	2.7	EPA 6010D	8-5-20	8-5-20	
Zinc	**26**	2.7	EPA 6010D	8-5-20	8-5-20	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB105-S2-7.0**					
Laboratory ID:	08-031-14					
Arsenic	**ND**	13	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.65	EPA 6010D	8-5-20	8-5-20	
Chromium	**26**	0.65	EPA 6010D	8-5-20	8-5-20	
Copper	**49**	1.3	EPA 6010D	8-5-20	8-5-20	
Lead	**66**	6.5	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.33	EPA 7471B	8-7-20	8-7-20	
Nickel	**33**	3.3	EPA 6010D	8-5-20	8-5-20	
Zinc	**110**	3.3	EPA 6010D	8-5-20	8-5-20	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB105-S3-12.0**					
Laboratory ID:	08-031-15					
Arsenic	**ND**	13	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.65	EPA 6010D	8-5-20	8-5-20	
Chromium	**15**	0.65	EPA 6010D	8-5-20	8-5-20	
Copper	**10**	1.3	EPA 6010D	8-5-20	8-5-20	
Lead	**ND**	6.5	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.33	EPA 7471B	8-7-20	8-7-20	
Nickel	**22**	3.3	EPA 6010D	8-5-20	8-5-20	
Zinc	**22**	3.3	EPA 6010D	8-5-20	8-5-20	

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB106-S1-2.0**					
Laboratory ID:	08-031-16					
Arsenic	**ND**	14	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.68	EPA 6010D	8-5-20	8-5-20	
Chromium	**150**	0.68	EPA 6010D	8-5-20	8-5-20	
Copper	**650**	1.4	EPA 6010D	8-5-20	8-5-20	
Lead	**140**	6.8	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.34	EPA 7471B	8-7-20	8-7-20	
Nickel	**28**	3.4	EPA 6010D	8-5-20	8-5-20	
Zinc	**230**	3.4	EPA 6010D	8-5-20	8-5-20	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB106-S2-8.0**					
Laboratory ID:	08-031-17					
Arsenic	**ND**	13	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.63	EPA 6010D	8-5-20	8-5-20	
Chromium	**17**	0.63	EPA 6010D	8-5-20	8-5-20	
Copper	**7.7**	1.3	EPA 6010D	8-5-20	8-5-20	
Lead	**ND**	6.3	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.32	EPA 7471B	8-7-20	8-7-20	
Nickel	**17**	3.2	EPA 6010D	8-5-20	8-5-20	
Zinc	**22**	3.2	EPA 6010D	8-5-20	8-5-20	

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**LW-SB106-S3-11.5**					
Laboratory ID:	08-031-18					
Arsenic	**ND**	12	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.60	EPA 6010D	8-5-20	8-5-20	
Chromium	**14**	0.60	EPA 6010D	8-5-20	8-5-20	
Copper	**13**	1.2	EPA 6010D	8-5-20	8-5-20	
Lead	**ND**	6.0	EPA 6010D	8-5-20	8-5-20	
Mercury	**ND**	0.30	EPA 7471B	8-7-20	8-7-20	
Nickel	**21**	3.0	EPA 6010D	8-5-20	8-5-20	
Zinc	**28**	3.0	EPA 6010D	8-5-20	8-5-20	

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

TOTAL METALS
EPA 6010D/7471B
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0805SM2					
Arsenic	**ND**	10	EPA 6010D	8-5-20	8-5-20	
Cadmium	**ND**	0.50	EPA 6010D	8-5-20	8-5-20	
Chromium	**ND**	0.50	EPA 6010D	8-5-20	8-5-20	
Copper	**ND**	1.0	EPA 6010D	8-5-20	8-5-20	
Lead	**ND**	5.0	EPA 6010D	8-5-20	8-5-20	
Nickel	**ND**	2.5	EPA 6010D	8-5-20	8-5-20	
Zinc	**ND**	2.5	EPA 6010D	8-5-20	8-5-20	
Laboratory ID:	MB0807S1					
Mercury	**ND**	0.25	EPA 7471B	8-7-20	8-7-20	

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

TOTAL METALS
EPA 6010D/7471B
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	07-031-07										
	ORIG	DUP									
Arsenic	**ND**	**ND**	NA	NA		NA		NA	NA	20	
Cadmium	**ND**	**ND**	NA	NA		NA		NA	NA	20	
Chromium	**12.9**	**11.9**	NA	NA		NA		NA	8	20	
Copper	**21.7**	**22.5**	NA	NA		NA		NA	3	20	
Lead	**ND**	**ND**	NA	NA		NA		NA	NA	20	
Nickel	**16.2**	**16.0**	NA	NA		NA		NA	1	20	
Zinc	**48.5**	**50.9**	NA	NA		NA		NA	5	20	
Laboratory ID:	07-031-07										
Mercury	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	07-031-07										
	MS	MSD	MS	MSD		MS	MSD				
Arsenic	**82.4**	**85.3**	100	100	ND	**82**	**85**	75-125	3	20	
Cadmium	**42.1**	**43.4**	50.0	50.0	ND	**84**	**87**	75-125	3	20	
Chromium	**101**	**102**	100	100	12.9	**88**	**89**	75-125	0	20	
Copper	**64.6**	**66.7**	50.0	50.0	21.7	**86**	**90**	75-125	3	20	
Lead	**230**	**234**	250	250	ND	**92**	**93**	75-125	2	20	
Nickel	**103**	**105**	100	100	16.2	**87**	**89**	75-125	2	20	
Zinc	**133**	**137**	100	100	48.5	**84**	**89**	75-125	4	20	
Laboratory ID:	07-031-07										
Mercury	**0.483**	**0.544**	0.500	0.500	0.0255	**92**	**104**	80-120	12	20	
SPIKE BLANK											
Laboratory ID:	SB0805SM2										
Arsenic	**83.6**		100		N/A	**84**		80-120			
Cadmium	**42.8**		50.0		N/A	**86**		80-120			
Chromium	**90.9**		100		N/A	**91**		80-120			
Copper	**44.9**		50.0		N/A	**90**		80-120			
Lead	**243**		250		N/A	**97**		80-120			
Nickel	**93.9**		100		N/A	**94**		80-120			
Zinc	**85.2**		100		N/A	**85**		80-120			
Laboratory ID:	SB0807S1										
Mercury	**0.512**		0.500		N/A	**102**		80-120			

Date of Report: August 13, 2020
Samples Submitted: August 5, 2020
Laboratory Reference: 2008-031
Project: 190239

% MOISTURE

Client ID	Lab ID	% Moisture	Date Analyzed
LW-SB101-S1-1.0	08-031-01	**5**	8-6-20
LW-SB101-S2-10.5	08-031-02	**19**	8-6-20
LW-SB101-S3-13.5	08-031-03	**17**	8-6-20
LW-SB102-S1-1.0	08-031-04	**7**	8-6-20
LW-SB102-S2-8.0	08-031-05	**18**	8-6-20
LW-SB102-S3-11.0	08-031-06	**21**	8-6-20
LW-SB103-S1-1.0	08-031-07	**5**	8-6-20
LW-SB103-S2-7.3	08-031-08	**17**	8-6-20
LW-SB103-S3-11.0	08-031-09	**16**	8-6-20
LW-SB104-S1-1.5	08-031-10	**11**	8-6-20
LW-SB104-S2-5.0	08-031-11	**20**	8-6-20
LW-SB104-S3-10.0	08-031-12	**33**	8-6-20
LW-SB105-S1-1.5	08-031-13	**7**	8-6-20
LW-SB105-S2-7.0	08-031-14	**23**	8-6-20
LW-SB105-S3-12.0	08-031-15	**23**	8-6-20
LW-SB106-S1-2.0	08-031-16	**27**	8-6-20
LW-SB106-S2-8.0	08-031-17	**21**	8-6-20
LW-SB106-S3-11.5	08-031-18	**17**	8-6-20

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.

Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Laboratory Number: 08-031

Company: Aspect
Project Number: 190239
Project Name: Lignin Parcel
Project Manager: S. Germiat
Sampled by: A. Fitts

Turnaround Request (in working days) (Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Days
- ☐ 3 Days
- ☒ Standard (7 Days)
- ☐ ______ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	~~Organophosphorus Pesticides 8270D/SIM~~	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	As, Cd, Cr, Cu, Pb, Ni, Zn	Hg			% Moisture
1	LW-SB101-S1-1.0	8/3/20	8:45	S	1				X					X			~~X~~						X	X			O
2	LW-SB101-S2-10.5	8/3/20	8:50	S					X					X			~~X~~						X	X			
3	LW-SB101-S3-13.5	8/3/20	8:55	S					X					X			~~X~~						X	X			
4	LW-SB102-S1-1.0	8/3/20	12:23	S					X					X			~~X~~						X	X			
5	LW-SB102-S2-8.0	8/3/20	12:40	S					X					X			~~X~~						X	X			
6	LW-SB102-S3-11.0	8/3/20	12:42	S					X					X			~~X~~						X	X			
7	LW-SB103-S1-1.0	8/3/20	11:46	S					X					X			~~X~~						X	X			
8	LW-SB103-S2-7.3	8/3/20	11:48	S					X					X			~~X~~						X	X			
9	LW-SB103-S3-11.0	8/3/20	11:51	S					X					X			~~X~~						X	X			
10	LW-SB104-S1-1.5	8/3/20	13:19	S					X					X			~~X~~						X	X			

	Signature	Company	Date	Time
Relinquished	A. Fitts	Aspect	8/4/20	11:30
Received	[signature]	OSE	8/5/20	1155
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

No pesticide analysis

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

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Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Company: ASPECT
Project Number: 190239
Project Name: LIGNIN PARCEL
Project Manager: S. GERMIAT
Sampled by: A. FITTS

Turnaround Request (in working days) (Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Days
- ☐ 3 Days
- ☒ Standard (7 Days)
- ☐ ________ (other)

Laboratory Number: 08-031

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	~~Organophosphorus Pesticides 8270D/SIM~~	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	As, Cd, Cr, Cu, Pb, Ni, Zn	Hg			% Moisture
11	LW-SB104-S2-5.0	8/3/20	13:29	S	1				X					X			~~X~~						X	X			X
12	LW-SB104-S3-10.0	8/3/20	13:43	S	↓				X					X			~~X~~						X	X			↓
13	LW-SB105-S1-1.5	8/3/20	10:43	S	↓				X					X			~~X~~						X	X			↓
14	LW-SB105-S2-7.0	8/3/20	10:46	S	↓				X					X			~~X~~						X	X			↓
15	LW-SB105-S3-12.0	8/3/20	10:48	S	↓				X					X			~~X~~						X	X			↓
16	LW-SB106-S1-2.0	8/3/20	9:51	S	↓				X					X			~~X~~						X	X			↓
17	LW-SB106-S2-8.0	8/3/20	9:55	S	↓				X					X			~~X~~						X	X			↓
18	LW-SB106-S3-11.5	8/3/20	9:59	S	↓				X					X			~~X~~						X	X			↓

	Signature	Company	Date	Time
Relinquished	[signature]	ASPECT	8/4/20	11:30
Received	[signature]	[signature]	8/5/20	1155
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

No Pesticide analysis

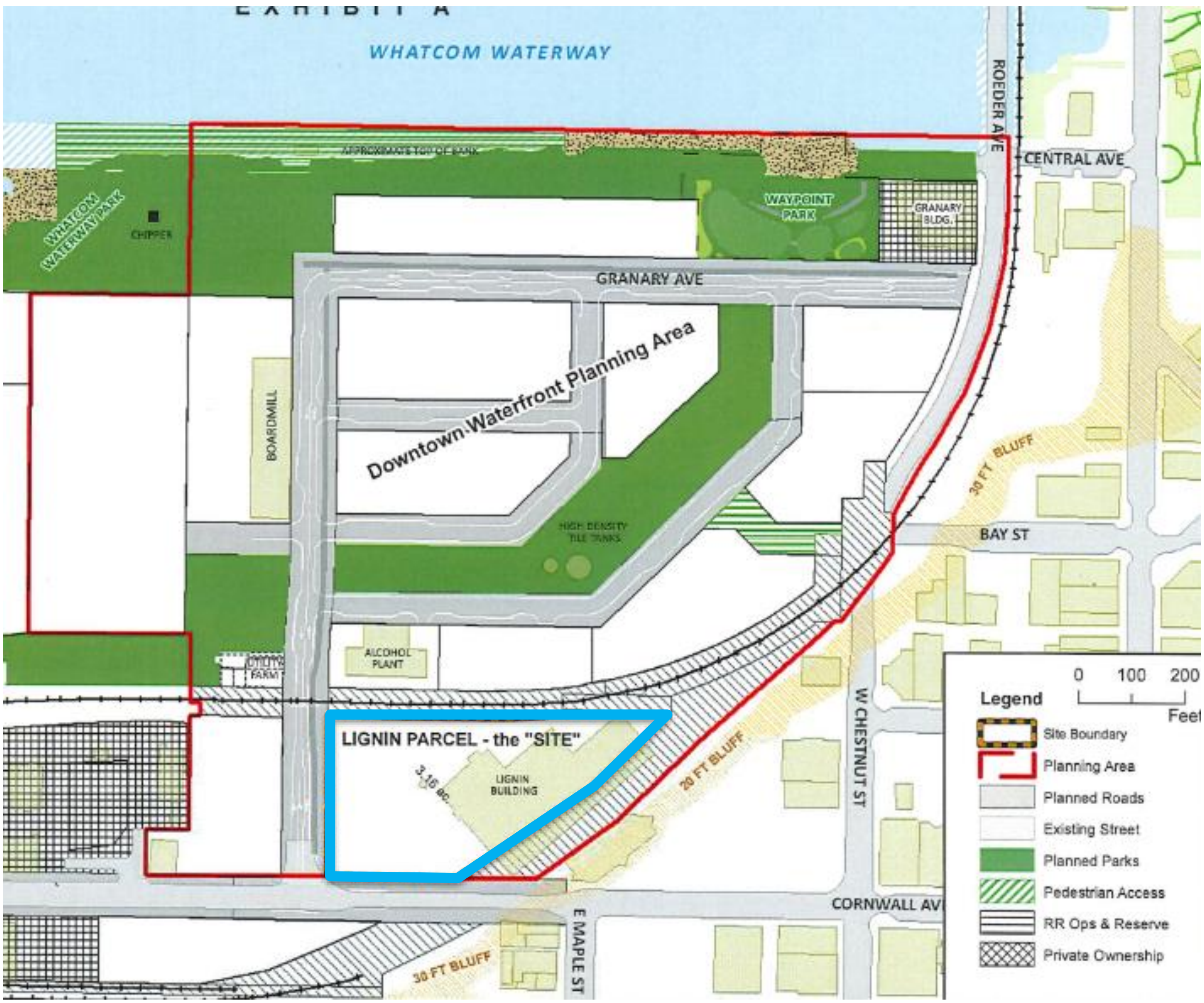
Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

APPENDIX C: LIGNIN PARCEL ZONING REPORT

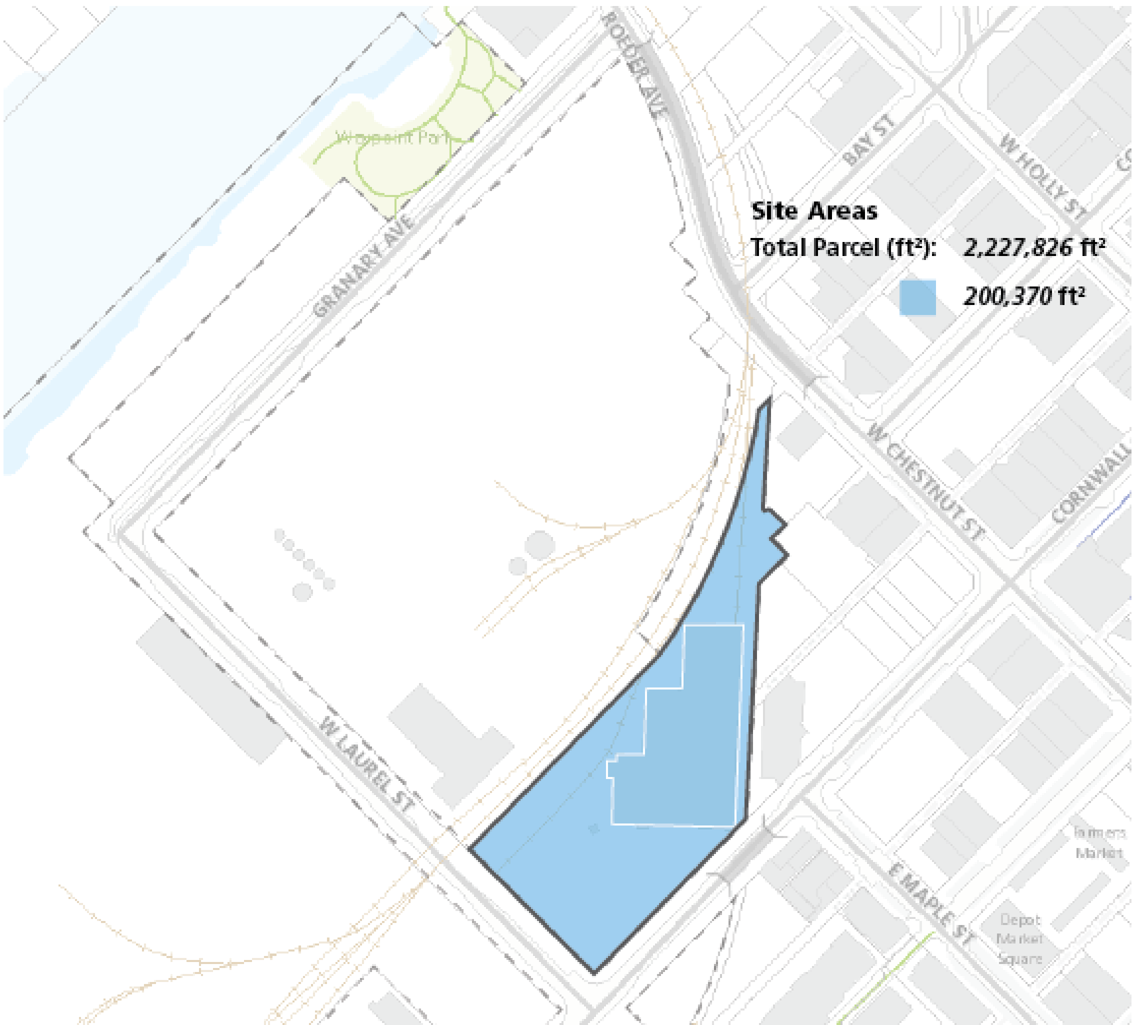
2006 - PoB Millworks IPG
Lignin Parcel Zoning Report

Site Boundary According to 2019 Port - Millworks Agreement:



2. Lignin Site Information

Part of Parcel No. 38033008066



Lignin Site Area Study

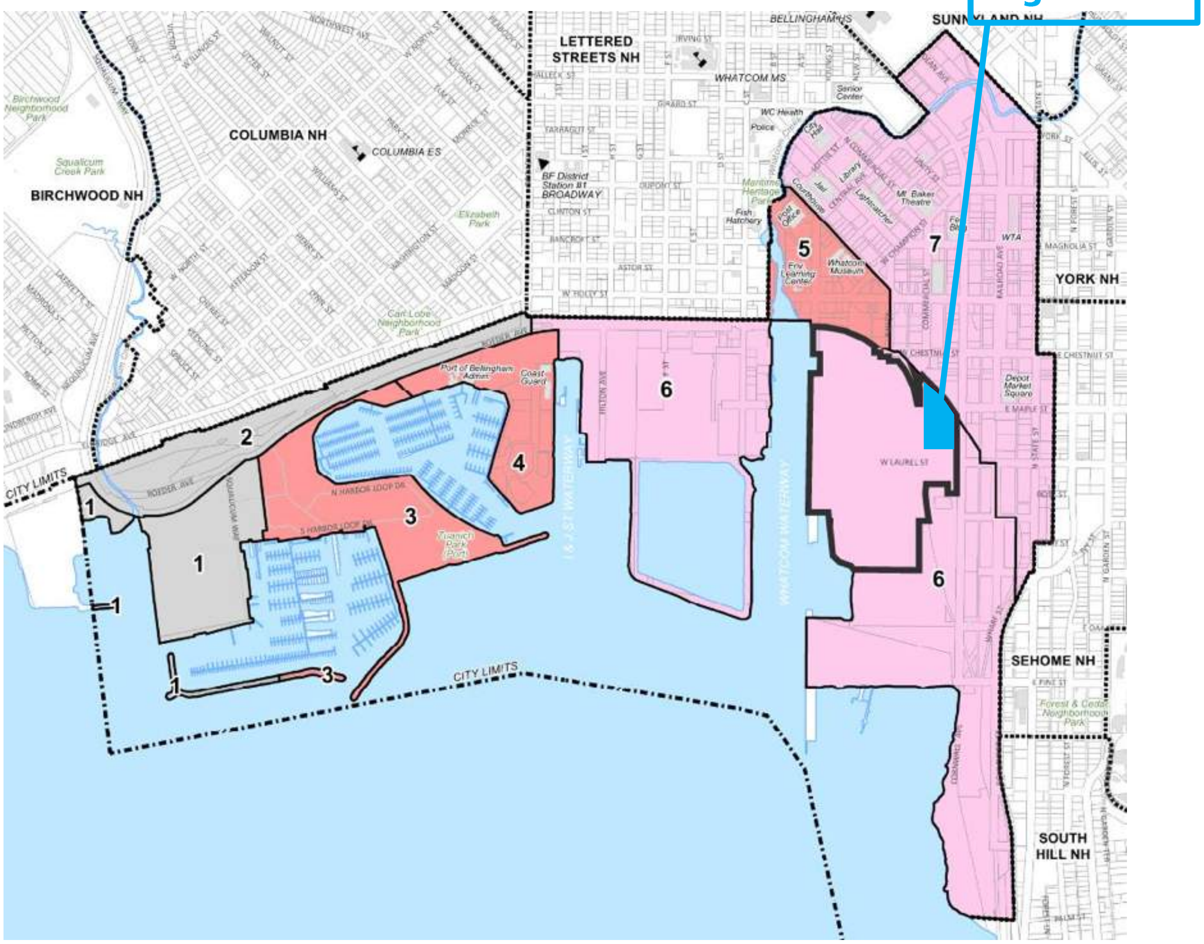
1. Neighborhood & Zoning ([BMC 20.00.031](BMC 20.00.031))

Neighborhood: City Center

Zoning: Area 6 – Waterfront District Urban Village – See BMC 20.37.400

Use Qualifier: Waterfront District

Special Conditions: Shoreline



BMC 20.00.031 – City Center Zoning

Waterfront District Urban Village – Boundary and Land Uses
BMC 20.37.400

BMC 20.37.410 – A Land Use

Waterfront District Urban Village - Uses
Excerpts from [BMC 20.37.420]

A.8 Shoreline Master Plan Program. Specific uses allowed in Table 20.37.420-A may be restricted by the shoreline masterplan

Permitted and Conditional Land uses (*Footnotes Page 7)
Permitted – *Conditional –*

Note: See Table 20.37.420-A for more detail

Land Use Classification	**Commercial** *Mixed Use*
A. RESIDENTIAL USES	
1. Short-term Rentals	
2. Confidential shelters	
3. Hotel, motel and hostel	*1
4. Residential Uses	*1
5. Night watchman or caretaker quarters	
6. Certain interim housing	
B. COMMERCIAL	
1. Adult Entertainment	
2. Commercial Recreation	
3. Crematory	
4. Day Care	
5. Day Treatment Center	
6. Drinking Establishment	
7. Drive-up / drive-through facilities (Bank tellers, food, beverage, car washes.)	
8. Eating Establishment	
9. Livelwork Unit	
10. Motor Vehicle Sales	*7
11. Nightclubs	
12. Offices	
13. Electronic / Furniture Repair	*2
14. Retail sales	
15. Personal Services	
16. Service Stations	
17. Water-related and water-depended commercial recreation and transportation.	
C. HEALTH CARE	
1. Doctor, dentist, medical and therapy	
2. Medical Care Facility	
3. Service Care	
4. Veterinary Service	*2

Land Use Classification	**Commercial** *Mixed Use*
D. PUBLIC AND SEMI-PUBLIC ASSEMBLY	
1. Aquarium, Interpretive center, library	
2. Art Gallery, art school and art studio	
3. Auditorium, Stadium, Theatre	
4. Church and house of worship	
5. Community Center	
6. Convention Center	
7. Institution of Higher Education	
8. Neighborhood Club and Activity Center	
9. Park, Trail, Playground	
10. Passenger Terminal	
11. Private Club and Lodge	
12. Public Building and Use	
13. School	
E. INDUSTRIAL	
1. Automobile Repair	
2. Automobile Wrecking	
3. Commercial Power generation	
4. Hazardous Waste Treatment	
5. Manufacture and Assembly	**2*
6. Mini Storage Facility	**8*
7. Monument and Stone Works	
8. Repair of Large Equipment	
9. Warehousing, Wholesaling and freight operation.	
10. Water-related industrial uses. (aquaculture, barge loading facility, boat/ship building, boat repair, dry dock, net repair, seafood processing, cargo terminal, web house, and offices supporting the same)	
F. MISCELLANEOUS USES	
1. Adaptive uses for historic register buildings	
2. Agricultural Nursery	
3. Community Gardens	
4. Community Public Facilities	
5. Parking Facility	
6. Parking Facility (Retail)	
7. Public Utilities on Private Property	
8. Public Utilities in Public Right-of-Way	
9. District Specific Utilities	**9*
10. Recreational vehicle park	
11. Recycling Collection and Processing	
12. Recycling and Refuse Collection Processing Center	**3*
13. Wireless Communications	
14. Certain Temporary Homeless Shelters	

Footnotes Outlined Above – See Table 20.37.420 – A for more detail

***(1)** Residential units or hotel rooms may not occupy the street level frontage on Granary Avenue or W. Laurel Street.*

***(2)** Provided noise, smell and other impacts are internalized within an enclosed structure.*

***(3)** Facilities shall be sized and designed to collect waste from residents, businesses and visitors to the waterfront district and shall not be used to collect or treat waste imported from outside of the district.*

***(7)** When entirely enclosed within a structure.*

***(8)** The floor area devoted to mini-storage shall be less than 50 percent of the floor area of other permitted use(s) on site, and mini-storage uses are prohibited on ground level street frontages except for entry, office and similar active uses.*

***(9)** As allowed through approval of a waterfront utility master plan.*

Waterfront District Urban Village:
Development Regulations (BMC 20.37.430)

B. Design Review: Is Required. See BMC 20.25

D. Minimum Lot Size: None

F. Setbacks:

F.1 Commercial Mixed-Use Subzone - There shall be no minimum yards or building setbacks.

G. Maximum Building Height:

1. Maximum building heights within the waterfront district are shown on Figure 20.37.430-A except as provided herein.

2. Height is measured per height definition No. 1. Exceptions:

a. Waterfront topography will be raised during construction in conformance with requirements of the waterfront district planned action ordinance (Chapter 16.30 BMC, Exhibit A) to account for sea level rise and installation of public infrastructure. Existing grade shall be that which is established with such fill activities when height is not measured from an abutting city sidewalk.
b. A building may be divided into modules and stepped with height measured on a per module basis to respond to topography on sloped property.

3. Solar and wind power generating facilities may be permitted to exceed maximum building height limits, provided they are not located within view corridors.

4. View Corridors

a. See following graphic for view corridors and building heights.

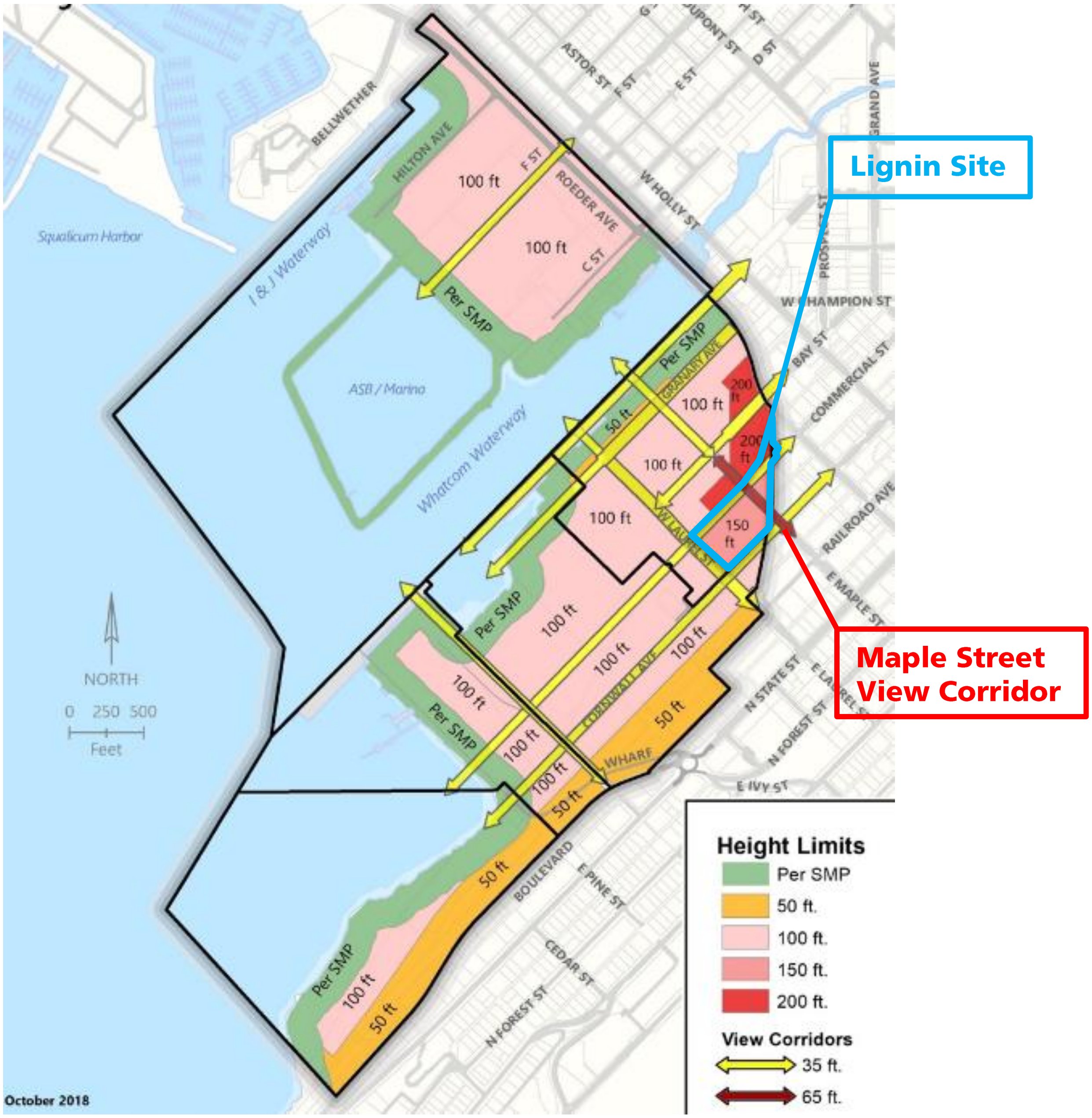
b. Building height within view corridors is limited to 35 feet with the exception of the Maple Street view corridor which is limited to 65 feet upland from the tile tanks, and 35 feet waterward from the tile tanks. Where view corridors fall within public rights-of-way, including the Bay Street extension over the proposed parking garage, the view corridor extends to the edge of the right-of-way. View corridors which do not fall within public rights-of-way extend 30 feet on either side of the centerline of the designated view corridor.

c. Height within view corridors is measured to the highest point of the building or structure. Encroachment above the height limit into view corridors by rooftop objects such as mechanical equipment, elevator and stair shafts, smokestacks and ventilators is prohibited, other than eaves, cornices, awnings, decks with see-through railings and other similar features not exceeding four feet tall.

5. Properties within the jurisdiction of the shoreline master program are also regulated by the height limits as defined in the shoreline master program. Where conflicts arise, the more restrictive height applies.

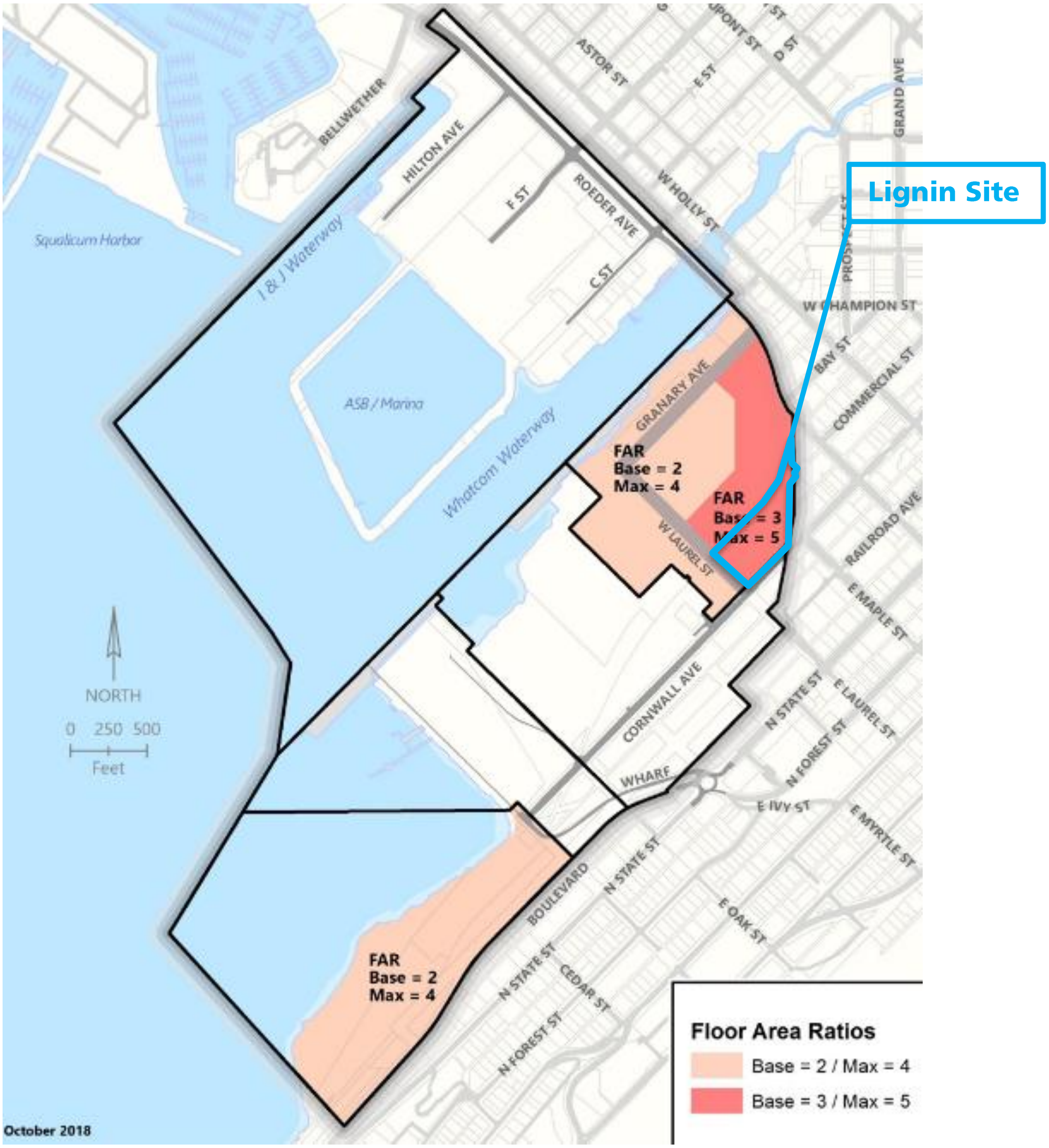
6. Building height is further defined by building step backs, tall building floor plate restrictions and tower location standards as specified in the applicable design standards in BMC 20.25.080.

Allowable Building Height and View Corridors: 150 ft



BMC 20.37.430 - A

BMC 20.3
Floor Area Ratios: Base = 3 / Max = 5



BMC 20.37.430 - B

H. Floor Area Ratio:

2b. Floor area transfer and bonuses outlined in Table 20.37.430-A provide the opportunity to increase FAR on individual building sites in the commercial mixed-use areas by a maximum of 2.0 FAR to the maximum FAR shown on Figure 20.37.430-B.

4. Floor Area Bonus Options. Floor area bonus options summarized in Table 20.37.430-A and fully described in subsection (H)(4)(c) of this section are offered as incentives to encourage facilities and amenities that implement the waterfront district subarea plan.

a. Projects may use more than one bonus option unless specifically stated otherwise; bonus floor area amounts are additive.

Bonus Option	Floor Area Bonus
Minimum LEED Platinum or Living Building Certification (or equivalent)	2.0 FAR Bonus
Public Plazas and Open Spaces	Provide 1 square foot of public open space; receive 2.5 square feet of building space.
Affordable Housing	Provide 1 square foot; receive 4 square foot bonus.
Minimum LEED Gold Certification (or equivalent)	1.0 FAR Bonus
Minimum LEED Silver Certification (or equivalent)	0.5 FAR Bonus
Lake Whatcom Watershed Property Acquisition Program	Receive 1 square foot for each fee unit paid (See Lake Whatcom watershed acquisition fee schedule.)

BMC 20.37.430 – A

c. Bonus Options.

I. Public Plazas and Open Spaces. Floor area may be transferred to and from any property within the waterfront district when approved by the planning director, provided:

(A) The transferred floor area will result in the provision of a public plaza or open space to remain open to the public in accordance with park hours established in BMC 8.04.040.

(B) For each square foot of base FAR allowed by the development code transferred from an eligible site, two and one-half square feet of bonus floor area are earned on the receiving site(s) up to a maximum of 1.0 FAR per receiving site.

(C) The property owner(s) executes a covenant with the city that is attached to and recorded with the deed of both the site transferring and the site receiving the floor area reflecting the respective increase and decrease of potential floor area.

II. Affordable Housing. Development which includes affordable owner-occupied housing or affordable renter-occupied housing which is ensured affordable for a period of not less than 50 years, or for a lesser period established in an adopted state or federal affordable housing finance and monitoring program, and documented through deed restriction and/or covenant, and where such units' affordability is ensured through enforcement and monitoring by a public agency.

a. For each square foot of affordable housing, four square feet of bonus floor area are earned, up to a maximum of 0.5 FAR.

b. Affordable owner-occupied housing" means housing units sold at a price affordable to households earning no more than 100 percent of Bellingham's median household income as published annually by the U.S. Department of Housing and Urban Development ("HUD").

c. "Affordable renter-occupied housing" means housing units rented to households earning no more than 80 percent of Bellingham's household income as published annually by HUD.

III. Leadership in Energy and Environmental Design (LEED) Certification or Living Building (or Equivalent). Buildings that incorporate sustainable design may receive a graduated (0.5 to 2.0) FAR bonus. To qualify for this bonus, the proposed project shall be certified by the planning director as a minimum LEED silver, gold, platinum or living building challenge certification (or equivalent).

I. Noise Level (BMC 20.37.430)

Noise Level Reduction required for residential. See BMC 20.37.430 I for more information on Exterior Wall, Windows, Doors and Roof/Ceilings

Sustainability (BMC 20.37.440)

See this section for Sustainability requirements. Highlights include light pollution reduction, landscape irrigation, energy conservation, recycling facilities, construction waste recycling, and district specific utilities.

Parking (BMC 20.37.450)

Residential	0.5 space per studio unit. 0.75 space per 1-bedroom unit 1.00 space per unit having 2 or more bedrooms
Commercial and Institutional	1 space per 500 SF of gross floor area used for offices, retail, services, eating and drinking establishments, cultural or education facilities and similar uses.
Industrial and Manufacturing	1 space per 5,000 square feet of gross floor area or 1 per 2 employees (working at the same time), whichever is greater.
Warehouse and Wholesale	1 space for every 20,000 square feet of gross floor area or 1 per 2 employees (working at the same time) whichever is greater.
Mini-Storage	1 space for every 2,000 square feet of storage area plus 3 spaces for the manager's office.
Marinas	See Shoreline Master Program
Boat Launches	See Shoreline Master Program

BMC 20.37.450 – A

See Section for options to reduce parking. Include Bike Parking per BMC 20.37.450 – G.

Landscaping (BMC 20.37.470)

See section for Landscaping Requirements

Signs (BMC 20.37.480)

See section for Sign Requirements

3. Additional BMC Information

3a. Sub-Area Plan

The Waterfront District Sub-Area plan lays out objectives and design standards for the further development of the Bellingham waterfront as a mixed-use area. This plan was done in 2019 and is intended to amend the sub-area plan done in 2013. It includes

3b. Heritage Trail Concept Plan

The Heritage Trail concept plan helps to outline how the historic aspects of the waterfront district could be approached. Primary sections include insight on the history of the waterfront and what can be preserved. Section 4.3.3 provides some context/approach to the mill building.

3c. Precedent Study

Useful precedent studies of similar waterfront projects. Primarily focused on the urban-design scape.

3d. Design Review (BMC 20.25.010-090)

3e. Waterfront District Planned Action BMC 16.30

This site is subject to BMC 16.30 which is a Planned Action. Further discussions with the city are needed to understand the impact of this ordinance on the project or the process to get a project built.

APPENDIX D: AFFORDABLE HOUSING FEASIBILITY REPORT

Port of Bellingham Lignin Parcel: Affordable Housing Feasibility Report
Mercy Housing Northwest
October 12, 2021

Background and Summary
In 2019, the Port of Bellingham was awarded an Integrated Planning Grant from the WA State Department of Ecology to conduct analysis on the Lignin Parcel, an approximately 3.3 acre site in Bellingham's Waterfront District. Mercy Housing Northwest, an experienced non-profit owner, developer, and service provider, was engaged to assist with feasibility analysis for affordable housing on the site, to include analysis on site conditions, programming, design approach and financing.

That analysis follows in the four sections below. Our full recommendations can be found at the conclusion of this report, and a summary is listed below. The Port is also exploring other mixed-use functions possible at the site with the Whatcom Community Foundation; our analysis in this report is limited to affordable housing development. We have determined the site is a strong fit for the development of affordable housing, with the following recommendations:

1. *Development Program: An 80-unit development, serving families at or below 60% AMI, with potential for mixed-use community-serving space such as an Early Learning Center. Homeownership housing is another potential program element; given the complexity of having two types of housing tenure in one project, additional feasibility analysis beyond the scope of this report is needed.*
2. *Financing Strategy: A financing strategy based on the 4% Low Income Housing Tax Credits, accompanied by City of Bellingham, State of Washington Housing Trust Fund, and tax-exempt permanent debt. Gap-filling strategies to be identified for funding applications beginning in early 2021.*
3. *Need for Public Subsidy: Any affordable housing development will require significant public housing capital resources. To produce housing for lower-wage working households, we estimate that the public resources required will be $8-$10 million.*
4. *On-going Coordination: Need for coordination with Port of Bellingham, City of Bellingham, and other key stakeholders to contribute financial and staff resources to make affordable housing financially feasible.*
5. *Cost Efficient Design: Priority for cost-efficient, high-quality design to enable financial feasibility and create a vibrant new building in the City's central Waterfront District.*

Site Evaluation
The Waterfront District is a critical part of the City's center and also an area undergoing significant redevelopment in recent years. In partnership with RMC Architects, we have conducted a preliminary analysis of the site conditions and its suitability for affordable family housing.

1. *Land Use and Zoning*
   The site's current land use and zoning is compatible with mixed use development, including multi-family residential and compatible commercial uses. A pre-application meeting with the City will need to be scheduled to determine any further site development challenges. See further analysis in Appendix C of report.

2. *Parking and Access*
   Site planning is somewhat constrained by parking requirements, which require 1 stall for each 2- and 3-bedroom unit, and 0.75 stalls for each 1-bedroom unit. Given the prohibitive cost of structured or below-ground parking, parking will need to be accomplished at grade. Affordable housing and transit reductions are available to the site, and will need to be pursued for the site to achieve a feasible density for development. Access to the site is only possible along Laurel Street. As such, Laurel Street will need to be utilized for access for residents, guests, fire, and solid waste. Preliminary analysis suggests that all required access can be accomplished, however it does require breaking up the Laurel Street façade for vehicle entrance. See further analysis in Section 3 of report.

3. *Environmental Conditions*
   The site is contaminated and will need to be fully remediated prior to affordable housing development. The site is part of the Georgia-Pacific West Site and more specifically the Chlor-Alkali area which was contaminated by a pulp and tissue mill that operated at the site from 1926 to 2007. The site soil has high levels of mercury and petroleum, among other contaminants. The Port of Bellingham and Department of Ecology are engaged on remediation planning for the site. No environmental clean up costs have been included in the budget models that follow.

4. <u>Soils Conditions</u>
   No soils report was available for the project site at the time this report was drafted. However, given the project's location at the waterfront, we recommend geotechnical analysis be conducted as early as possible to understand soil conditions and to inform project design, constructability, and cost.

5. <u>Site Constraints</u>
   The site contains several restrictions that significantly constrain development potential.
   - *RR & Sewer Easement: the eastern portion of the site includes a 55' train operations and reserve easement and a 20' sewer easement. This restricts buildable area. Further investigation is needed to determine whether this area can be used for surface parking.*
   - *View corridors: two view corridors run across the site, each restricting development height. The Commercial Ave corridor runs along the east boundary of the site with a height restriction of 35'. The Maple Street corridor runs through the east portion of the site and has a height restriction of 65'.*
   - *Slope & Sewer Easements: a 10' slope easement runs along Laurel Street, and a 20' sewer easement runs along Cornwall Avenue.*
   - *Railroad: an active BNSF rail line, running north-south along the western portion of the site. This will not impede site development but will require noise mitigation for residential use, which should be factored into anticipated construction costs.*
   - *In addition, potential for a future BNSF line to the south could further impact development.*

Program Opportunities
Based on the project site and preliminary conversations with the Port of Bellingham and project partners, we have focused our efforts on evaluating affordable family housing serving a workforce population, primarily concentrated at or below 60% of Area Median Income.

1. <u>Site Context and Amenities</u>
   The project is well located for the development of affordable housing, including affordable family housing. The site is immediately adjacent to Downtown Bellingham, with excellent access to retail, services, and amenities. See a sampling of nearby amenities below.

Amenity Type	***Name***	***Distance from Site***
Grocery Store	*Community Co-op*	*0.5 miles*
Produce	*Bellingham Farmer's Market*	*0.2 miles*
Household Items	*RiteAid*	*0.4 miles*
Health Clinic	*Planned Parenthood*	*0.8 miles*
Health Clinic	*Unity Care Bellingham*	*0.7 miles*
Behavioral Health	*Wellsource Counseling*	*0.3 miles*
Food Bank	*Bellingham Food Bank*	*0.9 miles*
Social Service Provider	*Opportunity Council*	*0.1 miles*
School	*Carl Cozier Elementary*	*1.1 miles*
School	*Whatcom Middle School*	*0.8 miles*
School	*Bellingham High School*	*1.0 miles*
Park	*Waypoint Park*	*0.4 miles*
Park	*Maritime Heritage Park*	*0.5 miles*

   Despite the proximity of downtown, the current pedestrian connections will need to be improved to ensure adequate access for future residents. We recommend further evaluation to determine if a connection can be made from the site directly onto the Cornwall Avenue Bridge.

2. <u>Housing need in Bellingham</u>
   There is great need for affordable housing in Bellingham. The City of Bellingham 2018-2022 Consolidated Plan identifies cost burden as the most pressing issue in Bellingham: 43% of households in Bellingham are cost-burdened, including 24% of households that are severely cost-burdened. The City's Consolidated Plan and Comprehensive Plan cite developing new permanent affordable units as key goals, particularly in high opportunity areas with good access to jobs, schools, and transportation. In addition, the City identifies the need for housing with services to support residents, as well as diversity in housing types including family housing.

3. *Potential for Mixed Use Development*
The central location of this site in Bellingham's core and the mixed-use zoning makes it a potential fit for a mixed-use project. Our experience is that childcare, community space, or social service space are typically a good fit for family housing. Although financing such spaces can be challenging, they provide an overall public benefit to the local community and neighborhood. Given the significant need for childcare in Bellingham, and our experience successfully integrating childcare spaces into housing projects, we believe this site could be a fit for a small Early Learning Center. In addition to financial feasibility, a mixed-use proposal would need to be evaluated to ensure legal structure and operations would align, and a project partner would need to be carefully selected for alignment in mission.

4. *Potential for Affordable Homeownership Development*
The project site would also be a potential fit for affordable homeownership development. A mix of housing tenure types would provide additional opportunities for housing stability and wealth building. Mercy Housing Northwest has had preliminary conversations with Kulshan Community Land Trust to explore the possibility of incorporating 10-20 units serving households earning up to 80-120% AMI as part of the residential project. The units would be included in the residential building to capitalize on construction and community space efficiencies.

Homeownership development differs from rental development and typically has different timing, financing, and structuring constraints. Different public and private financing sources would require that each housing element have distinct ownership, achieved by creating a commercial condominium association. Additionally, the homeownership units would need to be further conveyed to individual owners. How that might be achieved – potentially through a cooperative – will require further exploration. Neither MHNW nor Kulshan have pursued this type of structure before, and there are limited precedents and financing partners in the region. Further, both housing types are driven by public funding deadlines, which can differ based on program. Funding timelines would need to be aligned to allow the project to have all financing secured and start construction. Given these challenges, additional financing and structuring analysis outside the scope of this report is needed to evaluate whether homeownership is feasible for this project.

Preliminary Design Approach

1. *Cost Efficiency*
Affordable housing is dependent on limited public funding resources, and good stewardship of those limited resources enables the development of as much affordable housing as possible. Public funders typically establish a per unit or per project cap for funding, and also evaluate projects on cost efficiency. Because of this, cost-efficient construction is a very high priority for all affordable housing projects. Cost efficient construction is based on an efficient design and programming approach.

In general, we seek to identify ways to create a cost-effective but high-quality design. Given the zoning and footprint of this site, we believe a key starting point is to limit building height to four stories. This will allow cost-effective wood framing for the entire building, while also creating a building at an urban scale that will fit in to the current (and future) context of the downtown waterfront. In addition, a simple massing should be pursued, with architectural treatments that will provide visual interest and welcoming atmosphere while maintaining a feasible budget.

We also recommend early involvement of a General Contractor to assist in the evaluation of building design. Participation in the early stages of design can help identify basic design principals – such as stacking units and standard dimensions to simplify construction and reduce waste – that greatly impact cost.

2. *Sustainability*
Environmental sustainability is a high priority for affordable housing, in order to reduce energy consumption and ongoing operating costs. Given the public funding resources available in the City of Bellingham and Washington State, the project will at baseline need to comply with the Evergreen Sustainable Design Standard, which includes features such as efficient plumbing and lighting fixtures, enhanced building envelope, and energy efficient building systems. Where financially feasible, other sustainable features could be evaluated to further improve the building's performance.

3. *Program*
Affordable housing projects typically include a small amount of non-unit spaces that includes community space, property management offices, and services offices. We suggest including these spaces as ground floor spaces, providing easy access to residents and helping to activate the ground floor. If non-residential space is incorporated into the project, this space can also be on the ground floor, preferably in a street-fronting location along Laurel Avenue.

In addition, open space is a key component of affordable housing projects, especially family projects. A playground or play area is desirable. Given the configuration of the site, there is potential for open space in areas less suitable for built spaces. Additionally, if non-residential space such as childcare is pursued, there is potential for sharing outdoor spaces between uses.

Financing Strategies

1. *Financial Feasibility*
   We evaluated several financing strategies to determine what pathways exist for feasible affordable housing on this site. MHNW has many years of experience in assembling financing for affordable housing and has utilized a wide array of sources including: 4% and 9% Low Income Housing Tax Credits, tax-exempt bonds, WA State Housing Trust Fund, HOME, CDBG, HUD 202/811, Section 8 Project Based Vouchers, Federal Home Loan Bank, and conventional debt.

   Because program and unit mix impact cost and funding sources and therefore overall feasibility, we have evaluated multiple design and financing strategies, discussed in further detail below. However, our general baseline approach, determined by site parameters and funding availability, was to evaluate an approximately both 80-unit and 120-unit buildings with a mix of affordability (30-60% AMI) and unit types (1-3 bedrooms).

   From there, we analyzed the impact of unit types, income levels, and financing types to evaluate different scenarios. For each, we looked at timeline, funding competitiveness, project size, and overall feasibility to a balanced budget.

   The primary financing we evaluated are 4% and 9% Low Income Housing Tax Credit, because that subsidy provides the bulk of financing to an affordable housing project. Other funding sources - City of Bellingham HOME/Levy funds and WA State Department of Commerce Housing Trust Fund dollars, as well a conventional permanent debt – were considered in both scenarios.

2. *Scenario 1: 9% credit*
   The 9% Low Income Housing Tax Credit is the more generous of the two tax credit programs, but because it provides higher subsidy per unit, is more competitive and limited throughout the state. Because of this competitiveness, the Housing Finance Agency that allocates credits prioritizes projects that serve the highest need populations, primarily homeless.

   a. *Timeline:*
      The 9% credit evaluates projects in pools based on geographic location: King County, Metro Counties, and Balance of State. Projects in Bellingham are included in the Metro Counties Pool, which includes Pierce, Snohomish, Whatcom, Clark, and Spokane counties. Based on high competitiveness and lack of resources in this pool in recent years, tax credit policy has been reformed to distribute credits among the counties, such that each county receives enough allocation for one project each year. Based on this, Whatcom undergoes an annual planning process to select the priority project for the 9% credit. A project has already been identified for the December 2021 application; the earliest a Lignin site project could go ahead is 2022, and based on the pipeline, the timing could be later.
      - *City Funding Application: January 2022*
      - *State Funding Application: September 2022*
      - *9% Tax Credit Application: December 2022*
      - *Close/Construction Start: July 2023*

   b. *Competitiveness:*
      In addition to the need to be determined priority project as discussed in the timeline section above, projects seeking 9% credits must also hit a minimum points threshold in the tax credit scoring criteria. This scoring is heavily weighted toward projects with deep affordability levels or permanent supportive housing for homeless households, as well as projects that achieve significant efficiencies and come in below the development cost limits. Meeting this scoring threshold for a family project with incomes ranging up to 60% AMI will be challenging.

c. *Project Size:*
Although Whatcom County is awarded a project each year, there is a limit to the amount of credits that project may take. Based on costs in the Bellingham area and other available sources, this credit allocation amount is best suited to a project size of around 50 units. This means that as project size grows, available subsidy does not also increase on pace. Based on this, an 80-unit project is more feasible than a larger project.

d. *Overall Feasibility:*
The Whatcom allocation restriction and the limitation of the subsidy to one project per year makes the 9% tax credit a challenging fit both in terms of timeline and budget. If pursued, the project would likely be on a longer timeline and with adjustments made to project concept. To evaluate 9% feasibility, we pursued a concept with more restricted income levels: half at 30% AMI and half at 50% AMI, which would provide a pathway to hitting the minimum threshold.

Based on that adjusted concept, the total gap for the 9% scenario, at 80 units, is $6.2 million. See attachment for summary budget.

3. *Scenario 2: 4% credit*
The 4% Low Income Housing Tax Credit provides less subsidy per unit but is paired with tax-exempt bonds, allowing projects to drive debt at a discounted rate. It is a program generally well-suited for workforce housing projects with slightly higher affordability levels (averaging 50%-60% Area Median Income).

a. *Timeline:*
In the last several years, 4% tax credits/bonds have been awarded twice a year; early indication is that 2022 credits will only have one application cycle. Although competitiveness may impact timeline, the project could apply as early as Q1 2022.
- *City Funding Application: January 2021*
- *State Funding Application: September 2021*
- *4% Tax Credit Application: February 2022*
- *Close/Construction Start: August 2022*

b. *Competitiveness:*
The 4% tax credit/bond program is newly competitive in Washington State. Having historically been a program aimed at workforce housing, the Housing Finance Agency has now added multiple, overlapping priorities to achieve public benefit, including deeper affordability. Although the scoring is well-suited to projects with a slightly higher income level mix, demand in the last several cycles has been high, resulting in only the highest-scoring projects achieving awards. Several aspects of the project could make it competitive: availability of other public resources to leverage, brownfield site, amenity-rich location, potentially for mixed use. However, policy and scoring have been shifting in recent years, and so competitiveness will need to be carefully managed for as the project moves forward.

c. *Project Size:*
Because the 4% subsidy is a less robust subsidy than the 9% program, the incremental increase in tax credits as a project adds units does not fully cover the cost of those added units. Other project sources are also extremely limited in their ability to award more for a larger project (City of Bellingham) or are capped by a per-project limit (State of WA). Based on this, the 80-unit project is most feasible.

d. *Overall Feasibility:*
The 4% offers several opportunities for a workforce project. Because the project is located in a HUD-designated qualified census tract (QCT), it is eligible for a 130% boost in the amount of tax credits and is also eligible to count non-residential spaces that serve the community (such as an early learning center or social service space) to generate additional tax credits. In addition, the scoring of the program, designed to serve slightly higher AMIs, is better aligned with this project concept. The higher AMIs enable to the project to drive permanent debt and receive the benefit of the tax exempt bonds. Additionally, the open application process of the 4% program, while still presenting challenges in competitiveness, likely provides the fastest path to project start. To evaluate 4% feasibility, we pursued a concept with income levels at 30-60% AMI, with an average of 50% AMI.

As proposed, the total gap for the 4% scenario, at 80 units, is $2.9 million. See attachment for summary budget.

4. *Operating and Rental Subsidy*
Operating and project-based rental subsidy both offer a significant benefit to affordable housing projects by providing additional income to the property that enables leveraging of additional debt. Unfortunately, there is no subsidy available from the City or Bellingham Housing Authority at this time.

5. *Mixed Use Project Financing*
Financing a non-residential project component is challenging. Non-residential uses tend to have even fewer funding sources than housing. For uses such as childcare, limited capital funds are available at the State level (through the Early Learning Fund at the Department of Commerce) and the City level (City of Bellingham CDBG funds). In addition, there are below market debt programs available through the Washington Community Reinvestment Act (WCRA). However, due to funding constraints, non-residential spaces typically require significant sponsor or philanthropic support, often limiting their size or their overall feasibility.

Recommendations

1. *Advance design and planning for an approximately 80-unit affordable mixed-use project*
For the reasons noted above, we recommend advancing design and planning efforts for a mixed-use development that includes approximately 80 units of permanently affordable rental housing, a ground-floor Early Learning Center, surface parking, and associated support spaces. The development should be focused on the need identified by the City of Bellingham and prioritized by local and state funders: family-focused housing at 30% - 60% Area Median Income.

2. *Pursue financing scenario 2: 4% Tax Credit*
As described above, we believe the 4% Tax Credit financing strategy represents the most feasible and expedited pathway to bring affordable housing to the Lignin site. This strategy enables the project to pursue the desired workforce housing population and take advantage of the project's location in a QCT to maximize Tax Credit equity.

As planning for the 2022 4% Tax Credit application period advances, the team will need to stay intently focused on emerging priorities and quickly adapt the project plan to remain competitively positioned for this resource. Examples could include slight adjustments to unit mix and income levels, pursuing additional project partnerships, and advancing the mixed-use concept.

3. *Engage key stakeholders to achieve financial feasibility and coordinate efforts*
Because of the important nature of this project as a gateway to the Bellingham waterfront, as well as the significant challenges presented by development mixed-use affordable housing on this site, we recommend continuously engaging key stakeholders, particularly the Port of Bellingham and City of Bellingham, as the project advances. While affordable housing will bring significant community benefits and advance Port and City goals, it will also require significant public subsidy and coordinate planning efforts around site clean-up, infrastructure, permitting, and site acquisition. The Port and City are key players in these efforts and should bring their significant resources to bear to support the advancement of creating a vibrant affordable community on the Lignin parcel to serve as connection between downtown and the Bellingham waterfront.

4. *Seek additional public and private housing capital resources*
While Scenario 2 presents the most feasible, efficient pathway toward advancing a development, it requires intentional, coordinated effort to align the non-LIHTC capital resources. These will likely include the City of Bellingham HOME Fund, Washington State Housing Trust Fund, permanent private financing and philanthropic support. Securing these resources will require a coordinated effort from Mercy Housing Northwest and the Whatcom Community Foundation. The Port of Bellingham should be involved in support access to additional Healthy Housing or other Washington State resources to support the remediation work and site preparation.

5. *Advance planning for cost-efficient design and construction*
To achieve financial feasibility and position the project to be as competitive as possible for public resources, we recommend a four-story development, that creates a vibrant, welcome atmosphere for residents and visitors alike, in a cost-efficient manner. Prioritizing cost-effective design principals from early stages of design will be critical to the project's feasibility.

Budget Scenario Summaries:

9% Financing

80 unit	30% AMI	50% AMI	60% AMI
1 BR	18	18	-
2 BR	14	14	-
3 BR	8	8	-
Total	40	40	-

Acquisition	721,044
Hard Costs	18,652,329
Soft Costs	2,896,590
Financing Costs	586,563
Dev Fee, Reserves	2,163,712
Total	25,116,498
9% Tax Credits	11,700,000
WA Commerce	5,000,000
City of Bellingham	1,500,000
Permanent Debt	700,000
Total	18,900,000
GAP	(6,216,498)

120 unit	30% AMI	50% AMI	60% AMI
1 BR	27	27	-
2 BR	21	21	-
3 BR	12	12	-
Total	60	60	-

Acquisition	721,044
Hard Costs	25,097,262
Soft Costs	3,564,898
Financing Costs	653,125
Dev Fee, Reserves	3,291,162
Total	33,327,491
9% Tax Credits	11,700,000
WA Commerce	5,000,000
City of Bellingham	1,500,000
Permanent Debt	1,100,000
Total	19,300,000
GAP	(14,027,491)

4% Financing

80 unit	30% AMI	50% AMI	60% AMI
1 BR	4	26	6
2 BR	2	20	6
3 BR	2	10	4
Total	8	56	16

Acquisition	721,044
Hard Costs	18,652,329
Soft Costs	2,897,035
Financing Costs	682,823
Dev Fee, Reserves	2,166,512
Total	25,119,743
4% Tax Credits	11,766,619
WA Commerce	5,000,000
City of Bellingham	1,500,000
Permanent Debt	4,000,000
Total	22,166,619
GAP	(2,853,125)

120 unit	30% AMI	50% AMI	60% AMI
1 BR	4	40	10
2 BR	4	30	8
3 BR	4	14	6
Total	12	84	24

Acquisition	721,044
Hard Costs	25,097,262
Soft Costs	3,629,556
Financing Costs	730,826
Dev Fee, Reserves	3,291,162
Total	33,327,491
4% Tax Credits	15,589,363
WA Commerce	5,000,000
City of Bellingham	1,500,000
Permanent Debt	5,800,000
Total	27,889,363
GAP	(5,645,059)

**Budgeting is based on 2021 Whatcom LIHTC rent limits, with financing and cost assumptions based on recent similar MHNW projects in Bellingham and the region.

APPENDIX E: MILLWORKS DESIGN CHARRETTE - JUNE 10, 2021

Millworks Design Charette
June 10, 2021 (1:00pm to 5:00pm)
Squalicum Boathouse

12:30pm	*Optional in-person tour of the parcel (corner of W Laurel St and Cornwall Ave).*	
1:00pm	**Welcome**	Mauri Ingram, Whatcom Community Foundation Colin Morgan-Cross, Mercy Housing Northwest
1:15pm	**Site Orientation**	Neil McCarthy, RMC Architects
1:30pm	**Sustainable Design**	Presenter TBD Topic: Sustainability North Star in a Cost Constrained Environment & Environmental Justice Q&A and Group Discussion
2:15pm	**Break (15 minutes)**	
2:30pm	**Urban Design**	Presentation by Brice Maryman, MIG SvR Topic: Placemaking & Public Space Q&A and Group Discussion
3:15pm	**Small Group Breakout Sessions**	
4:15pm	**Small Groups Report Back**	
4:45pm	**Closing**	

Millworks Design Charette Purpose: To think creatively and critically as a group about the design opportunities and challenges that the Millworks project faces and to identify solution sets and directional goals related to:

- Community Expression, Connection & Connectivity
- Massing & Site Design
- Sustainability & Climate Change Adaptation

This discussion will help inform the design decisions for the project.

DESIGN CHALLENGES

Community Connection

- How can the design connect to and honor the site's history, its intended uses for The Millworks, and future growth of the waterfront?
- How can the design reinforce a welcoming, authentic neighborhood character & identity (fostering a sense of place and belonging)?
- How do we optimize access and connections to downtown as well as the waterfront district?

Massing and Site Plan

- How can we best accommodate multiple uses in a constrained site while maintaining cost efficiency?
- What opportunities are there for shared site (non-building) spaces to create and/or reinforce a sense of place?
- How can the project elements and orientation respond to and mitigate the impacts of the railroad line on the north property line, potential future railroad line on the east side, and limited access point on Laurel (among others)?

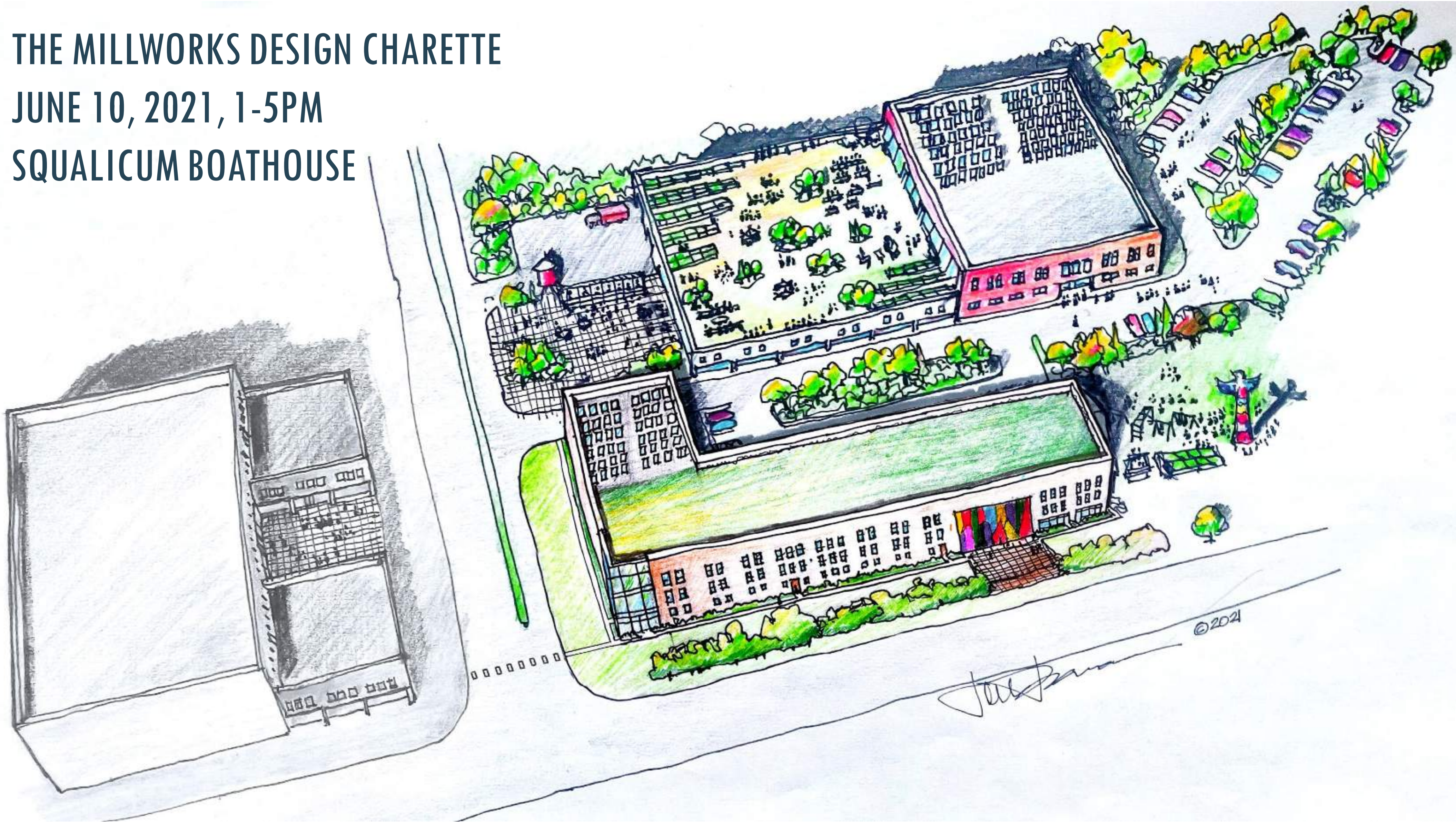
Sustainability/Infrastructure

- What sustainability focus best aligns with the site/program/cost constraints?
- What potential future public investments should be considered (or encouraged) as part of the design process? (Examples: Will the railroad eventually move? Will the Cornwall Ave bridge be replaced eventually? What public amenities would enhance the District?)

THE MILLWORKS DESIGN CHARETTE

JUNE 10, 2021, 1-5PM

SQUALICUM BOATHOUSE



MILLWORKS PROJECT GOALS

Community benefit: address on-going community needs for affordable housing, childcare space, and a local food campus with agricultural small business and non-profit support spaces

Waterfront district redevelopment: activate a key waterfront district gateway, bringing a mix of uses and creating economic development and job opportunities

A place for families: develop a project that responds to what families need to thrive, including housing, childcare, and on-site services that focus on health and wellness, education support, and financial stability.

Partnership approach: collaborate with public and private partners, including the Port, City, State, and local nonprofits and small businesses to maximize the public benefit and deliver a project that meets community needs.

MILLWORKS PROJECT OVERVIEW

Millworks Family Housing

- **70-80 units of affordable family housing**
  (1, 2, and 3 BD units) in 4 stories
- **Community space** for residents, property management and resident services office space
- **4-classroom Early Learning Center** with adjacent outdoor playground
- Surface parking to meet minimum parking requirements

Millworks Food Campus

Food Components:

- Food Hub
- Business incubation
- Shared logistics, processing and production facilities
- Co-located offices for food and Ag businesses
- Workforce training
- Event space
- Retail food cart and truck vendors

Community Components:

- Center for Employee Ownership
- Co-op office space
- Potential permanent non-profit offices

MILLWORKS DESIGN CHARETTE PURPOSE

To think creatively and critically as a group about the design opportunities and challenges that the Millworks project faces and to identify solution sets and directional goals related to:

- Community Expression, Connection & Connectivity
- Massing & Site Design
- Sustainability & Climate Change Adaptation

This discussion will help inform the design decisions for the project.

MILLWORKS DESIGN CHARETTE AGENDA

JUNE 10, 2021

12:30pm Optional in-person tour of the Lignin site
(Meet at the corner of Laurel & Cornwall)

Design Charette 1pm-5pm
Location: Squalicum Boathouse

1:00pm Welcome Mauri Ingram, WCF
Colin Morgan-Cross, Mercy Housing

1:15pm Site Orientation Neil McCarthy, RMC Architects

1:30pm Sustainable Design
Presenter Pending Confirmation
Topic: Sustainability North Star in a Cost Constrained Environment & Environmental Justice
Q&A and Group Discussion

2:15pm Break (15 minutes)

2:30pm Urban Design
Presentation by Brice Maryman, MIG SvR
Topic: Placemaking & Multi-use Ideas
Q&A and Group Discussion

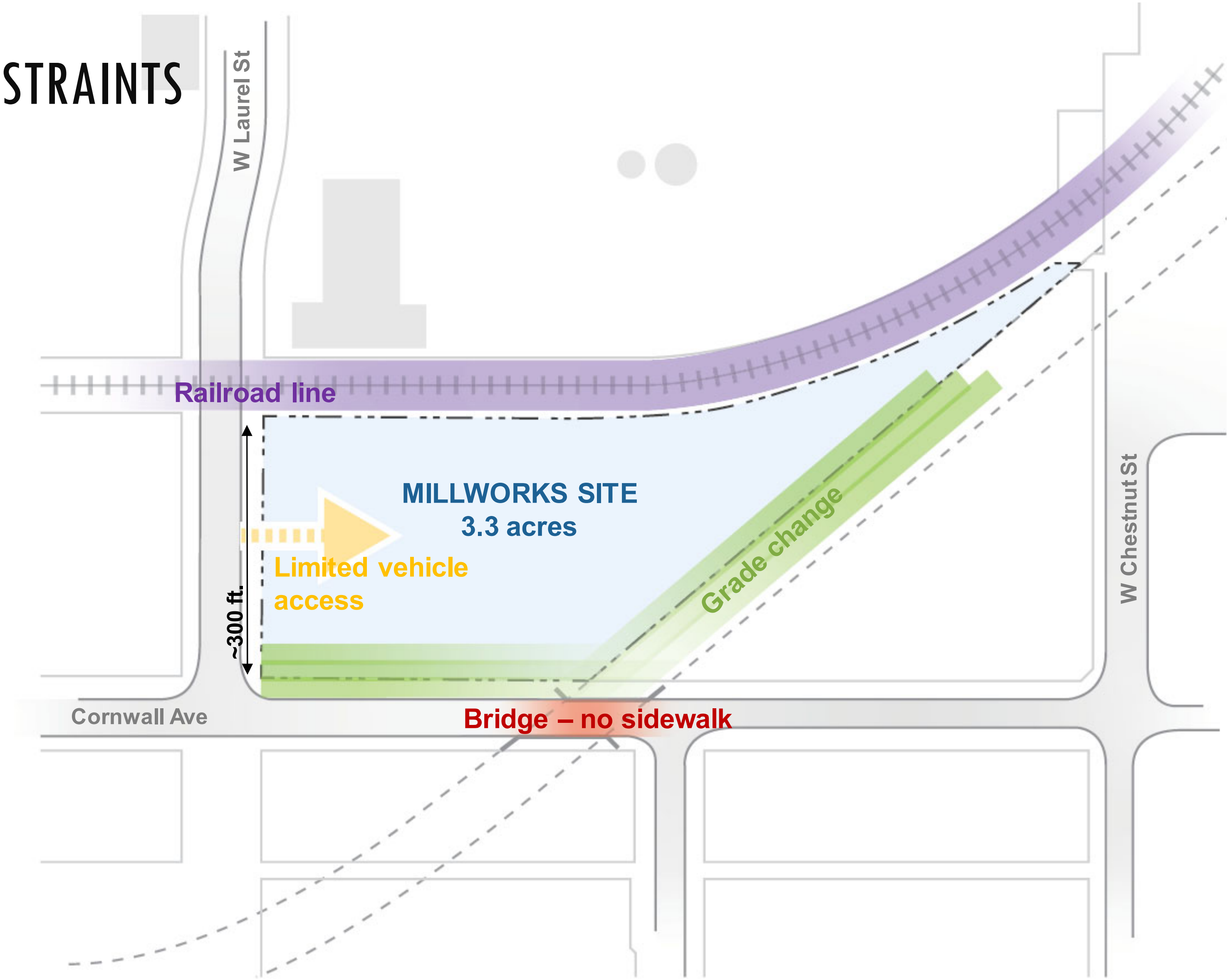
3:15pm Small Group Breakout Sessions

4:15pm Small Groups Report Back

4:45pm Closing

SITE CONTEXT

SITE CONSTRAINTS



DESIGN CHALLENGES

Community Connection

- How can the design connect to and honor the site's history, its intended uses for The Millworks, and future growth of the waterfront?
- How can the design reinforce a welcoming, authentic neighborhood character & identity (fostering a sense of place and belonging)?
- How do we optimize access and connections to downtown as well as the waterfront district?

Massing and Site Plan

- How can we best accommodate multiple uses in a constrained site while maintaining cost efficiency?
- What opportunities are there for shared site (non-building) spaces to create and/or reinforce a sense of place?
- How can the project elements and orientation respond to and mitigate the impacts of the railroad line on the north property line, potential future railroad line on the east side, and limited access point on Laurel (among others)?

Sustainability/Infrastructure

- What sustainability focus best aligns with the site/program/cost constraints?
- What potential future public investments should be considered (or encouraged) as part of the design process? (Examples: Will the railroad eventually move? Will the Cornwall Ave bridge be replaced eventually? What public amenities would enhance the District?)

THE MILLWORKS

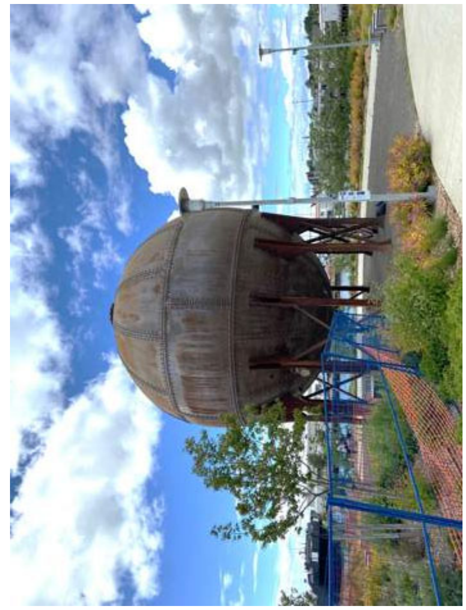
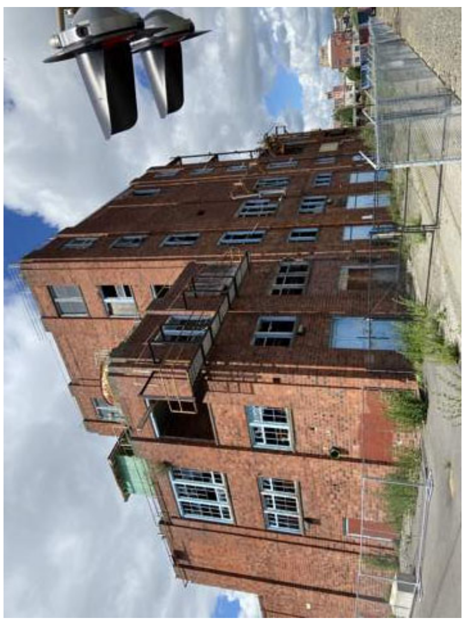
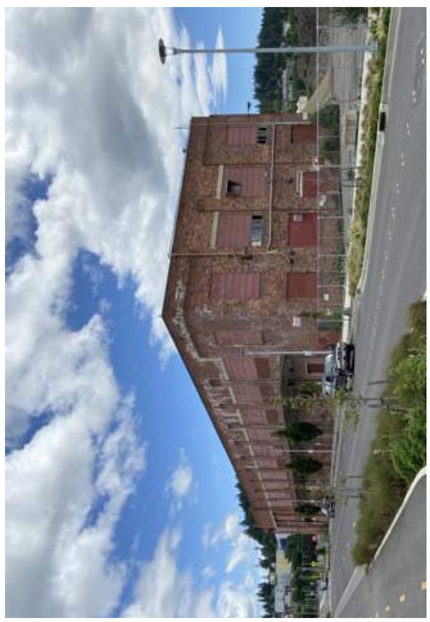
SITE ORIENTATION

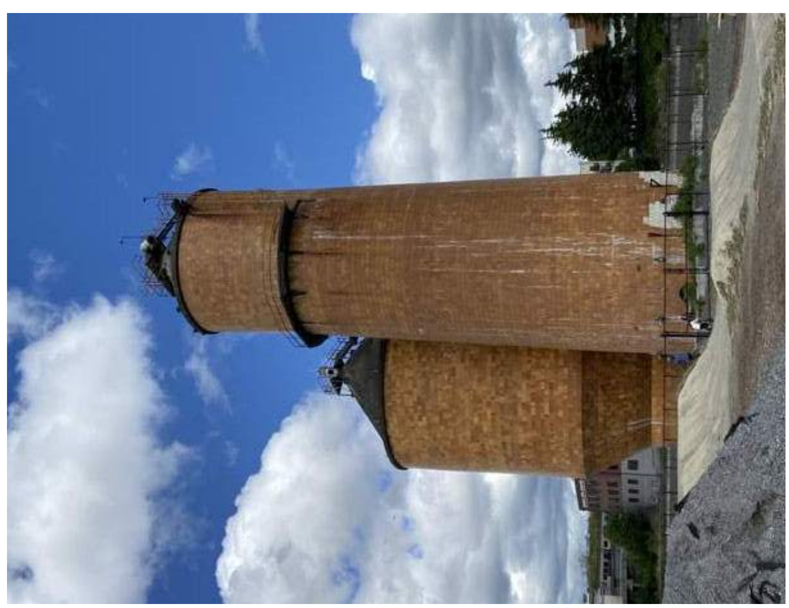
RMC ARCHITECTS

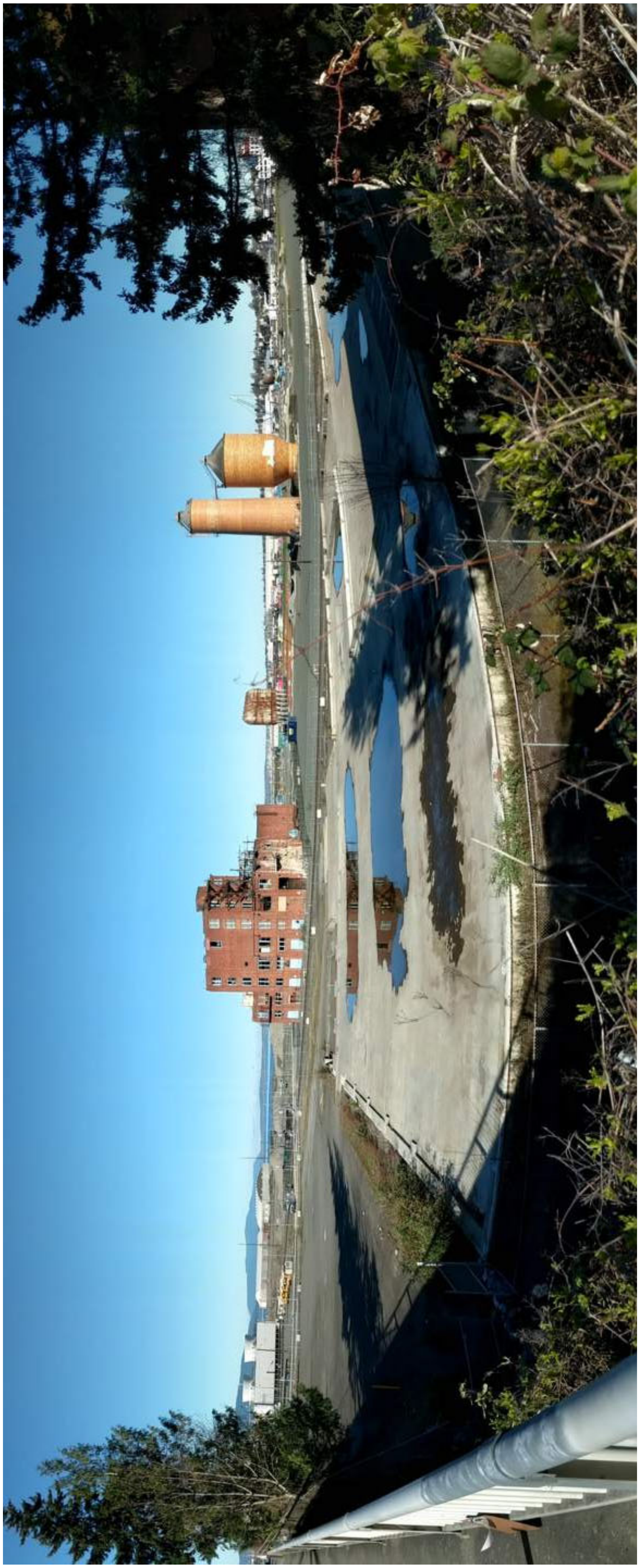
Georgia Pacific
full site build out.

GP continued
operations
until 2007.





Key Zoning Constraints:

Neighborhood: City Center
Zoning: Area 6, Waterfront District Urban Village
Use Qualifier: Waterfront District
Special Conditions: Shoreline

Min Lot Size: None
Setbacks: None
Max Height: 150’ except at view corridors
Density: FAR base 3. Max FAR 5 with bonuses
Parking:

- 0.5 space per studio unit
- 0.75 space per 1 bedroom unit
- 1 space per 2 bedroom unit
- 1 space per 500 s.f. commercial
- 1 space per 5,000 s.f. manufacturing
- 1 space per 20,000 s.f. warehouse

Additional requirements:

- Design Review
- Noise mitigation
- Sustainable Design

December 5, 2017

SITE PLAN - OPTION A

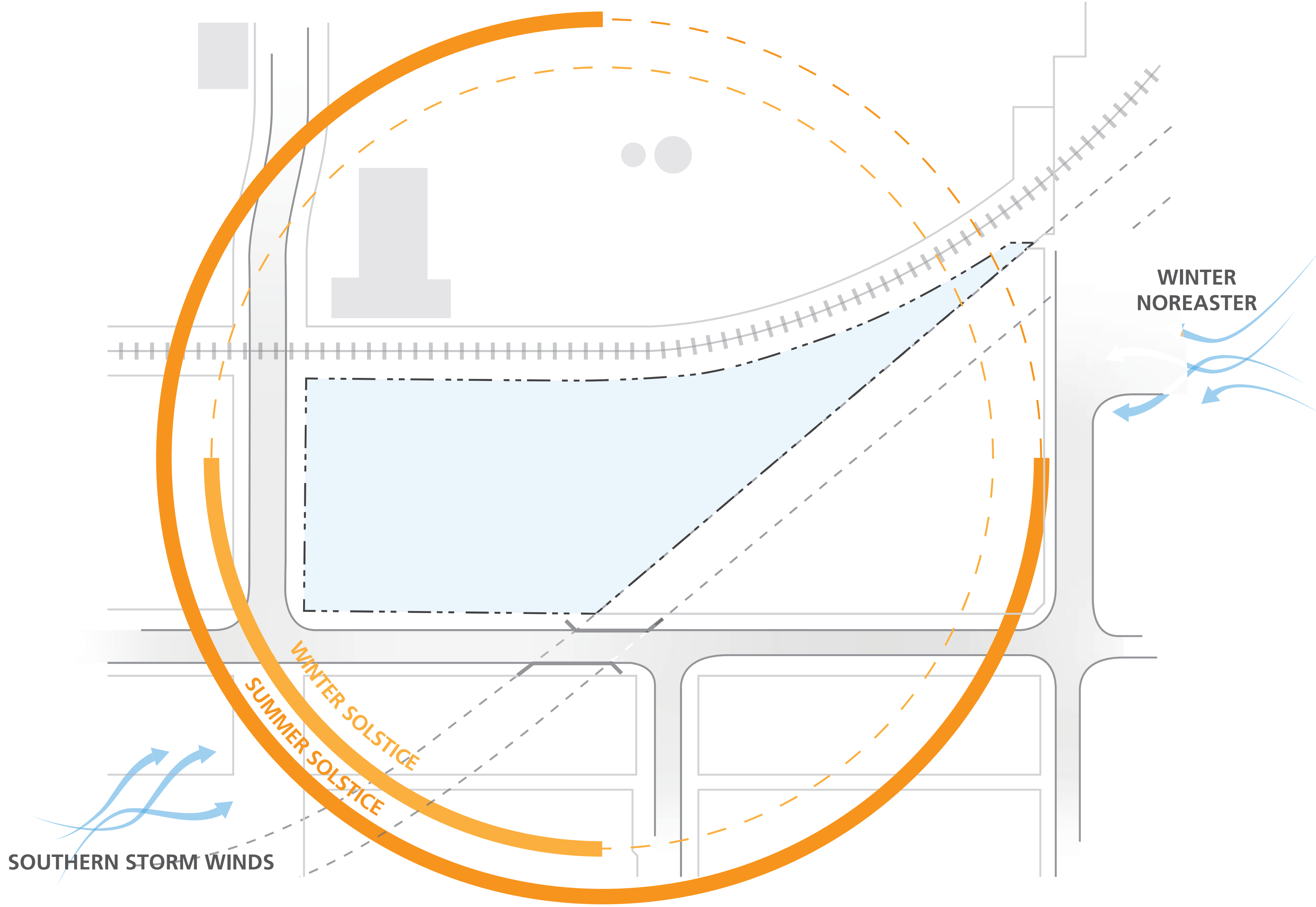
HARCOURT DEVELOPMENTS

Bellingham Waterfront
Bellingham, WA

D2 GROUPS, LLC

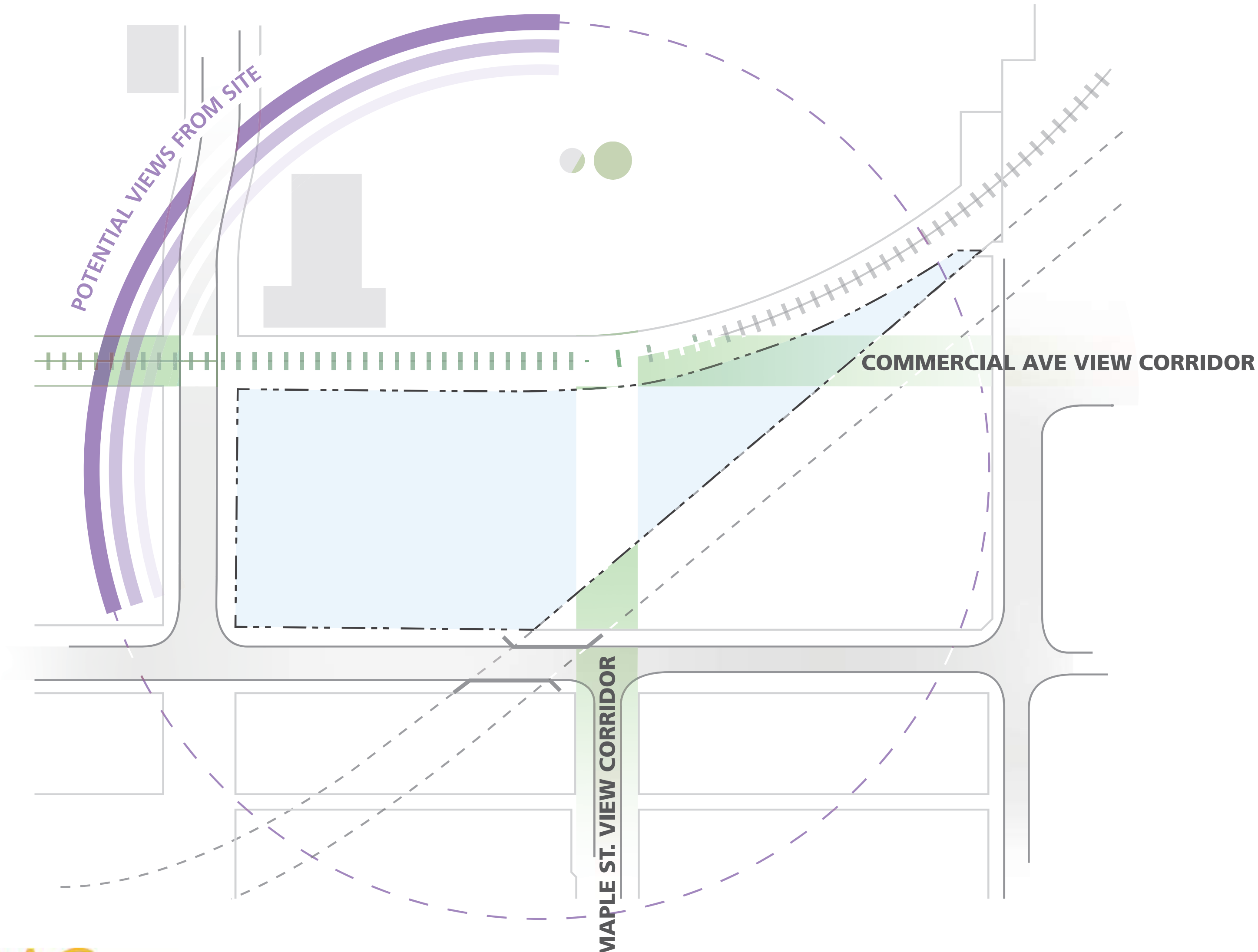
From 2019 Waterfront District Sub Area Plan


GRANARY AVE
WESTERN CROSSING
W LAUREL STREET
BAY STREET
CHESTNUT STREET
COMMERCIAL STREET
CORNWALL AVE
ARTIFACTS
ARRIVAL POINTS
VIEWS
HEART OF DISTRICT



RMC ARCHITECTS

WATERFRONT DISTRICT
LIGNIN PARCEL



RMC ARCHITECTS

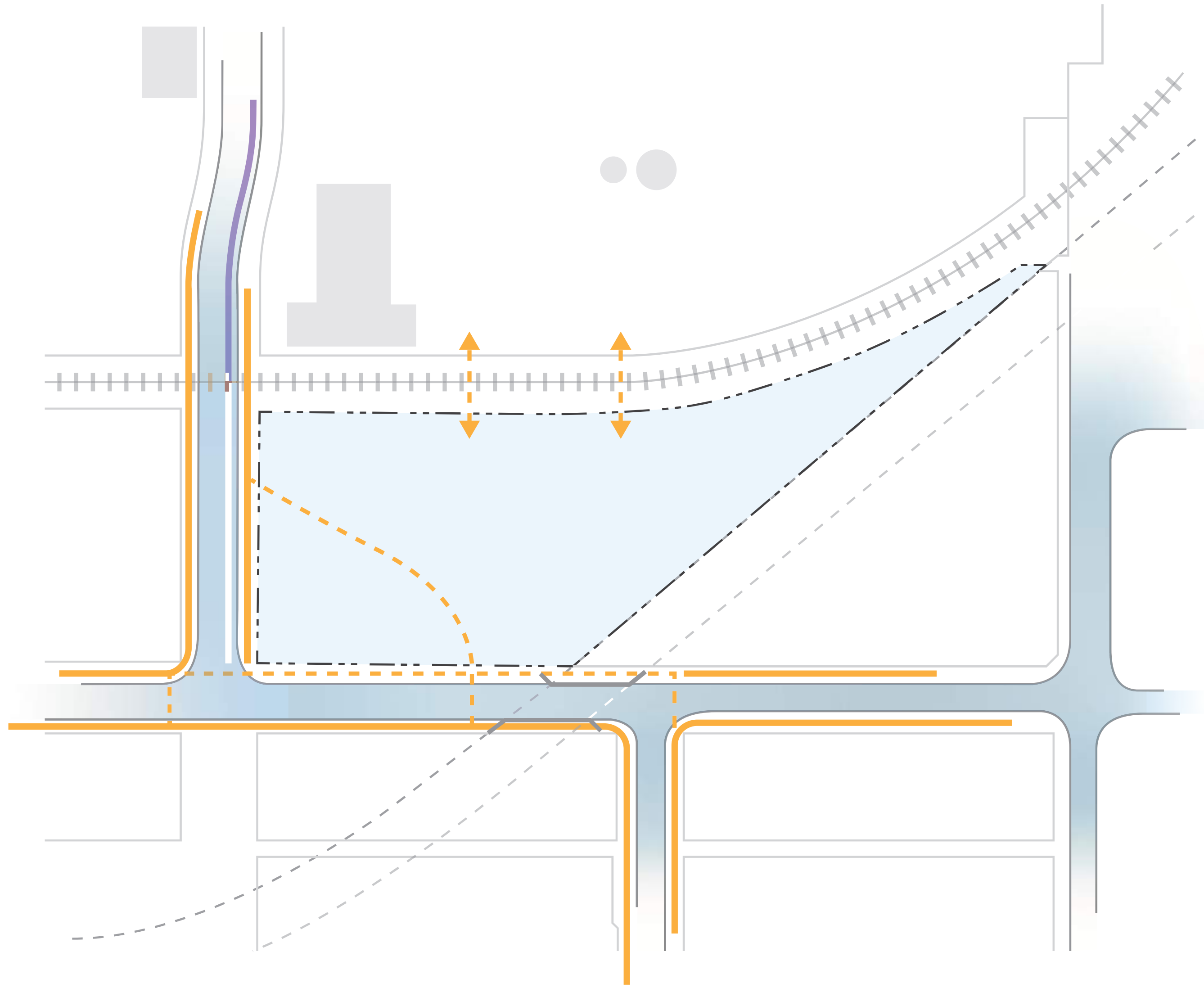
WATERFRONT DISTRICT
LIGNIN PARCEL

VIEW ANALYSIS

POTENTIAL VIEWS FROM THE SITE

VIEW CORRIDORS

SEPT 21, 2020



RMC ARCHITECTS

WATERFRONT DISTRICT
LIGNIN PARCEL

CONNECTIONS

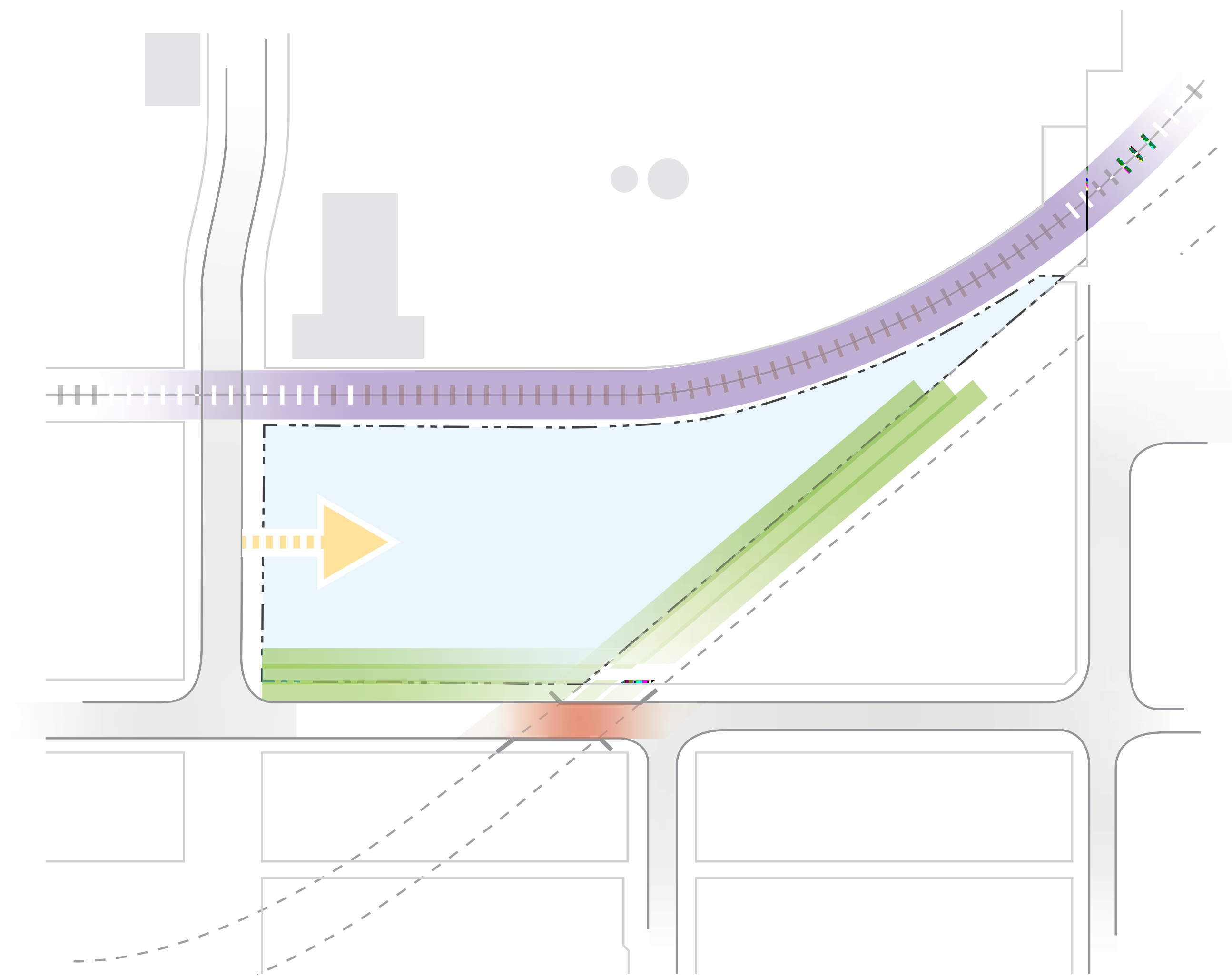
CURRENT PEDESTRIAN

FUTURE PEDESTRIAN

CYCLE

VEHICLES

SEPT 21, 2020



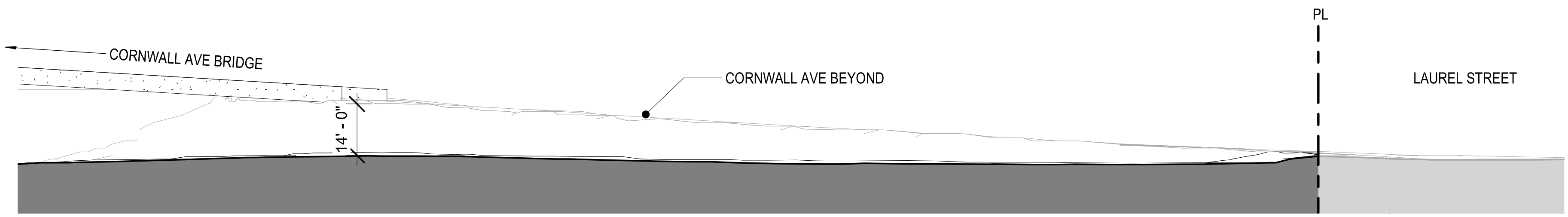
RMC ARCHITECTS

WATERFRONT DISTRICT
LIGNIN PARCEL

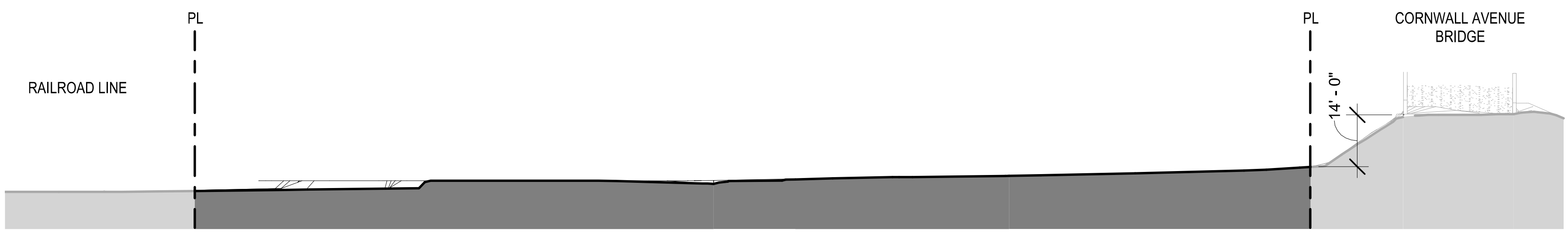
CHALLENGES

TRAIN BLOCKING CONNECTION
UNDERSIZED BRIDGE - NO SIDEWALK
GRADE CHANGE
LIMITED VEHICLE ACCESS

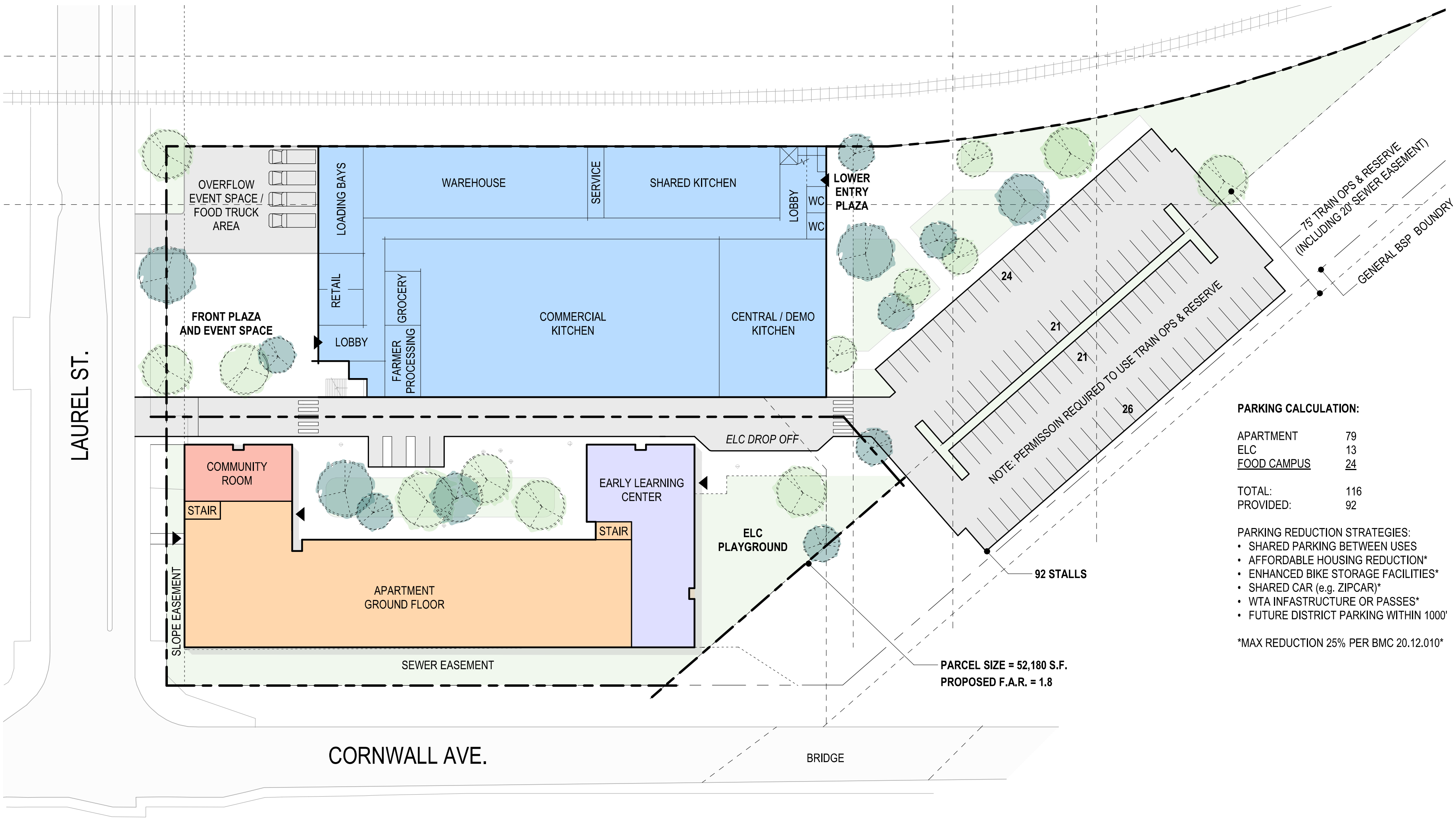
SEPT 21, 2020



2 View Looking South East



1 View Looking North East



PARKING CALCULATION:

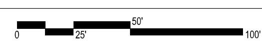
APARTMENT	79
ELC	13
FOOD CAMPUS	24
TOTAL:	116
PROVIDED:	92

PARKING REDUCTION STRATEGIES:
- SHARED PARKING BETWEEN USES
- AFFORDABLE HOUSING REDUCTION*
- ENHANCED BIKE STORAGE FACILITIES*
- SHARED CAR (e.g. ZIPCAR)*
- WTA INFASTRUCTURE OR PASSES*
- FUTURE DISTRICT PARKING WITHIN 1000'

MAX REDUCTION 25% PER BMC 20.12.010

1 **Current Site Plan**

1" = 50'-0"



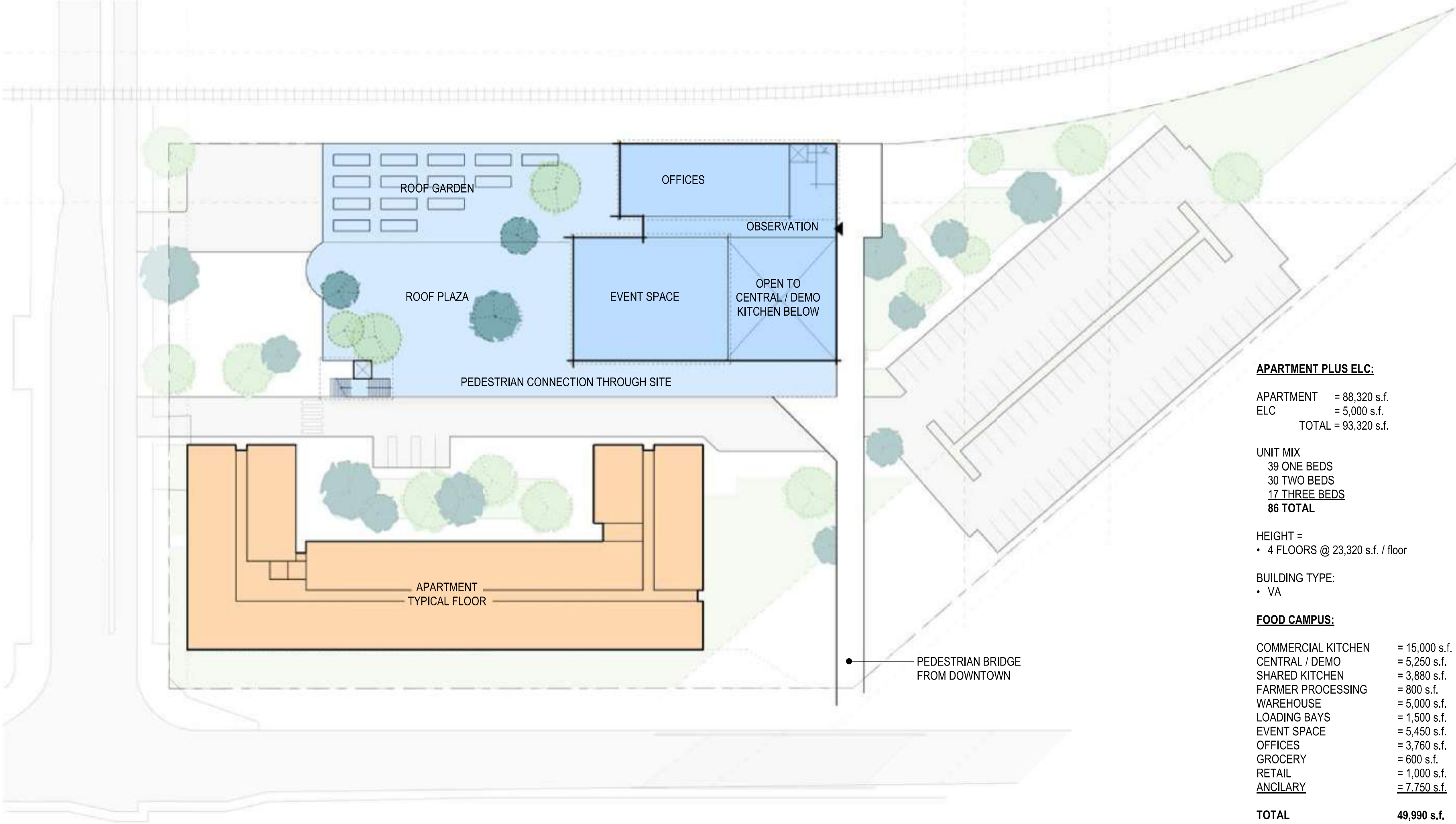
RMC ARCHITECTS
RMC Architects, PLLC • 1223 Railroad Avenue • Bellingham, WA 98225
P:360.676.7733 • F:360.738.0448 • rmc@rmcarchitects.com

MILLWORKS HOUSING
Waterfront District
Lignin Parcel

Job No: 2006	Date: 6/7/2021
File No:	2006 - Millworks
Drawn By:	JJF
Checked By:	NCM
Issued for:	REVIEW

SITE PLAN

A20



APARTMENT PLUS ELC:

APARTMENT = 88,320 s.f.
ELC = 5,000 s.f.
TOTAL = 93,320 s.f.

UNIT MIX
39 ONE BEDS
30 TWO BEDS
17 THREE BEDS
86 TOTAL

HEIGHT =
- 4 FLOORS @ 23,320 s.f. / floor

BUILDING TYPE:
- VA

FOOD CAMPUS:

COMMERCIAL KITCHEN	= 15,000 s.f.
CENTRAL / DEMO	= 5,250 s.f.
SHARED KITCHEN	= 3,880 s.f.
FARMER PROCESSING	= 800 s.f.
WAREHOUSE	= 5,000 s.f.
LOADING BAYS	= 1,500 s.f.
EVENT SPACE	= 5,450 s.f.
OFFICES	= 3,760 s.f.
GROCERY	= 600 s.f.
RETAIL	= 1,000 s.f.
ANCILARY	= 7,750 s.f.
TOTAL	**49,990 s.f.**

1 Site - Level 2
1" = 50'-0"

0 25' 50' 100'

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MILLWORKS HOUSING
Waterfront District
Lignin Parcel

Job No: 2006	Date: 6/7/2021
File No:	2006 - Millworks
Drawn By:	JJF
Checked By:	NCM
Issued for:	REVIEW

SITE PLAN
LEVEL

A21

ABUNDANCE THINKING

**work with you have
to create what you want**

minimize disturbance
reduce water use
eliminate carbon
save energy
reduce costs

---

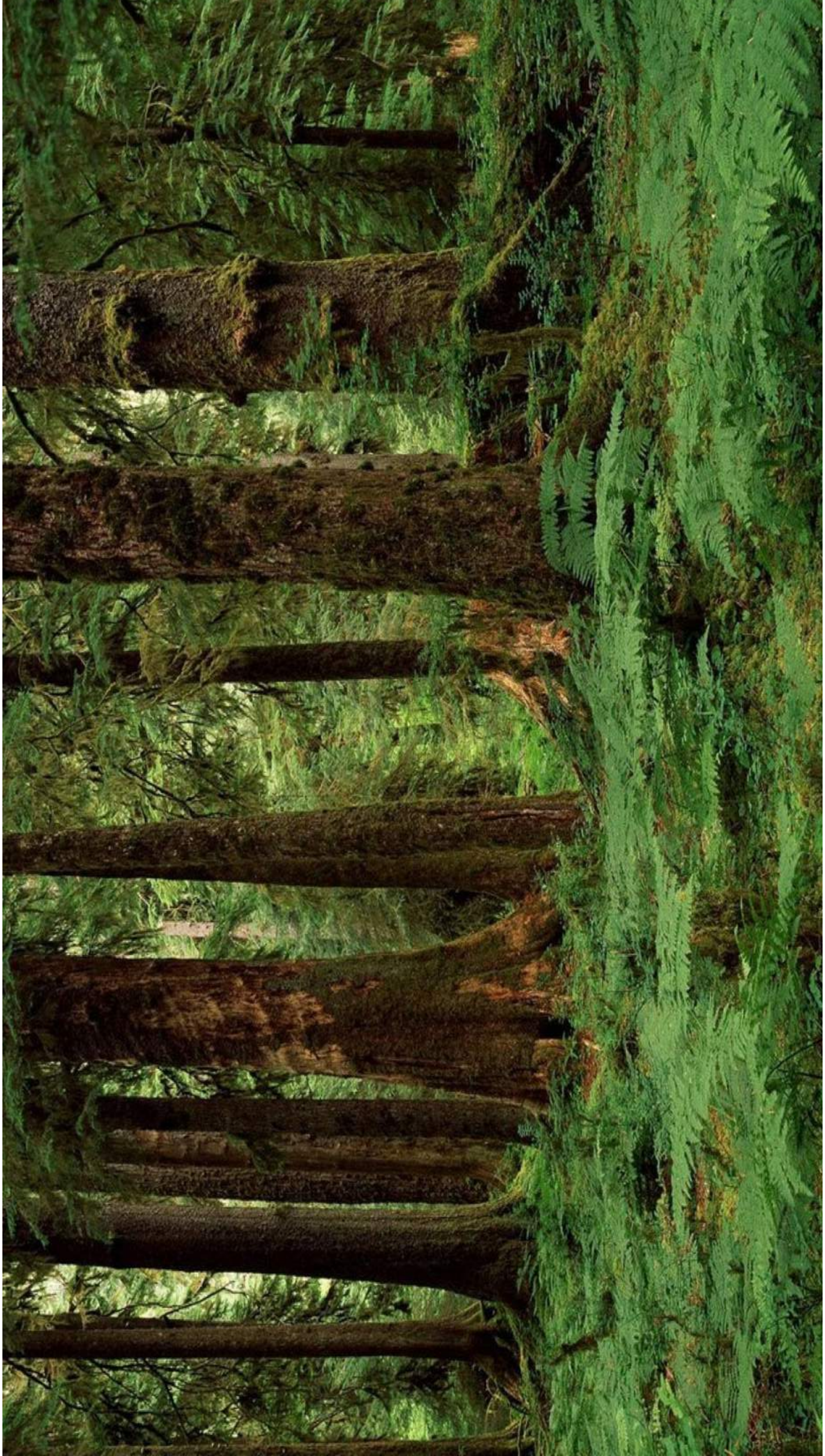
scarcity

abundance

enhance habitat
generate water
create community
harvest energy

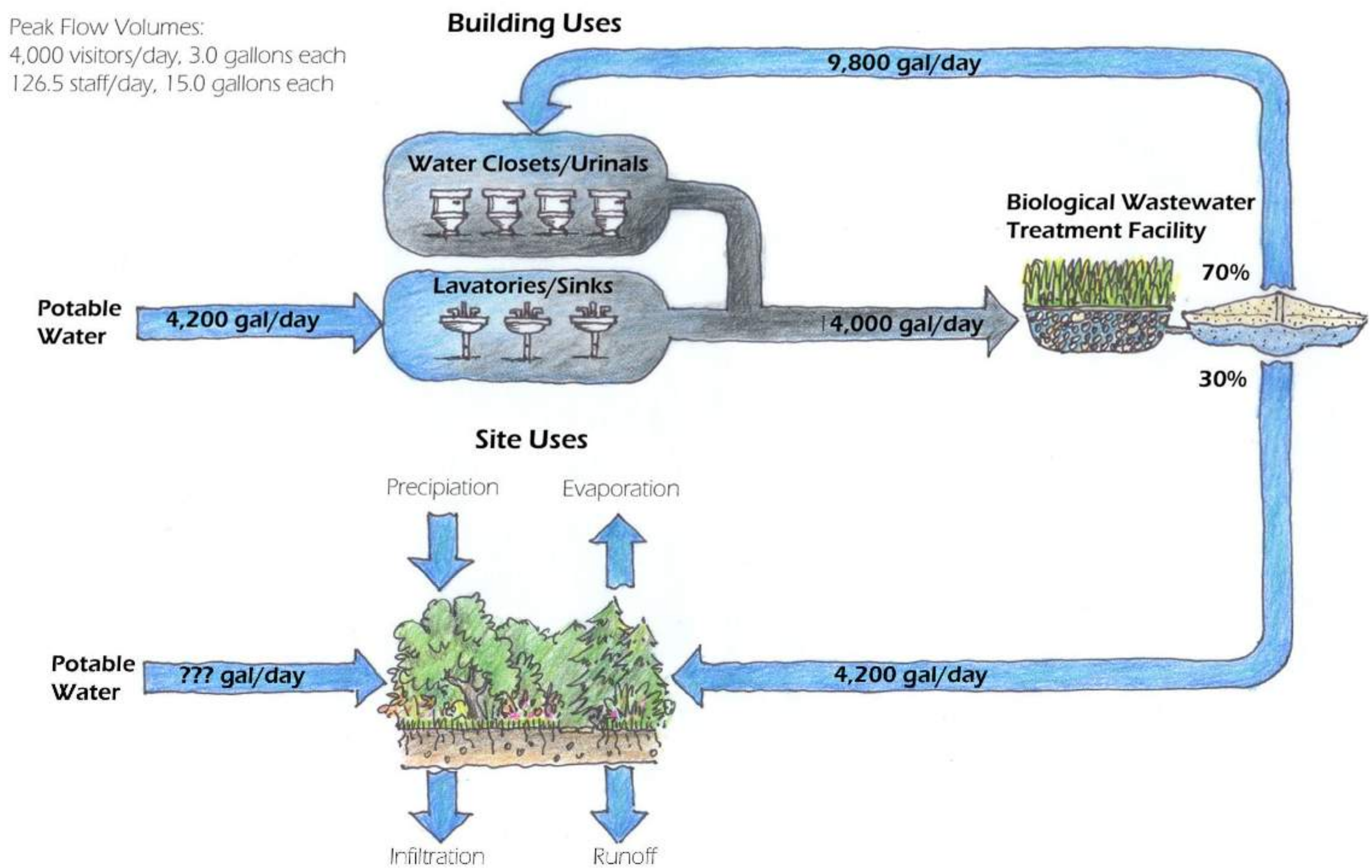
minimize disturbance
reduce water use
minimize waste
save energy
reduce costs

scarcity




Abundance Scan
arid
wind
visitors
caliche

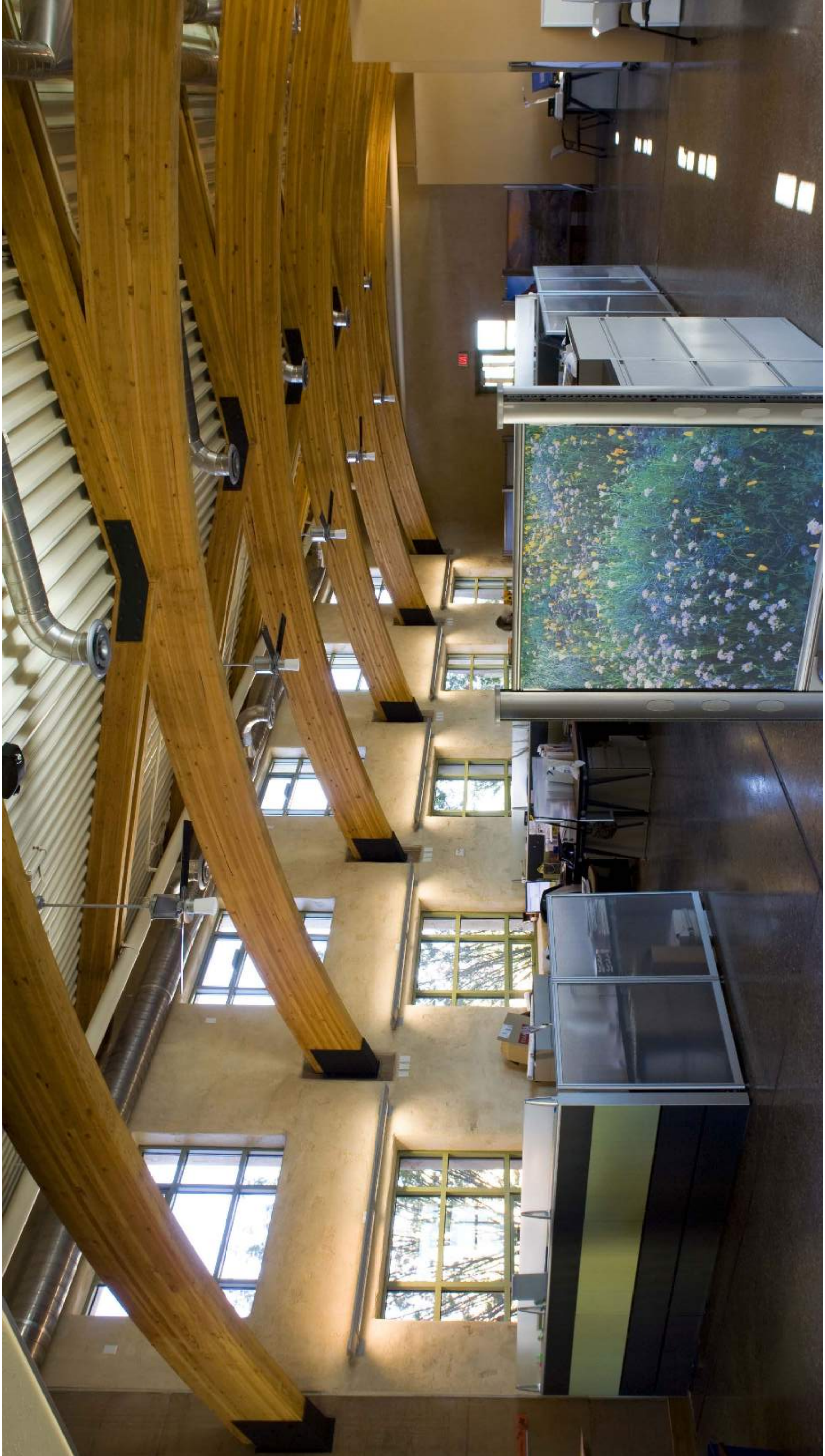
Big Idea

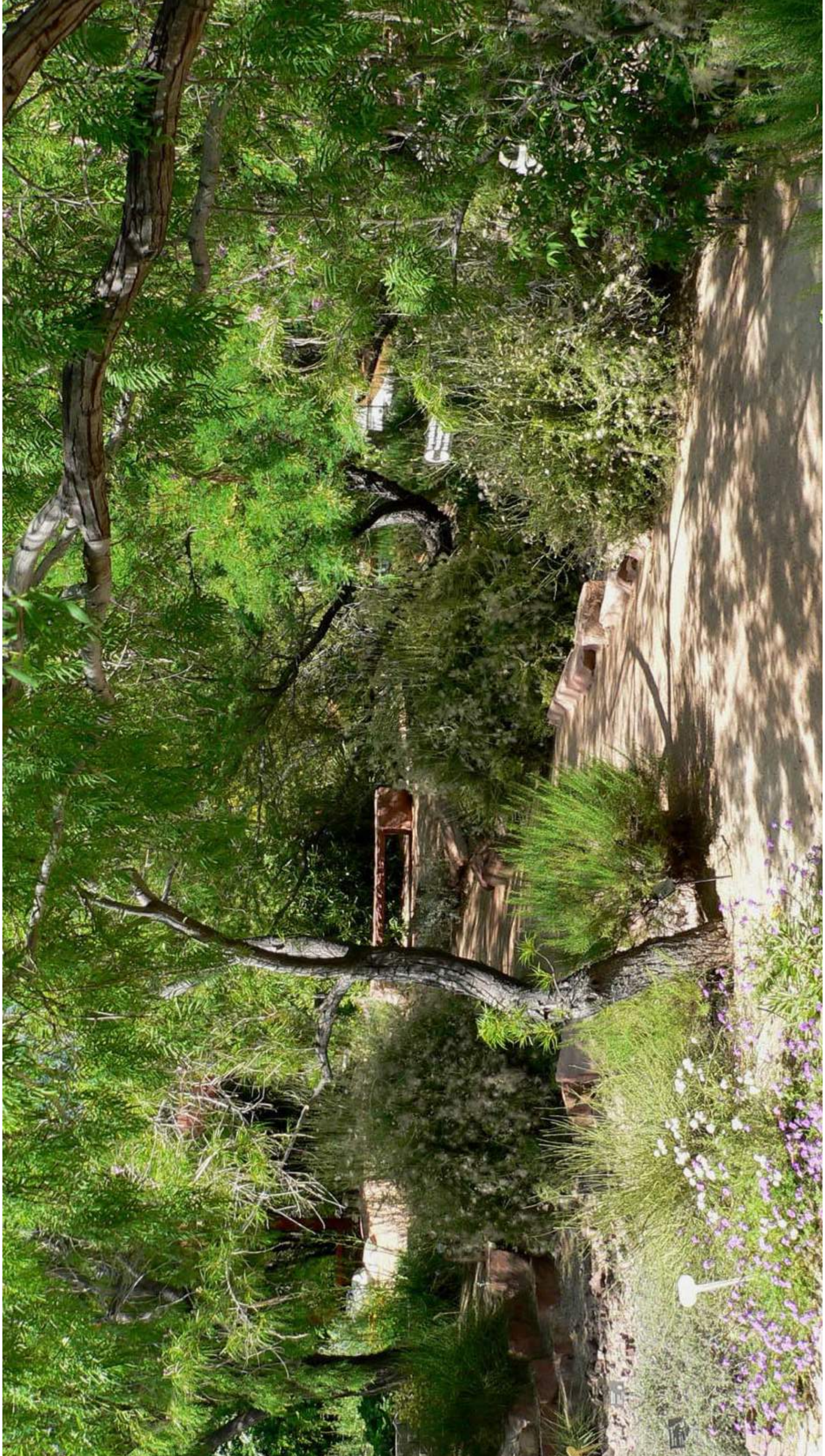


Paladino


DLC ENTRY COURT & TICKETING PLAZA
CONFERENCE CENTER/ FORECOURT
EXPLODED HOUSE
DRY WASH/ MOJAVE EDUCATION
HOW TO IRRIGATION
DESERT LIVING
SNWA EQUIPMENT
FUTURE PHASE
COMPETITION, WEDDING/ & EVENT GARDENS
HOW TO PLANTING


Luchessi Gallati Architects






Abundance Scan
sun
shade
bad soils
trade winds
1 million visitors

Big Idea

Exhibit Space Climate Control

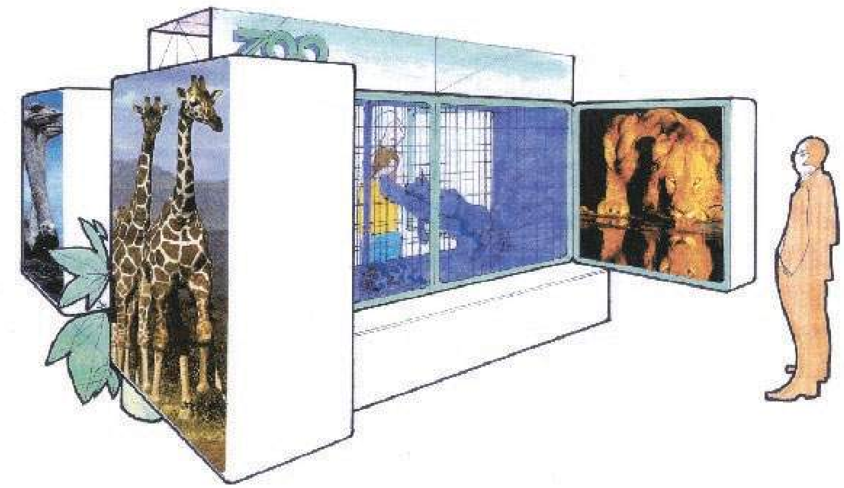


Exhibit Cases Climate Control

Paladino

Abundance in the Park

Sun, Wind, Climate, People, Powerful

Place, Park Space, Bad Soils, Artifacts

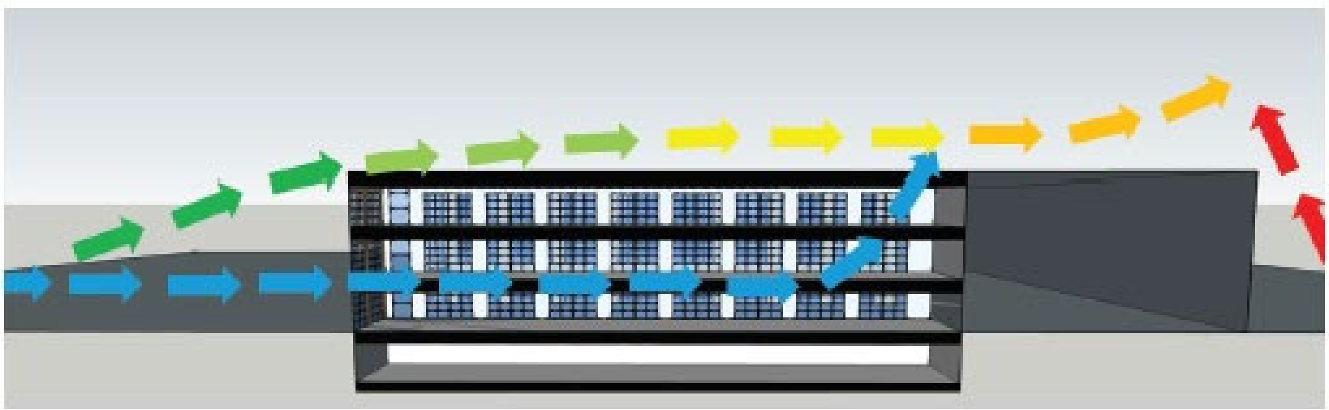

Valor & Pacific National Monument

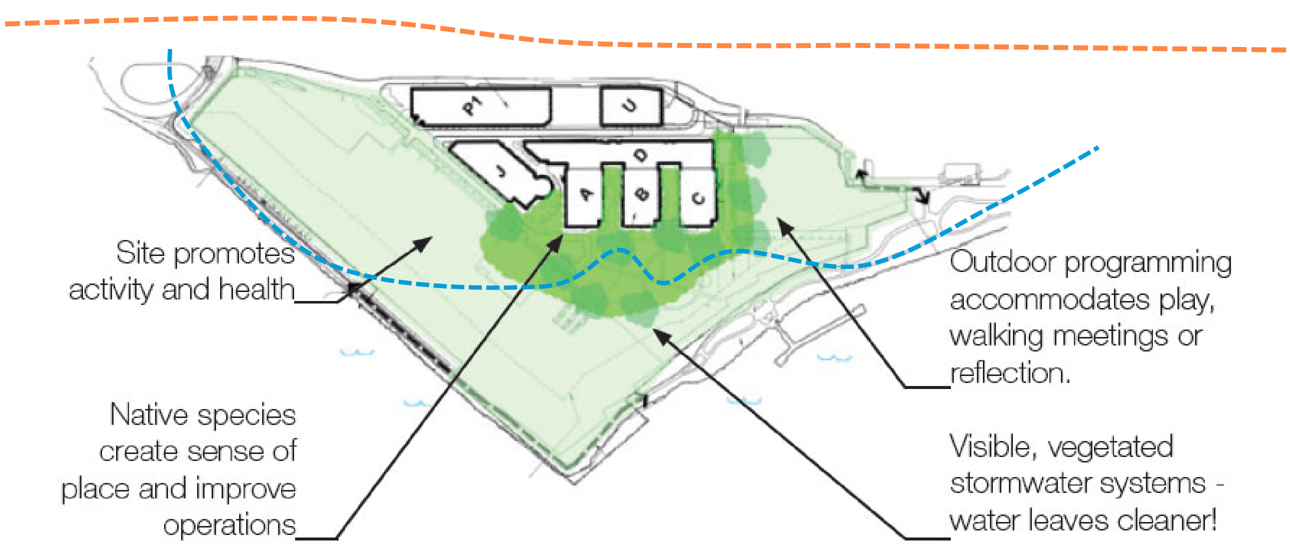

ATTACK
EXPERIENCE
NEXT PROGRAM IN
8:88
EXIT


The Portico Group


Abundance Scan
poor soils
rip rap
train & ship pollution
sea breeze
existing labs

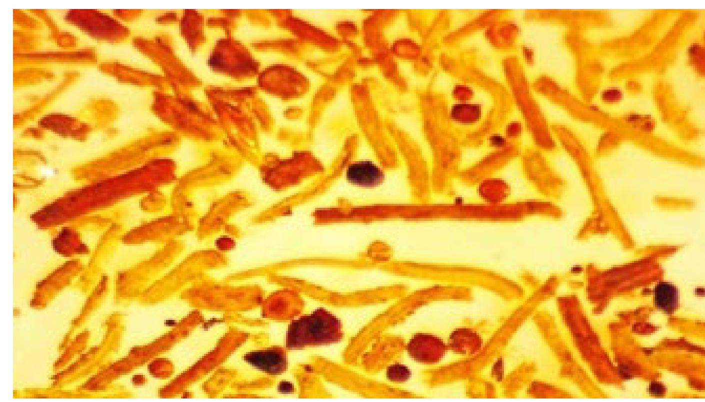
Big Idea



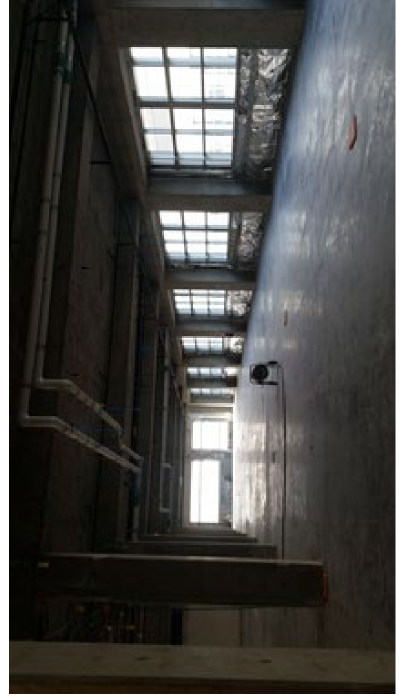
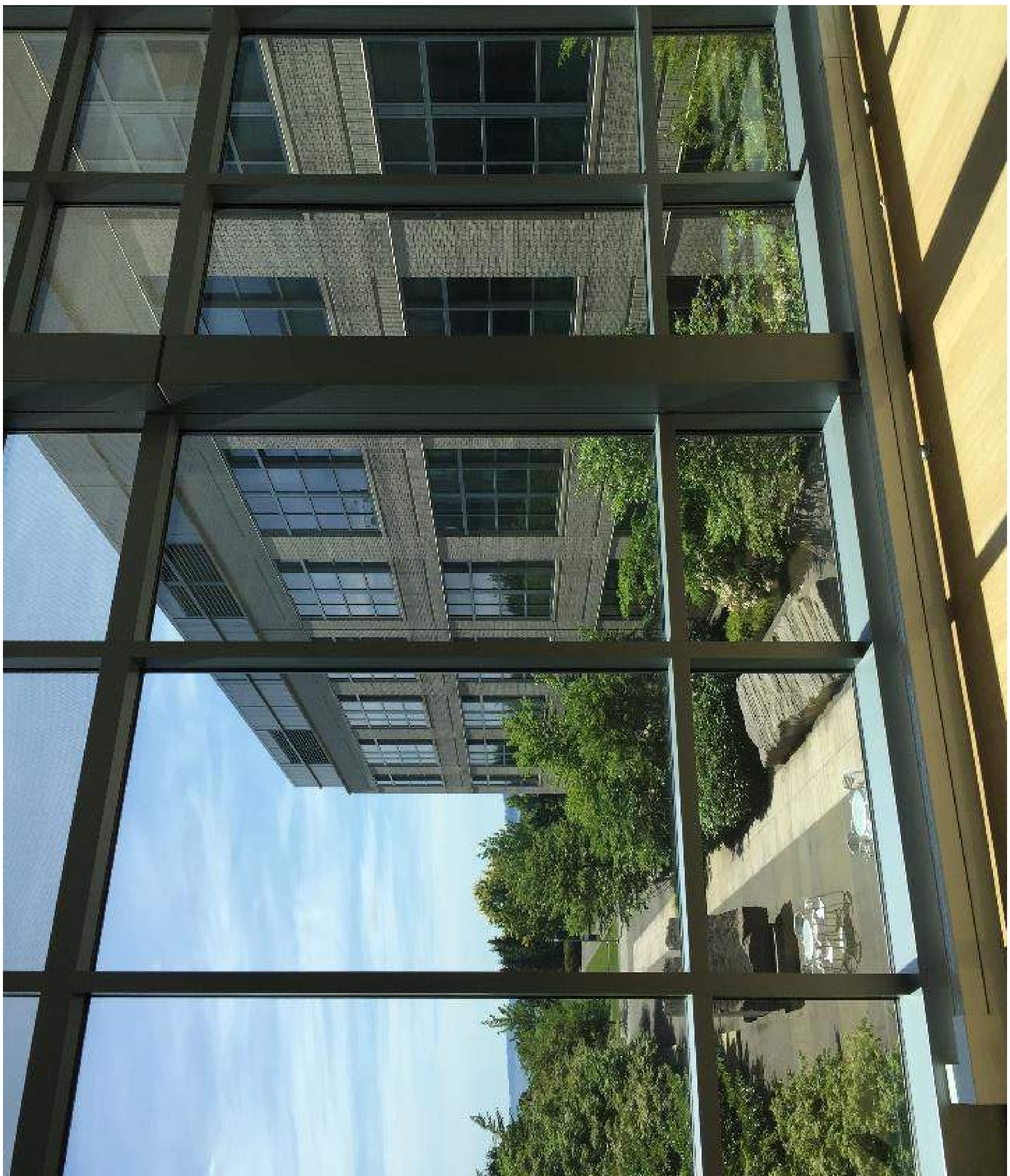


Paladino


C-175

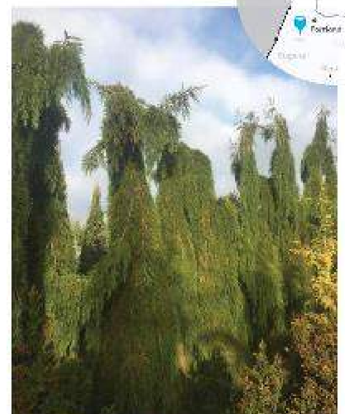




PEACE OF MIND NURSERY

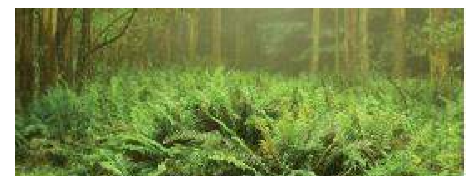
Silverton, Oregon



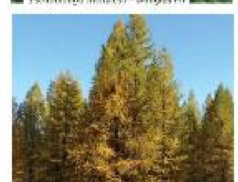
TEUFEL NURSERY

Hillsboro, OR

Pseudotsuga menziesii - Douglas Fir



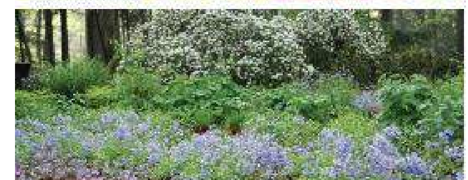
Ferns



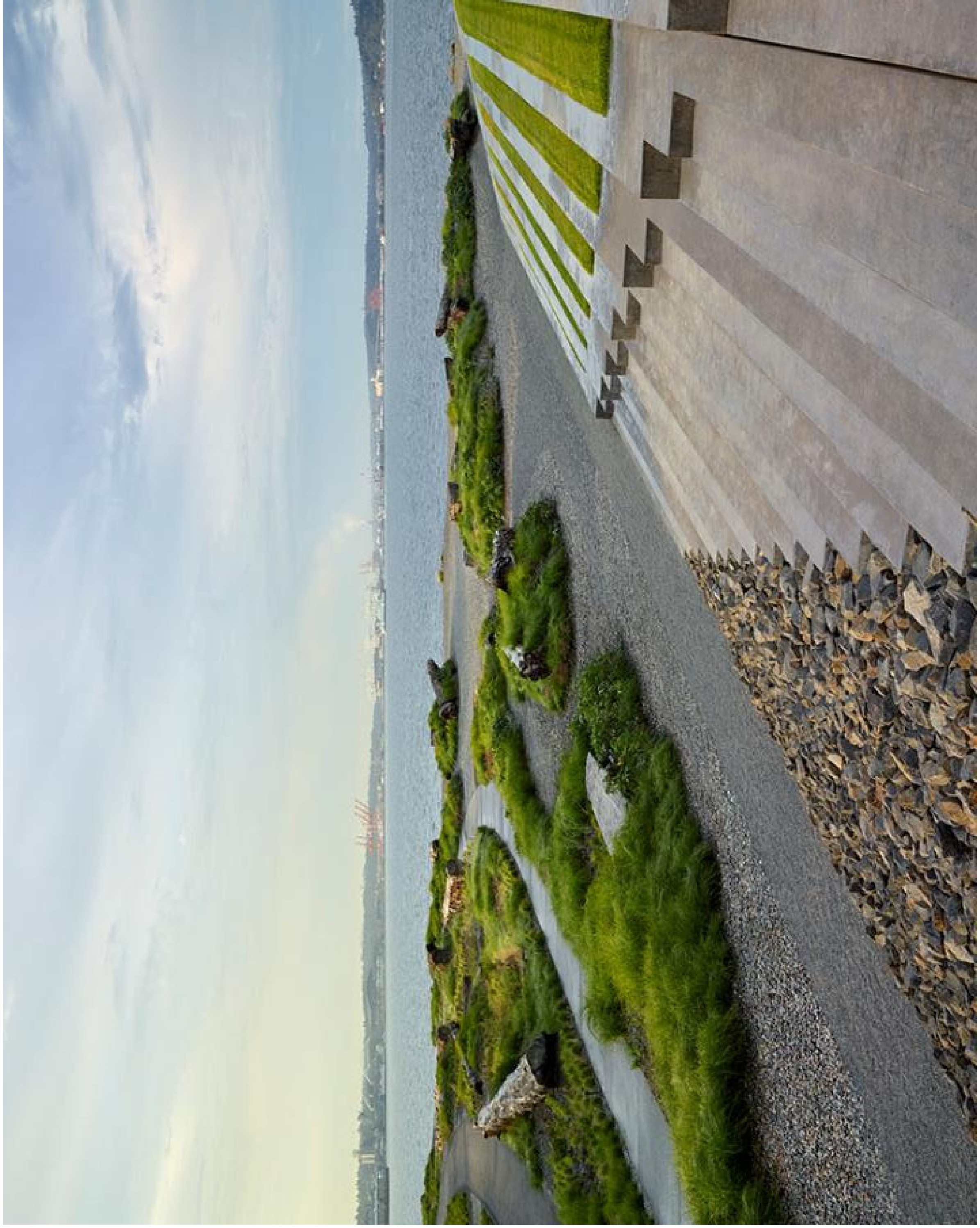
Larix occidentalis - Western Larch

Shrub / Groundcover Mix

Abies amabilis - Pacific Silver Fir



Shrub / Groundcover Mix




ZGF

ABUNDANCE THINKING

work with you have
to create what you want

MILLWORKS CHARRETTE:
PLACEMAKING + PUBLIC SPACE

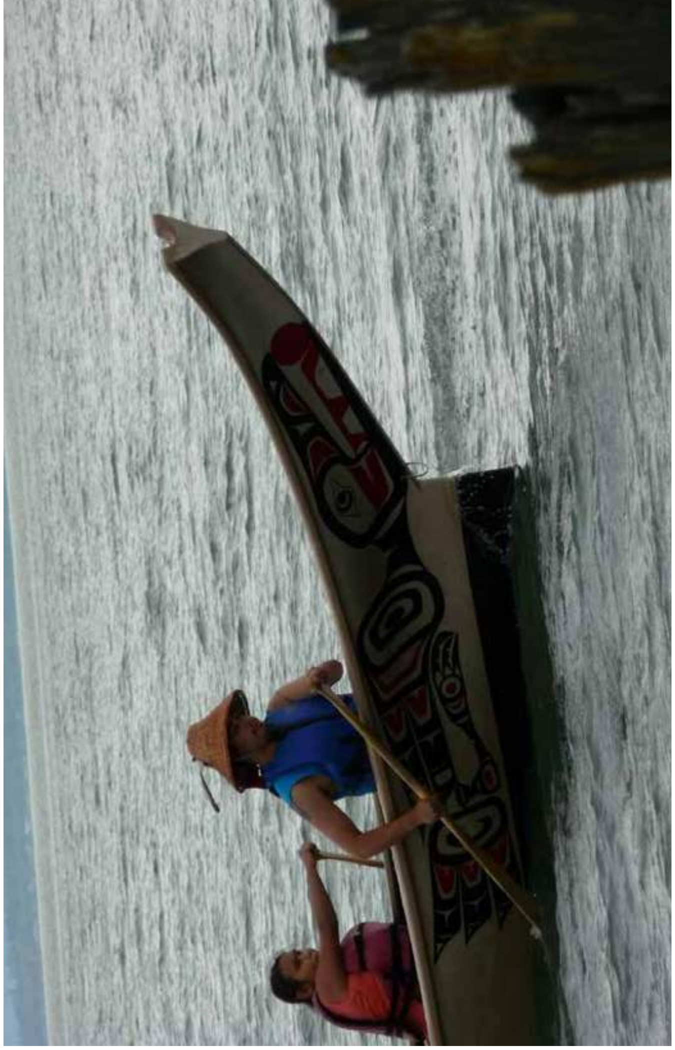
JUNE 10, 2021

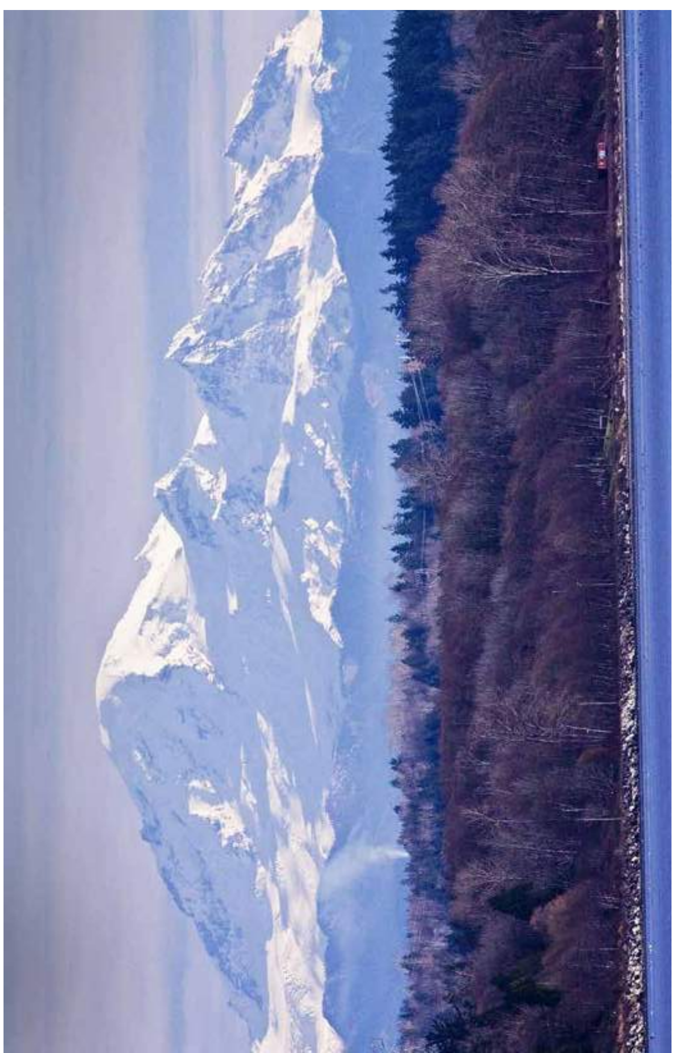
BRICE MARYMAN, PLA, FASLA

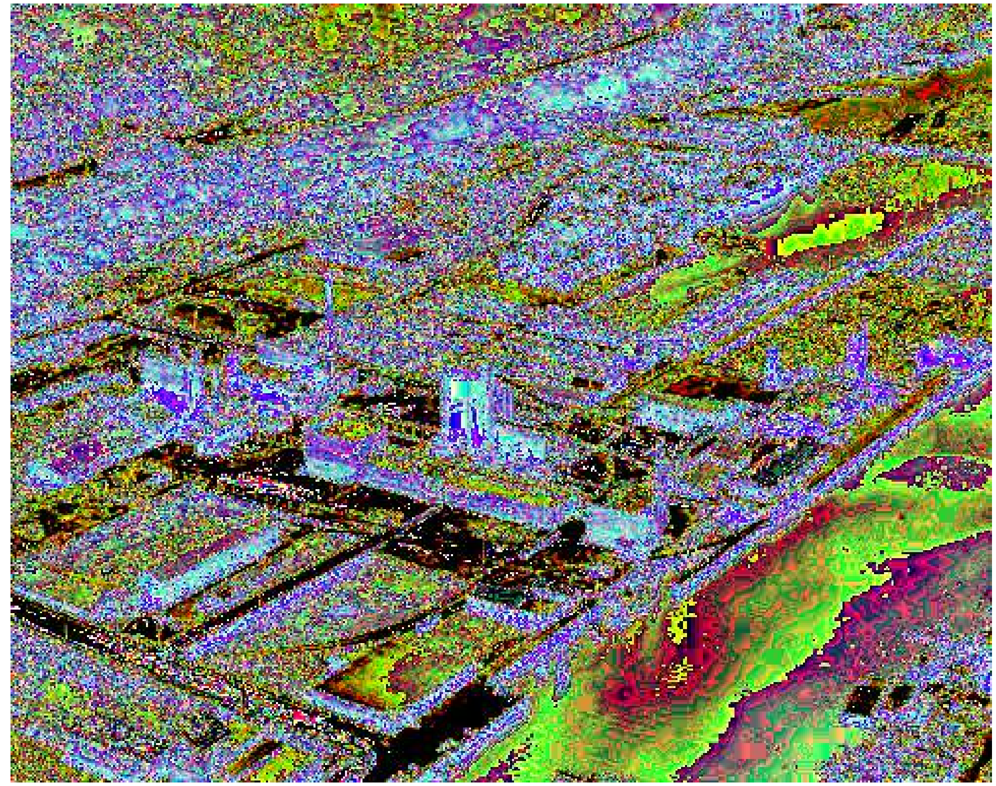
FIVE PLACEMAKING STRATEGIES

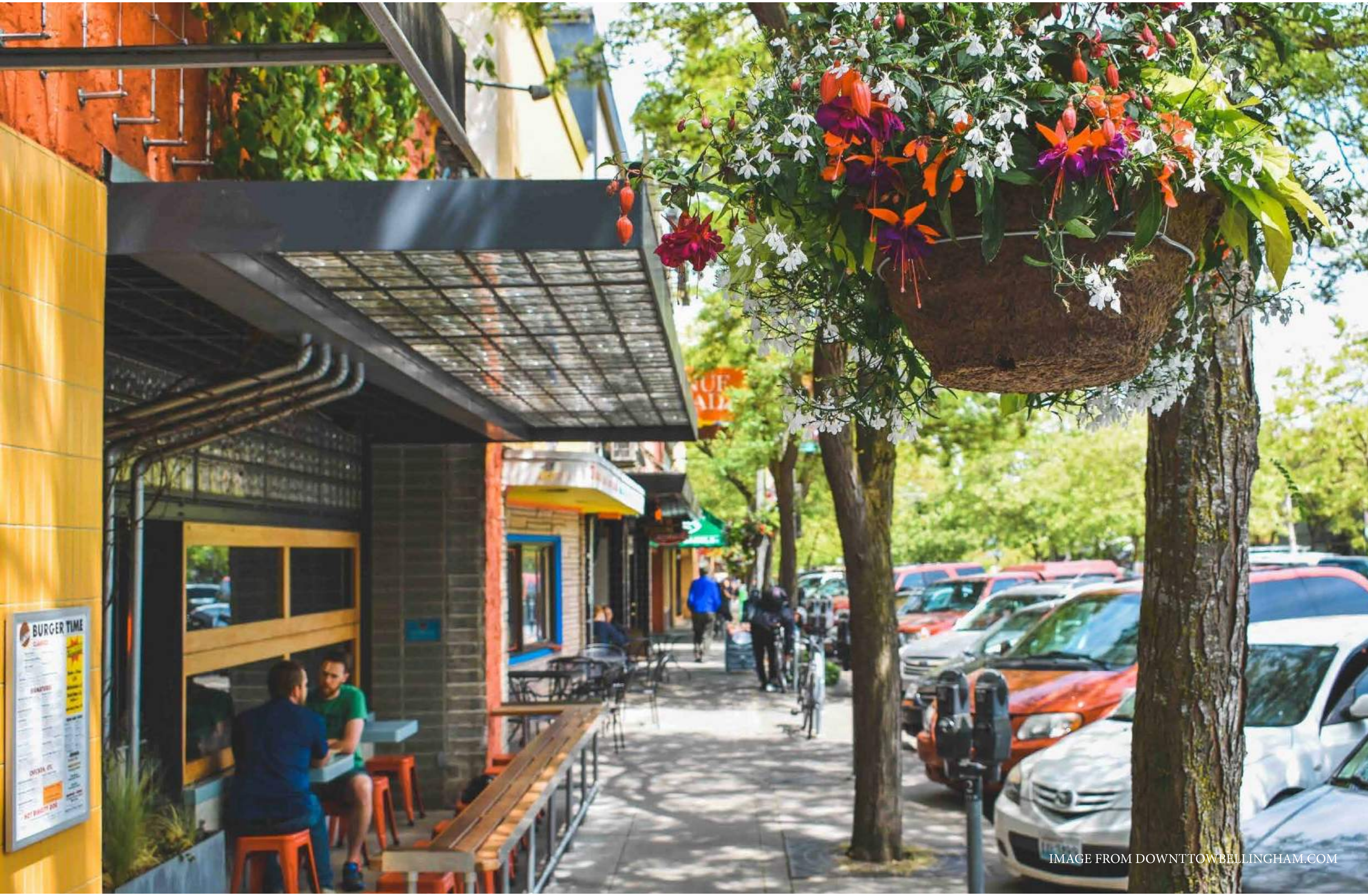
ROOTED
EMPATHETIC + EGALITARIAN
MULTI-FUNCTIONAL
HUMAN-SCALED
JOYFUL

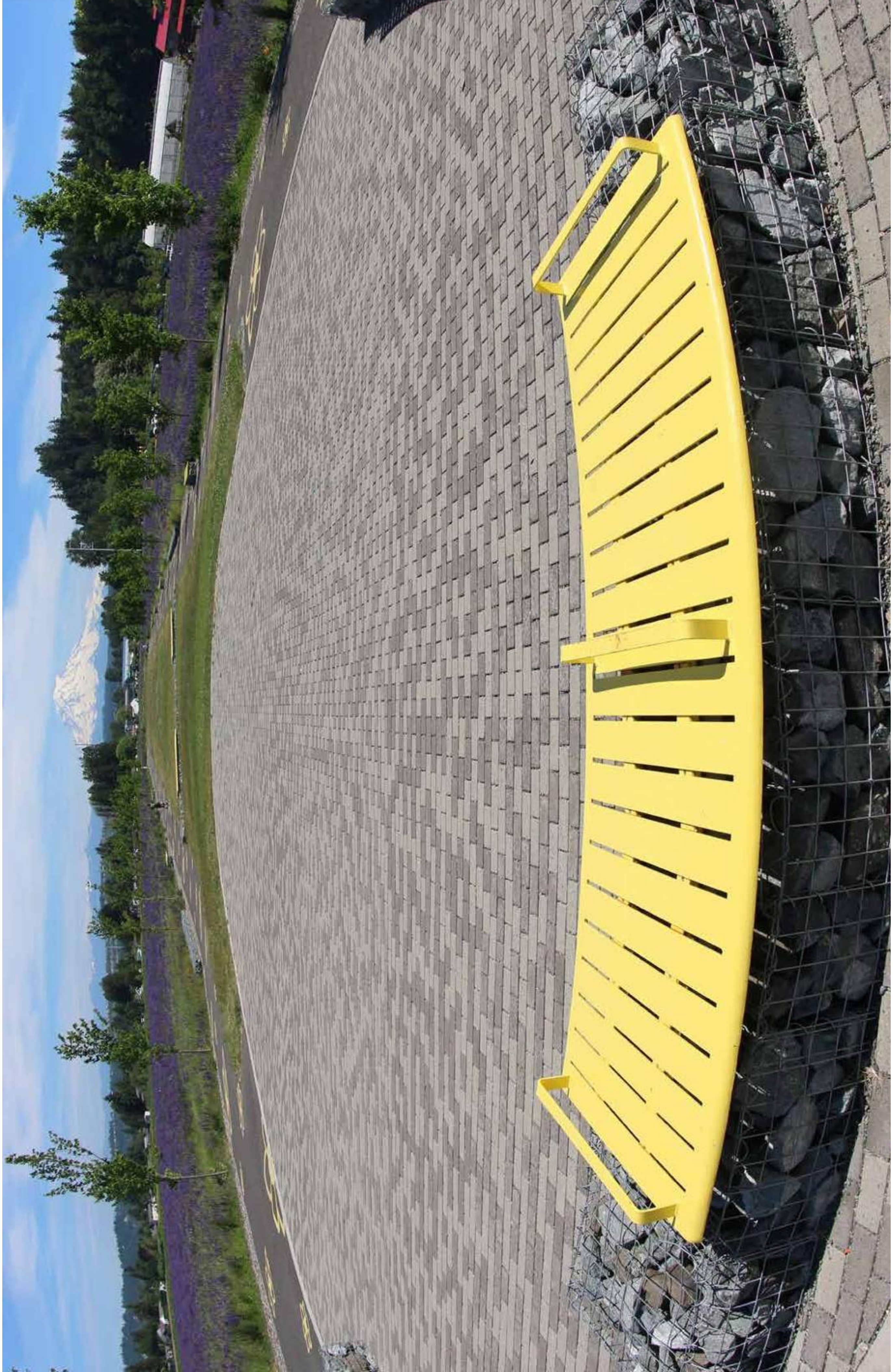
SITE CONTEXT

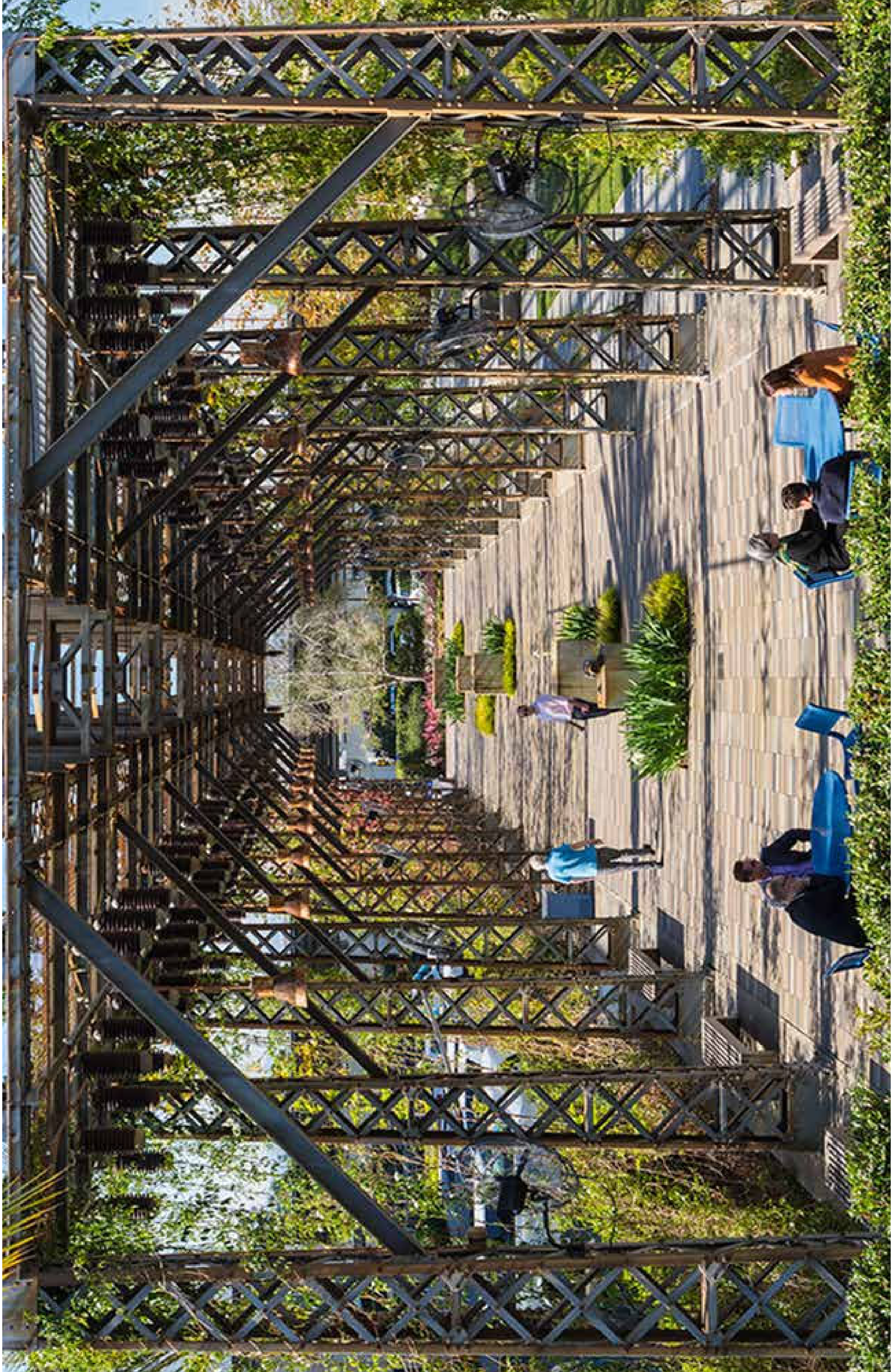






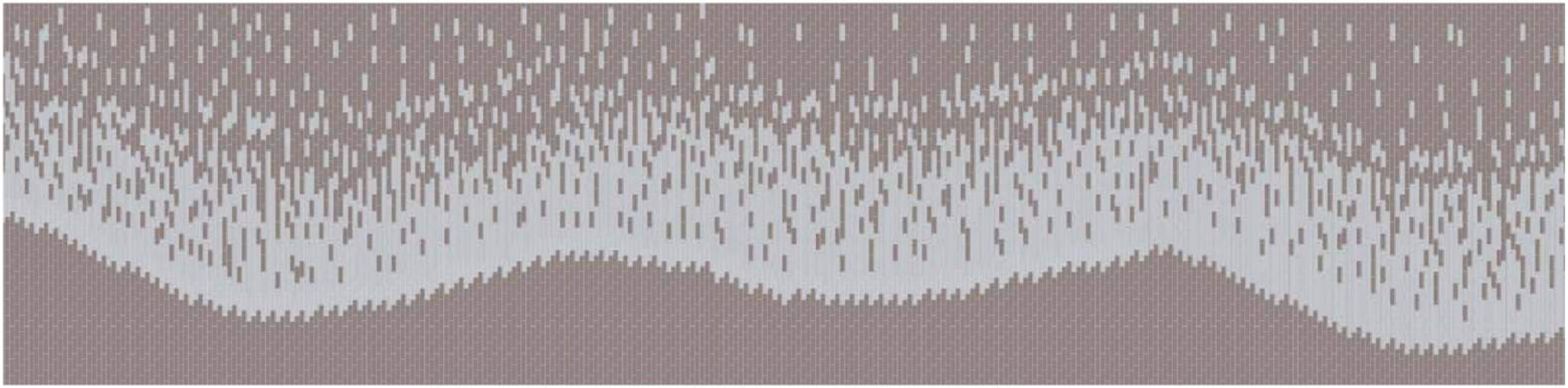

BURGER TIME
IMAGE FROM DOWNTTOWBELLINGHAM.COM



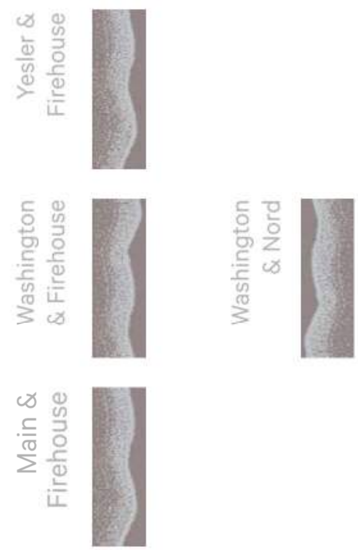


ORIGINAL SHORELINE

Demarcating the Shoreline Ground Treatment

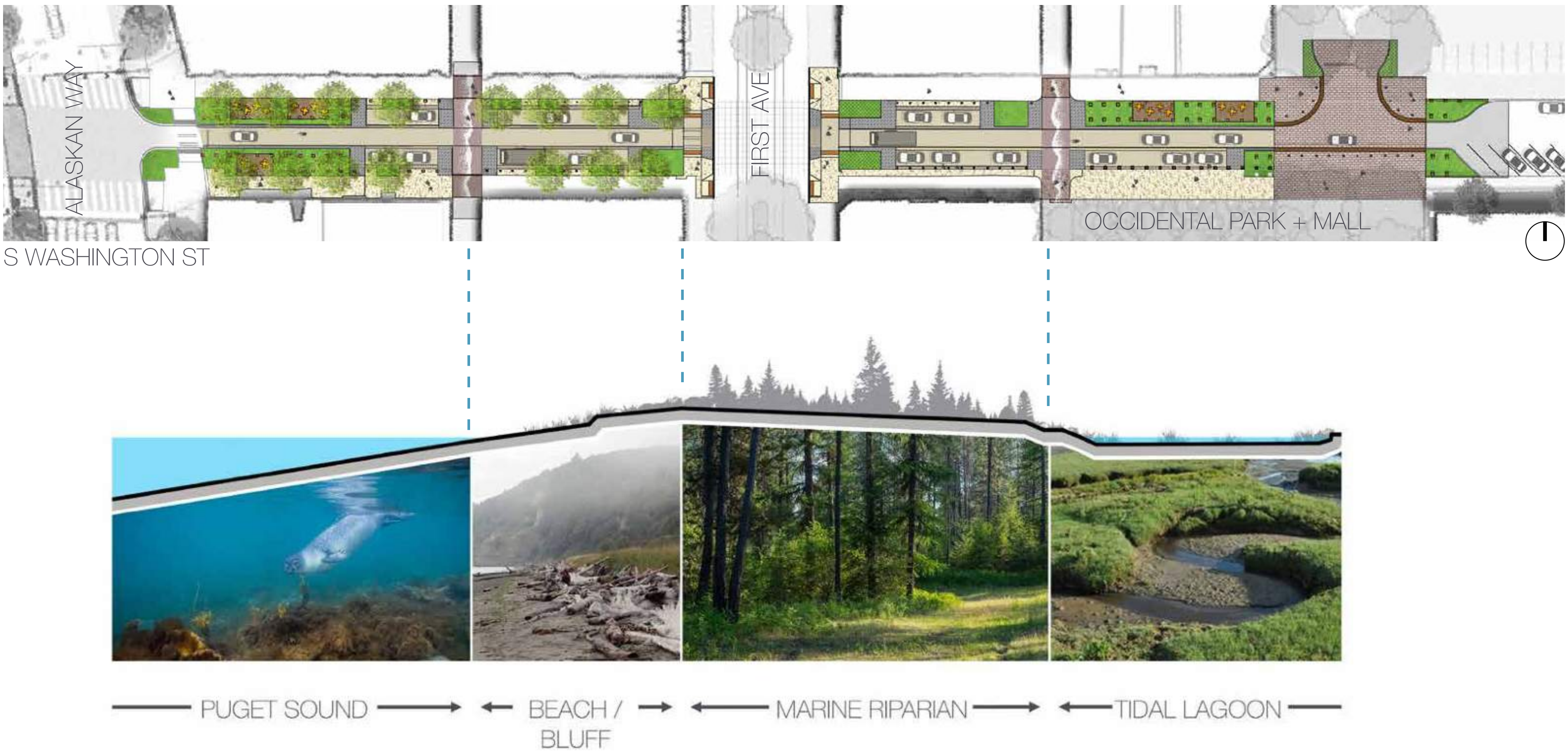


Paver designs depict waves on a coastline—with a slightly different pattern at each location



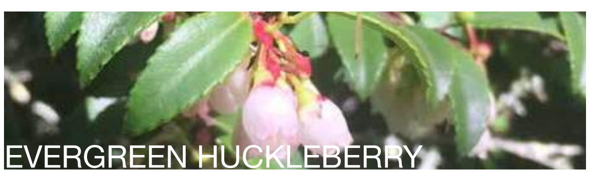
Studio Matthews

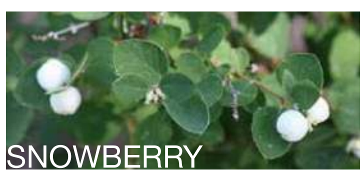
ORIGINAL ECOLOGIES

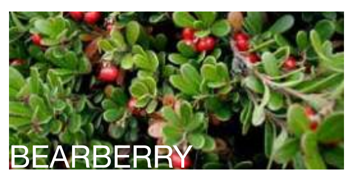


PLANT COMMUNITIES

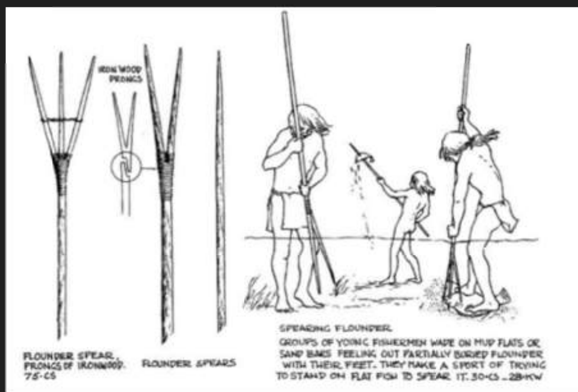
SHORELINE SHADE | UPLAND SHADE | UPLAND SUN | SHORELINE SUN







Flounder Spears



"Strong durable cherry bark (prunus emarginata) was used for lashing on prongs of a tougher, often springy wood: yew, ironwood or serviceberry wood"

VALERIE SEGREST

STUDIO MATTHEWS

Kickrail Sample content


PIONEER SQUARE
Occidental Ave S


PIONEER SQUARE

FIVE PLACEMAKING STRATEGIES

ROOTED

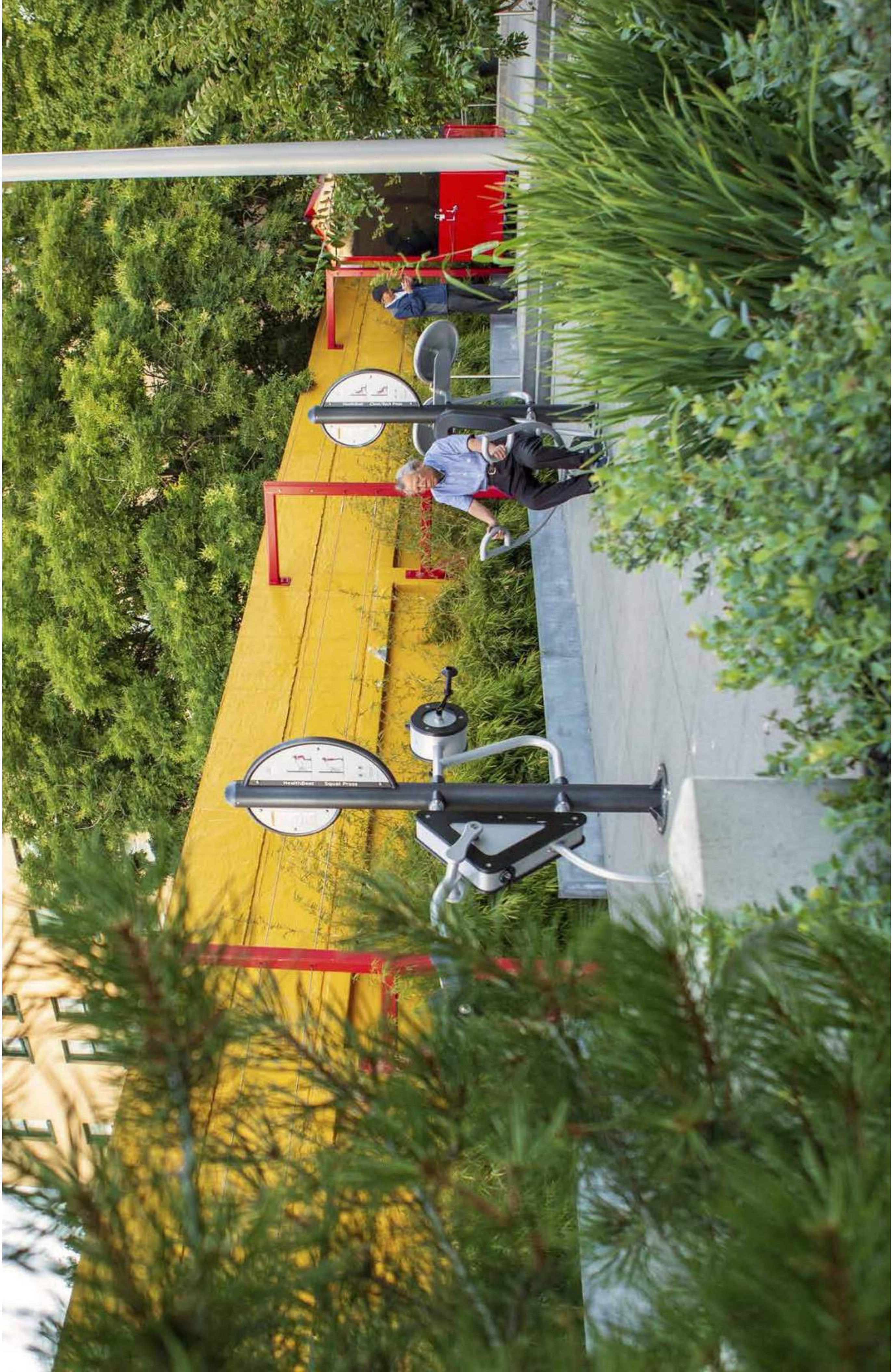
EMPATHETIC + EGALITARIAN

MULTI-FUNCTIONAL

HUMAN-SCALED

JOYFUL


RUTLAND OPTICAL
BY ERNIE
2012-2013 SEASON
Buy Local
STATE LAW
WITHIN CROSSWALK
SAMESUN
WHITE CANE
Awareness Day


HealthBeat Squat Press

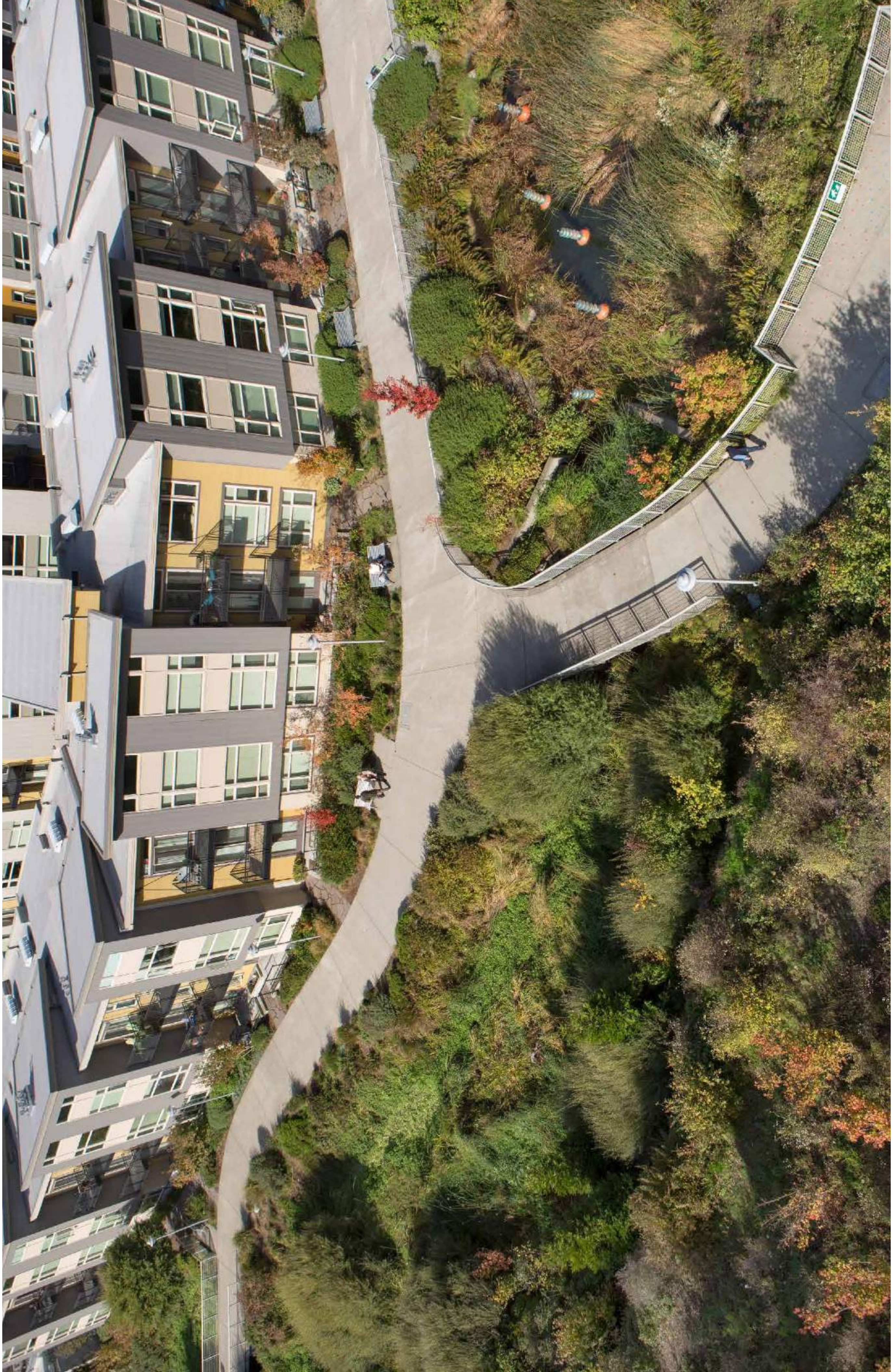
FIVE PLACEMAKING STRATEGIES

ROOTED
EMPATHETIC + EGALITARIAN
MULTI-FUNCTIONAL
HUMAN-SCALED
JOYFUL


City of WEST SACRAMENTO


BELLTOWNDANCESTUDIO.COM
BELLTOWNDANCESTUDIO.COM


Senior Living



FIVE PLACEMAKING STRATEGIES

ROOTED

EMPATHETIC + EGALITARIAN

MULTI-FUNCTIONAL

HUMAN-SCALED

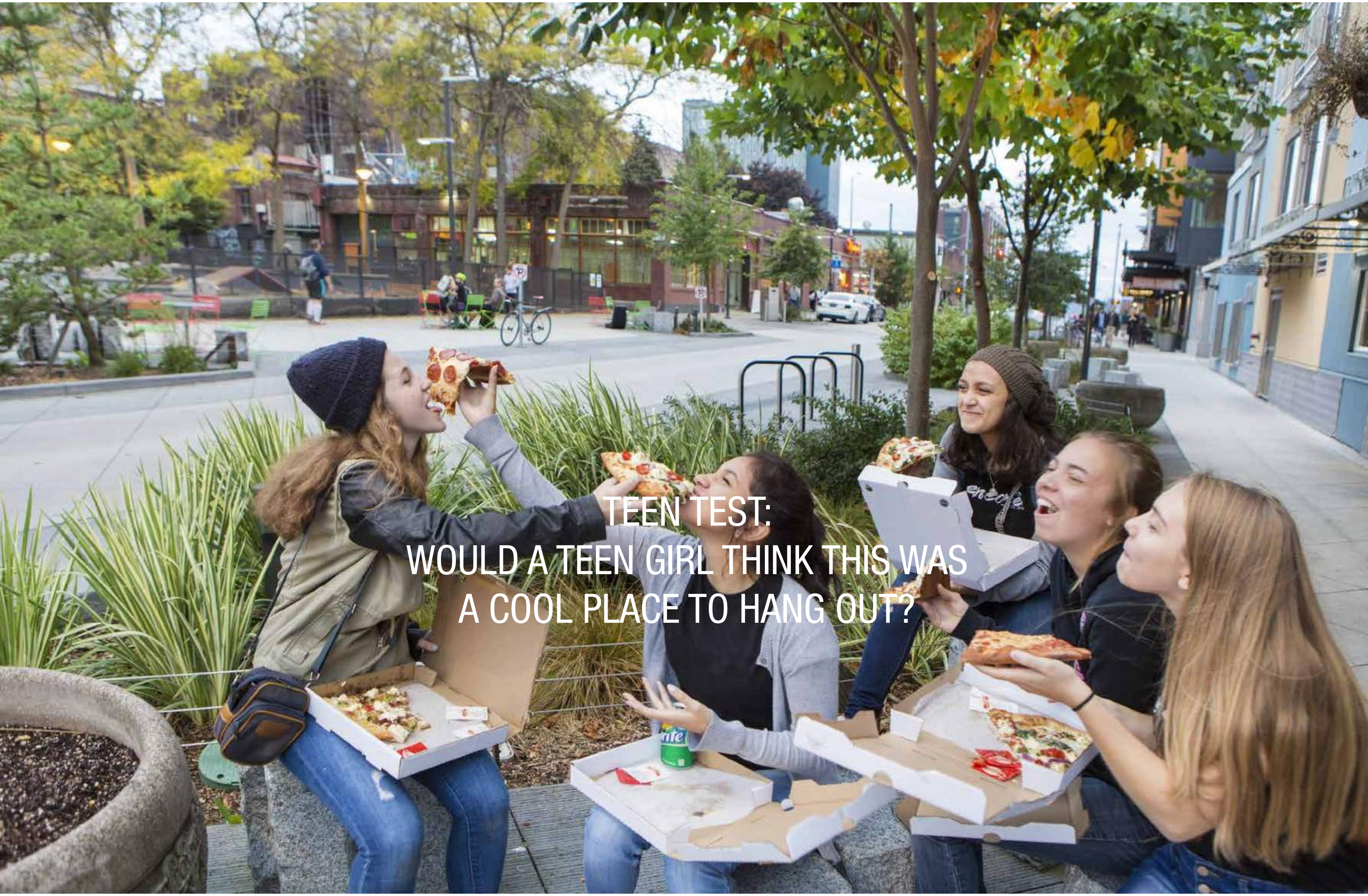
JOYFUL


Low Prices


DUTCH TEST
TOUCH TEST
TEEN TEST


DUTCH TEST:
WOULD A PARENT FEEL COMFORTABLE BIKING THEIR CHILDREN TO SCHOOL WITHOUT A HELMET?


TOUCH TEST:
DOES A PLACE PLEASANTLY ENGAGE
MORE THAN ONE SENSE?


TEEN TEST:
WOULD A TEEN GIRL THINK THIS WAS
A COOL PLACE TO HANG OUT?

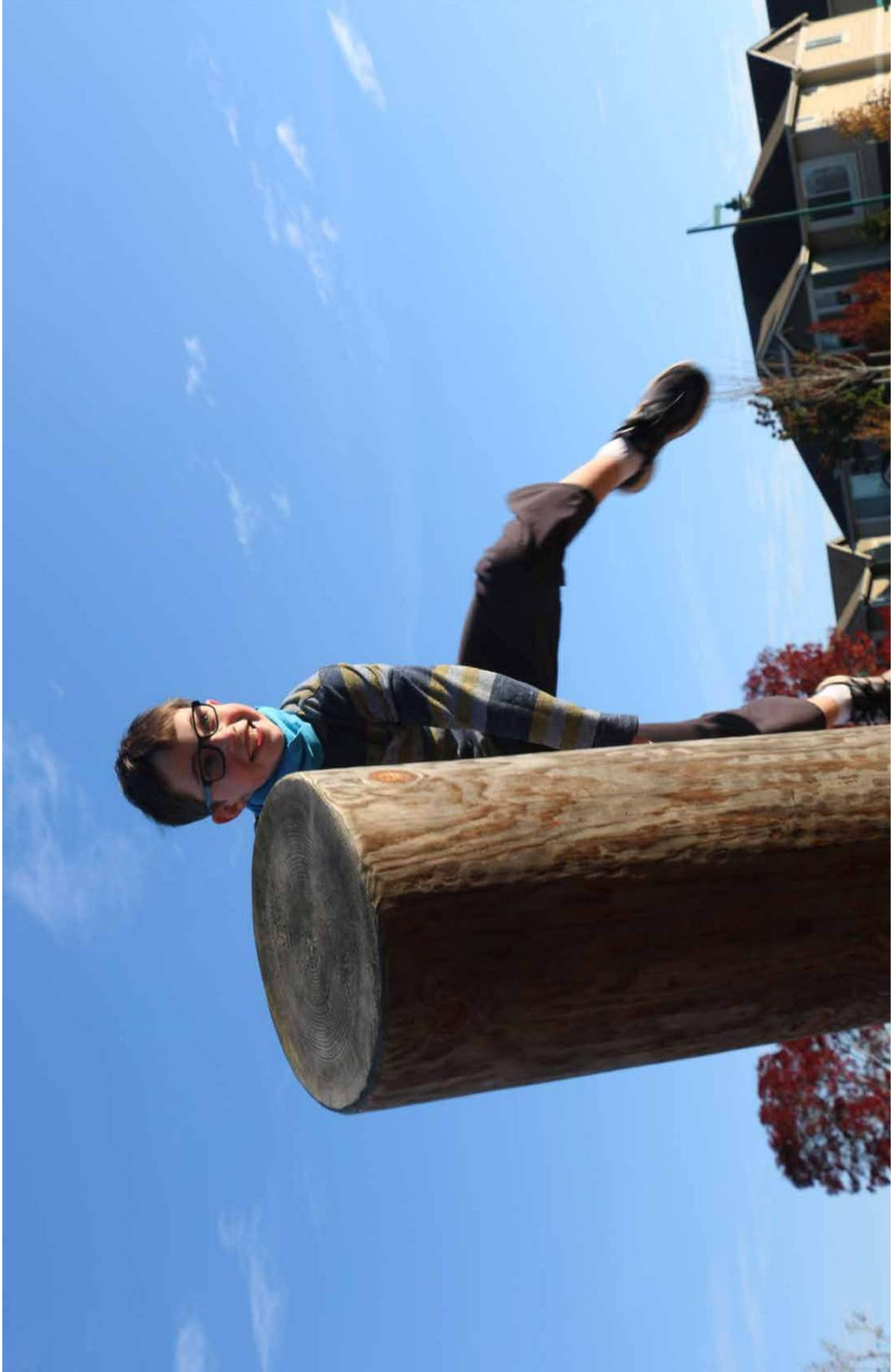
FIVE PLACEMAKING STRATEGIES

ROOTED
EMPATHETIC + EGALITARIAN
MULTI-FUNCTIONAL
HUMAN-SCALED
JOYFUL

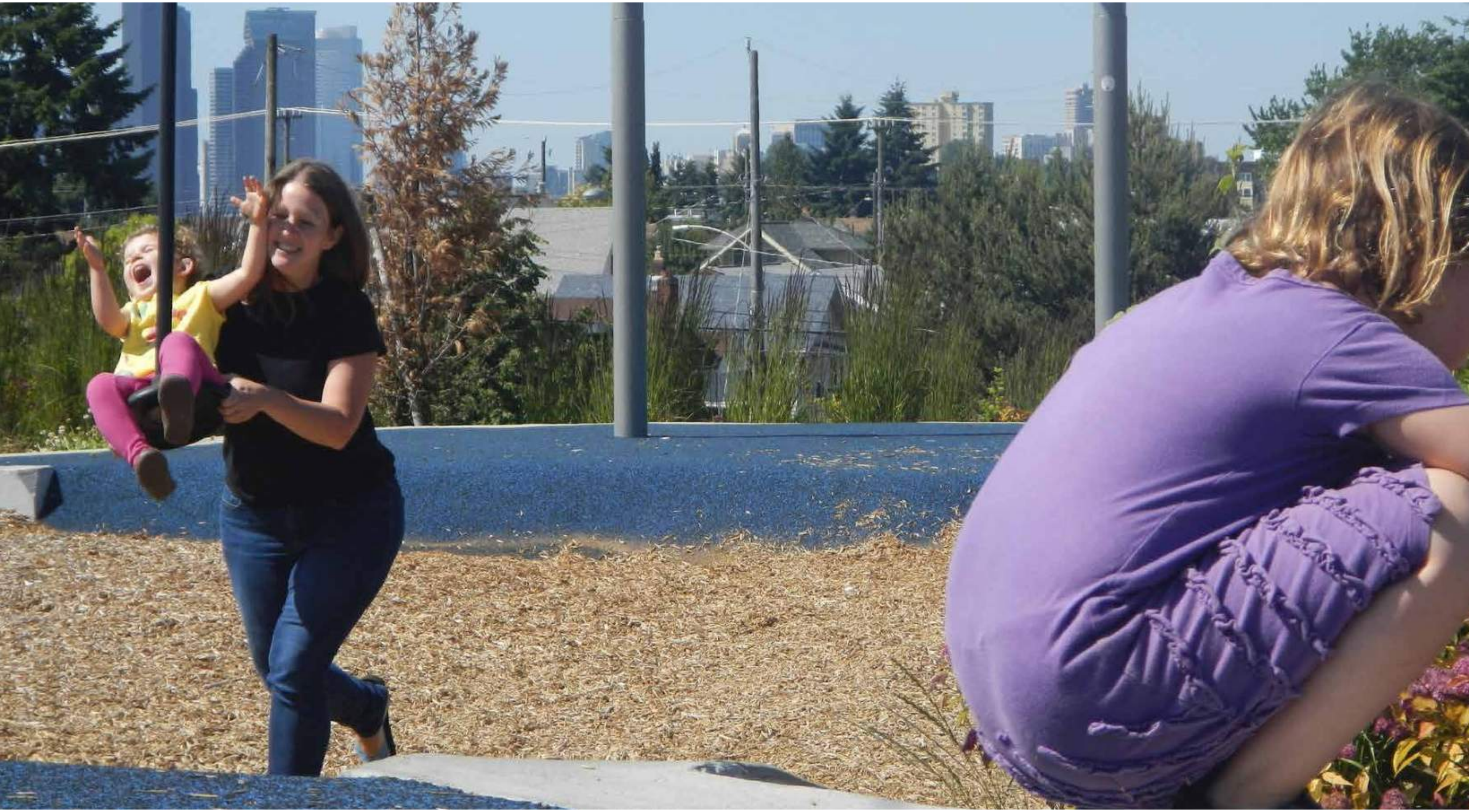
S/A

S/A

SMILE OPPORTUNITIES PER ACRE




GOOD OLD DAYS



“IT’S PLACEMAKING, NOT PLACEMADE.
IT’S A PROCESS. YOU ARE NEVER FINISHED.”

-PLACE GOVERNANCE WORKING GROUP PLACE GOVERNANCE WORKING GROUP

MILLWORKS CHARRETTE:
PLACEMAKING + PUBLIC SPACE

JUNE 10, 2021

BRICE MARYMAN, PLA, FASLA

MIG

RMC ARCHITECTS

Attn: Integrated Planning Grant Report

Company:

Date: June 10, 2021

Project: Healthy Housing IPG – Lignin Parcel

Job#: 2006

From: Neil McCarthy

RE: June 10 Design Charrette Notes

☐ **Transmittal**
☑ **Memo**
☐ **Phone Record**
☐ **Other:**

Message Attendees:

Jess Blanch	Enterprise Community Partners
Brian Gouran	Port of Bellingham
Nick Hartrich	PSE
Tony Hillaire	Lummi Nation
Mauri Ingram	Whatcom Community Foundation
Rose Lathrop	Sustainable Connections
Ellen Lohe	Mercy Housing
Neil McCarthy	RMC Architects
Jason McGill	Northwest Youth Services
Colin Morgan Cross	Mercy Housing
Sara Nichols Chiabai	Whatcom Community Foundation
Sukanya Paciorek	Whatcom Community Foundation
Kristi Park	BioDesign Studio
Alexandra Spaulding	Whatcom Community Foundation
Gina Stark	Port of Bellingham
Tara Sundin	City of Bellingham
Candice Wilson	Lhaq'temish Foundation

Five Takeaways:

1. Wrong Side of Tracks?
   - The site is separated from the rest of the waterfront district by the train tracks. Porosity through this barrier and/or some sort of mitigation should be considered.
   - A question of equity comes into play considering the project includes subsidized affordable housing. The site must be seen as a prominent component of the waterfront district, not an afterthought. Connections to downtown and marking the site as a gateway are a couple of ways to reinforce the site's importance.

2. Cultural Overtones
   - The site is rich with cultural overtones. Tony and Candice spoke eloquently about how this area is important to the Lummi Nation. Expectations have been established. Tony mentioned how the site was a meeting place, including with European settlers. He offered to have the Lummi Nation historians comment on the location for an authentic connection. Tell the story was his advice.

- The site also has a strong story to tell regarding historic economic development. Fishing, timber, shipping and other industries have made this a home for the past 150 years. Artifacts, including buildings, are plentiful in the district. The train also adds to the story.
- The district needs to be a place where all folks are welcome regardless of economic status, ethnicity, etc. This needs to be explicit. Issues such as wealthy landowners have access to waterfront property via condos while subsidized affordable housing is pushed to the back of the district need to be recognized and addressed. The public park system goes a long way in this regard.

3. Abundance
   - Tom Paladino gave a thought provoking presentation about approaching Sustainable Design (and by extension the project itself) from a position of abundance rather than scarcity. Enhance habitat, generate water, create community, harvest energy, etc. He showed a couple of projects in which he took stock of what project characteristics were abundant (good and bad) then took the biggest challenges and turned them into assets while reinforcing the positive characteristics.
   - Challenges on this site include the train, minimal connections to downtown, minimal connections to the rest of the waterfront district, soil contamination and parking. We need to consider how these can be addressed not only from a mitigation point of view but also by converting these into an asset. Add to that assets that the project already has in abundance like waterfront location, views, place making potential, etc.

4. Figure Ground
   - As we were working at our table, we decided to approach the massing and site layout not from a building point of view but from the spaces between the buildings. Many of these spaces become the public realm. How can we program, link and orient these to the project's best advantage.
   - This tied well into Brice Maryman's presentation regarding place making and public spaces. His themes were Rooted, Empathetic/Egalitarian, Multi-functional, Human Scaled, Joyful.

5. Cost Tensions
   - The project is a combination of two distinct programs with the public space as a shared component.
   - The subsidized affordable housing program is subject to some very strict and detailed funding parameters. It must compete with similar projects for the limited amount of available funding. Cost control is part of the scoring system.
   - The food campus is much more flexible in how it can be funded. Whatcom Community Foundation's expertise includes matching dollars to mission driven projects. The food campus is rich with mission driven possibilities. Bringing definition to all the parameters is a bigger challenge than funding itself.
   - Interestingly, it is unlikely that WCF can offer funding directly to the subsidized affordable housing component without jeopardizing its ability to score points on cost control. While a waiver may be possible, there may be other ways to split costs.
   - Using commercial condominiums are often a way to combine two programs in the same building. This process can potentially allow funding from one program to support another program. There are timing issues with this approach that make its application to our project difficult.
   - It is possible that WCF can support a higher proportion of public space expenses if they are mission driven. This may be a way to resolve the cost tensions in the project.

Additional Thoughts:

- Some random ideas that popped up in our table's conversations include:
  - Rose is willing to lead an effort to paint a mural on the existing slab of the demolished Lignin Building. A similar project was a great community building event in the Birchwood neighborhood.

  - The site has an odd geometry that makes stuff like parking lots difficult. Perhaps the parking should be in a park like setting. Maybe a dog walking area too?
  - It may be possible to tie into a future trail system in the railroad reserve area until the train moves.
  - The likelihood of the train moving is slim. We should keep it in mind but emphasize working with train in its current location.
  - An image of the area when it was mudflats prior to filling brings to mind how organic shapes are missing from current district vocabulary. WWU's Haskell Plaza comes to mind.
  - The food campus could be a lineal building shielding the site from train noise. It may include a place where folks interested in trains can watch them go by.
  - The Facebook Campus was cited for combination of vehicles and pedestrians.
  - Pike Place Market and Granville Island are good examples of pedestrians and vehicles co-mingling.
  - GasWorks Park (Rich Haag) is a good example of converting an industrial site into a people place.
  - Could food waste be used for district bio-digester?
  - It would be great to use CLT to celebrate historical timber use and emphasize Pacific Northwest aesthetic.

- Comments from follow up meeting on Friday
  - Colin emphasized that the apartment residents also need their areas of privacy. Aside from privacy in their units (i.e. minimize overview from Cornwall) areas of the site should also be reserved for residents.
  - Train quiet zone is on horizon.
  - All agreed that public infrastructure support is needed. Cornwall bridge is front and center but also infrastructure connecting across the site and possibly the railroad track could be considered.
  - Train elements to celebrate:
    - Kinetic architecture.
    - Industrial history of site
    - Getting product to market
    - Community train watchers
    - Immersive experience in public area perhaps? E.G. Doppler effect.
  - Train negative elements
    - Had a serious impact on Indigenous Peoples way of life.
    - Noise, pollution, dangerous cargo, etc.
  - Ellen brought up important tie of food and culture. Also food and energy. How can site be generative? Note that Lummi folks have been re-exploring traditional medicines. Perhaps that is part of food infrastructure. Alex cautioned about train line impact on food..
  - Mauri highlighted Candice's remark from Thursday about the community has expectations for the site. We have an obligation to the community. We are doing this as a public benefit – not as a "for profit" developer.
  - Mauri referenced the UW public engagement team project regarding ties to nature and mapping prior to European infrastructure.
  - Suki's comments were mainly about Lummi observations.
    - Tony made the comment to share everyone's history.
    - Consider reconciliation.
    - Lummi historian will be made available.
    - Tell the story.

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