LINCOLN HIGH SCHOOL

Design Advisory Group Meeting Four

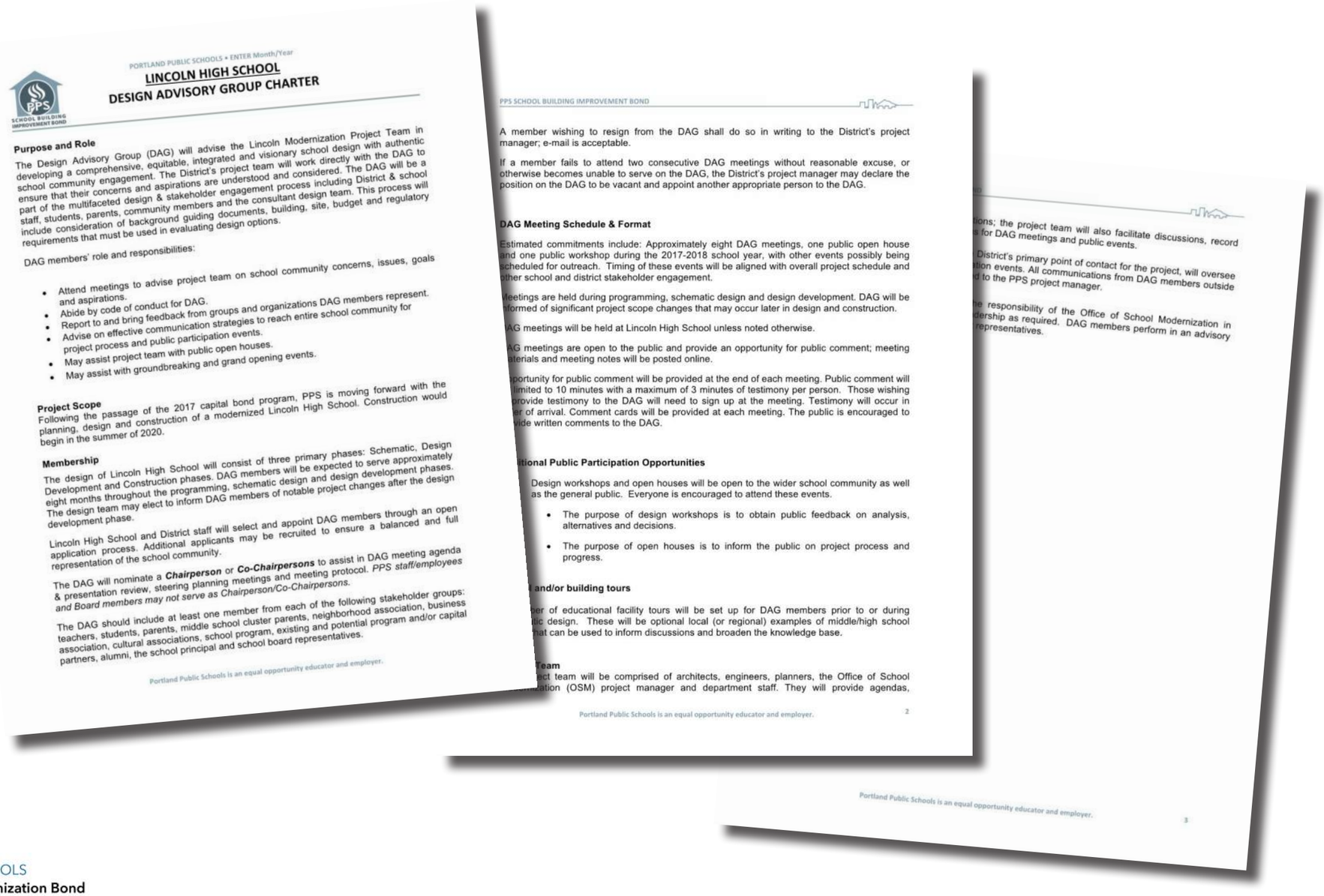
July 19, 2018

BORA

Agenda

Welcome & Introductions	5 minutes	Erik Gerding
DAG Rules of Engagement & Participation	5 minutes	Nancy Hamilton
Board of Education / Master Plan Approval	5 minutes	Bora / Erik Gerding
Site Design Report Back & Discussion	15 minutes	Mayer Reed
Interactive Design Exercise Sustainability: Student Engagement	80 minutes	RWDI / All
Upcoming DAG Meetings	5 minutes	Bora
Public Comment Period	10 minutes	All
Adjourn		

DAG Charter



PORTLAND PUBLIC SCHOOLS • ENTER Month/Year

LINCOLN HIGH SCHOOL
DESIGN ADVISORY GROUP CHARTER

Purpose and Role

The Design Advisory Group (DAG) will advise the Lincoln Modernization Project Team in developing a comprehensive, equitable, integrated and visionary school design with authentic school community engagement. The District's project team will work directly with the DAG to ensure that their concerns and aspirations are understood and considered. The DAG will be a part of the multifaceted design & stakeholder engagement process including District & school staff, students, parents, community members and the consultant design team. This process will include consideration of background guiding documents, building, site, budget and regulatory requirements that must be used in evaluating design options.

DAG members' role and responsibilities:

- Attend meetings to advise project team on school community concerns, issues, goals and aspirations.
- Abide by code of conduct for DAG.
- Report to and bring feedback from groups and organizations DAG members represent.
- Advise on effective communication strategies to reach entire school community for project process and public participation events.
- May assist project team with public open houses.
- May assist with groundbreaking and grand opening events.

Project Scope

Following the passage of the 2017 capital bond program, PPS is moving forward with the planning, design and construction of a modernized Lincoln High School. Construction would begin in the summer of 2020.

Membership

The design of Lincoln High School will consist of three primary phases: Schematic, Design Development and Construction phases. DAG members will be expected to serve approximately eight months throughout the programming, schematic design and design development phases. The design team may elect to inform DAG members of notable project changes after the design development phase.

Lincoln High School and District staff will select and appoint DAG members through an open application process. Additional applicants may be recruited to ensure a balanced and full representation of the school community.

The DAG will nominate a ***Chairperson*** or ***Co-Chairpersons*** to assist in DAG meeting agenda & presentation review, steering planning meetings and meeting protocol. *PPS staff/employees and Board members may not serve as Chairperson/Co-Chairpersons.*

The DAG should include at least one member from each of the following stakeholder groups: teachers, students, parents, middle school cluster parents, neighborhood association, business association, cultural associations, school program, existing and potential program and/or capital partners, alumni, the school principal and school board representatives.

Portland Public Schools is an equal opportunity educator and employer.

PPS SCHOOL BUILDING IMPROVEMENT BOND

A member wishing to resign from the DAG shall do so in writing to the District's project manager; e-mail is acceptable.

If a member fails to attend two consecutive DAG meetings without reasonable excuse, or otherwise becomes unable to serve on the DAG, the District's project manager may declare the position on the DAG to be vacant and appoint another appropriate person to the DAG.

DAG Meeting Schedule & Format

Estimated commitments include: Approximately eight DAG meetings, one public open house and one public workshop during the 2017-2018 school year, with other events possibly being scheduled for outreach. Timing of these events will be aligned with overall project schedule and other school and district stakeholder engagement.

Meetings are held during programming, schematic design and design development. DAG will be informed of significant project scope changes that may occur later in design and construction.

AG meetings will be held at Lincoln High School unless noted otherwise.

AG meetings are open to the public and provide an opportunity for public comment; meeting aterials and meeting notes will be posted online.

portunity for public comment will be provided at the end of each meeting. Public comment will limited to 10 minutes with a maximum of 3 minutes of testimony per person. Those wishing provide testimony to the DAG will need to sign up at the meeting. Testimony will occur in er of arrival. Comment cards will be provided at each meeting. The public is encouraged to vide written comments to the DAG.

tional Public Participation Opportunities

Design workshops and open houses will be open to the wider school community as well as the general public. Everyone is encouraged to attend these events.

- The purpose of design workshops is to obtain public feedback on analysis, alternatives and decisions.
- The purpose of open houses is to inform the public on project process and progress.

and/or building tours

ber of educational facility tours will be set up for DAG members prior to or during lic design. These will be optional local (or regional) examples of middle/high school hat can be used to inform discussions and broaden the knowledge base.

Team

ct team will be comprised of architects, engineers, planners, the Office of School ation (OSM) project manager and department staff. They will provide agendas,

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tions; the project team will also facilitate discussions, record s for DAG meetings and public events.

District's primary point of contact for the project, will oversee tion events. All communications from DAG members outside d to the PPS project manager.

he responsibility of the Office of School Modernization in dership as required. DAG members perform in an advisory representatives.

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DAG Code of Conduct

Expectations Regarding Committee Member Behavior

- Make every effort to attend every meeting, to arrive on time, and to be prepared.
- If you know you must be absent, advise the committee support staff in advance.
- Do not criticize board members, staff members, other committee members, or any citizen in public. Letters and e-mails to any district personnel or elected official is a public document.
- Speak when recognized by the facilitator. Don't interrupt or engage in side conversations when another committee member is speaking.
- Be brief and to the point.
- Say what you mean and mean what you say: no political speeches; don't posture or grandstand.
- Clearly explain how you came to your position on a subject and how it serves the public interest.
- Share credit generously. Spread opportunities to get positive recognition.
- Support the legitimacy of committee outcomes, even those you don't agree with. When a decision is made, move on.
- Outside of committee meetings, members must be crystal clear whether they are speaking as an individual or have been recognized by the committee to speak on their behalf.
- Respect the different styles of fellow committee members.
- Be open to changing your mind based on new information.
- Take personal responsibility for encouraging respectful behavior among your fellow committee members.
- Recognize that you are seen as committee members at all times during the process, no matter how you may see yourself.
- Whenever you put anything in writing, assume that everyone in the city is looking over your shoulder.
- Everyone does not have to weigh in on every question. Sometimes it's OK to just be present.
- Affirm the dignity and worth of the services rendered by Portland Public Schools and maintain a constructive, creative and practical attitude toward PPS affairs and a deep sense of social responsibility as committee members.
- Recognize that the chief function of PPS at all times is to serve the best interest of all its students.
- Refrain from activities which undermine public confidence.

- Be respectful of all people at all times.

Violation of these committee rules of conduct will result first in a written warning and may ultimately result in removal from the committee.

PORTLAND PUBLIC SCHOOLS
Health, Safety and Modernization Bond
www.pps.net/bond2017

DAG Rules of Engagement

Participation limited to DAG members only

Public is invited to observe & comment at the end of the meeting

DAG is an advisory group, not a decision-making group

Respect the outcomes of prior Master Plan Committee & DAG processes

Board of Education / Master Plan Approval

Where are we now?

KNOWNS

District Standards Apply
- Program/Ed Spec (adjacencies)
- Technical Standards
- Program Equity
- Sustainability - LEED Gold

Basic Organization
- Building Location
- Entry Location
- Location of Major Building Blocks

UNKNOWNS

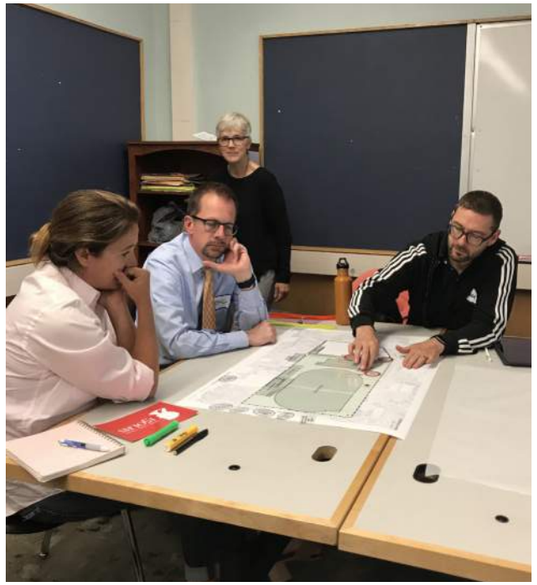
Site Access & Security
Neighborhood Amenities
Architectural Character
Alignment of Costs & Priorities

DAG #3 Report Back

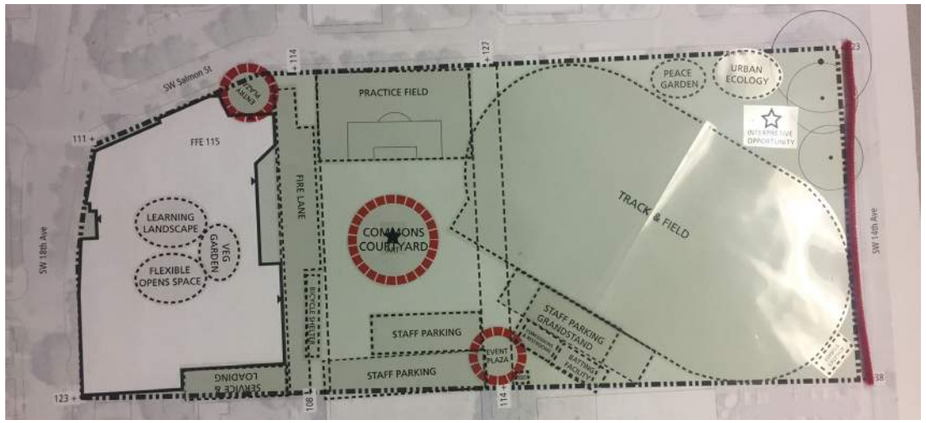
DAG #3: Site Design Workshop

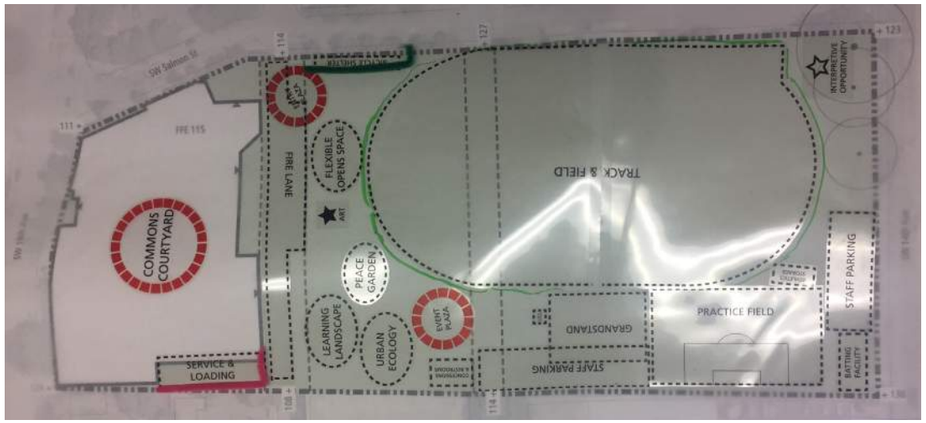


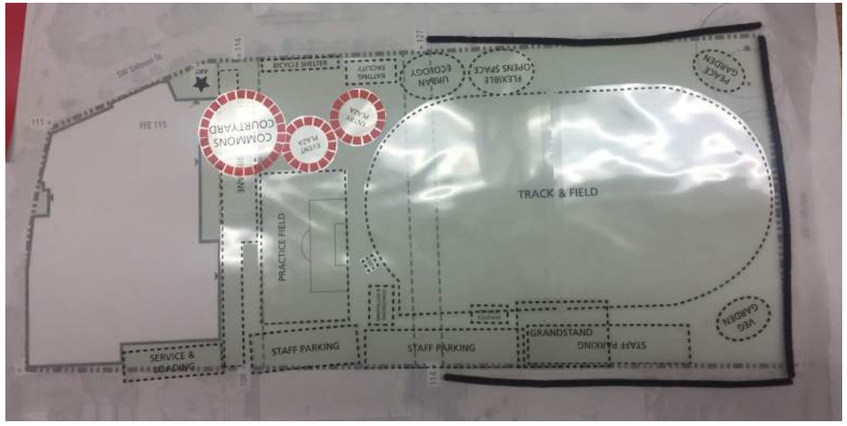


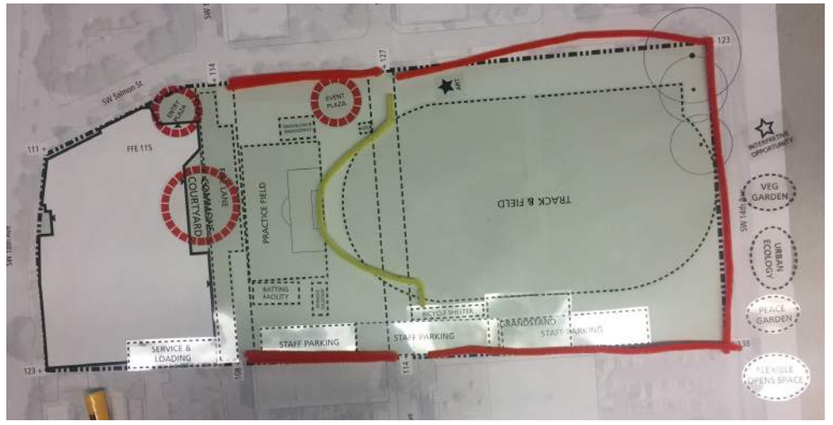


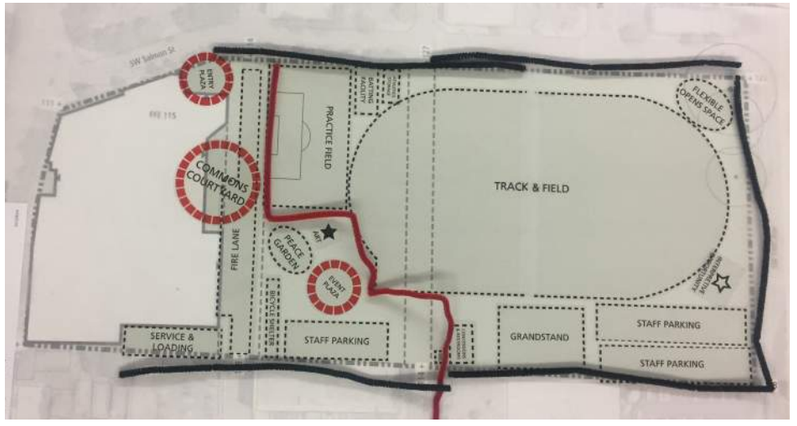

Site Design Schemes







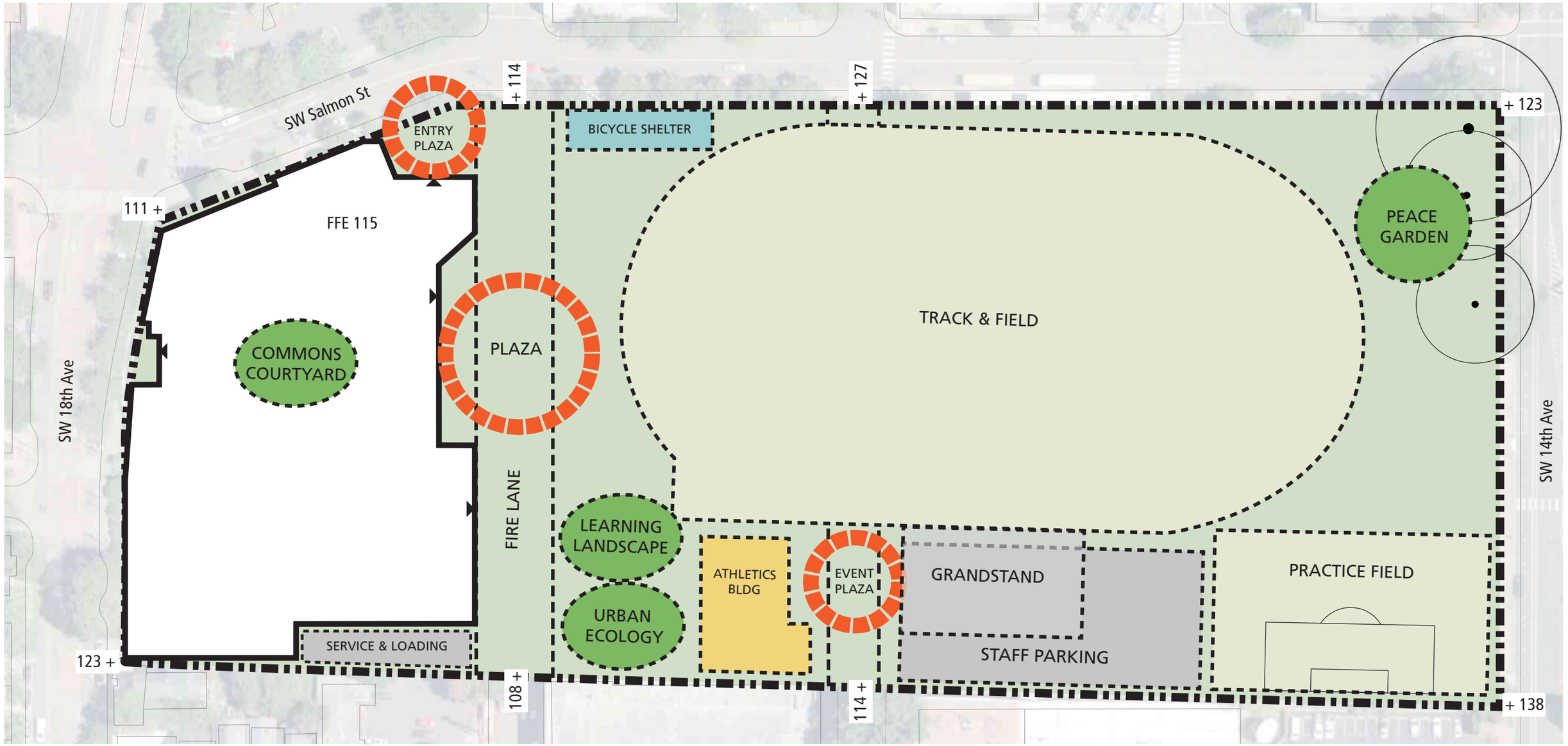




DAG #3: Common Locations of Major Site Elements

Plaza & Commons Courtyard - near the student commons
Entry Plazas - connected to Salmon & Jefferson St.
Track & Field - centered on site
Practice Field - variety of locations
Grandstands - south of track & field
Staff Parking - south of track & field
Bicycle Parking - near a major site entry point
Gardens and Learning Landscapes - near plaza and/or heritage tree

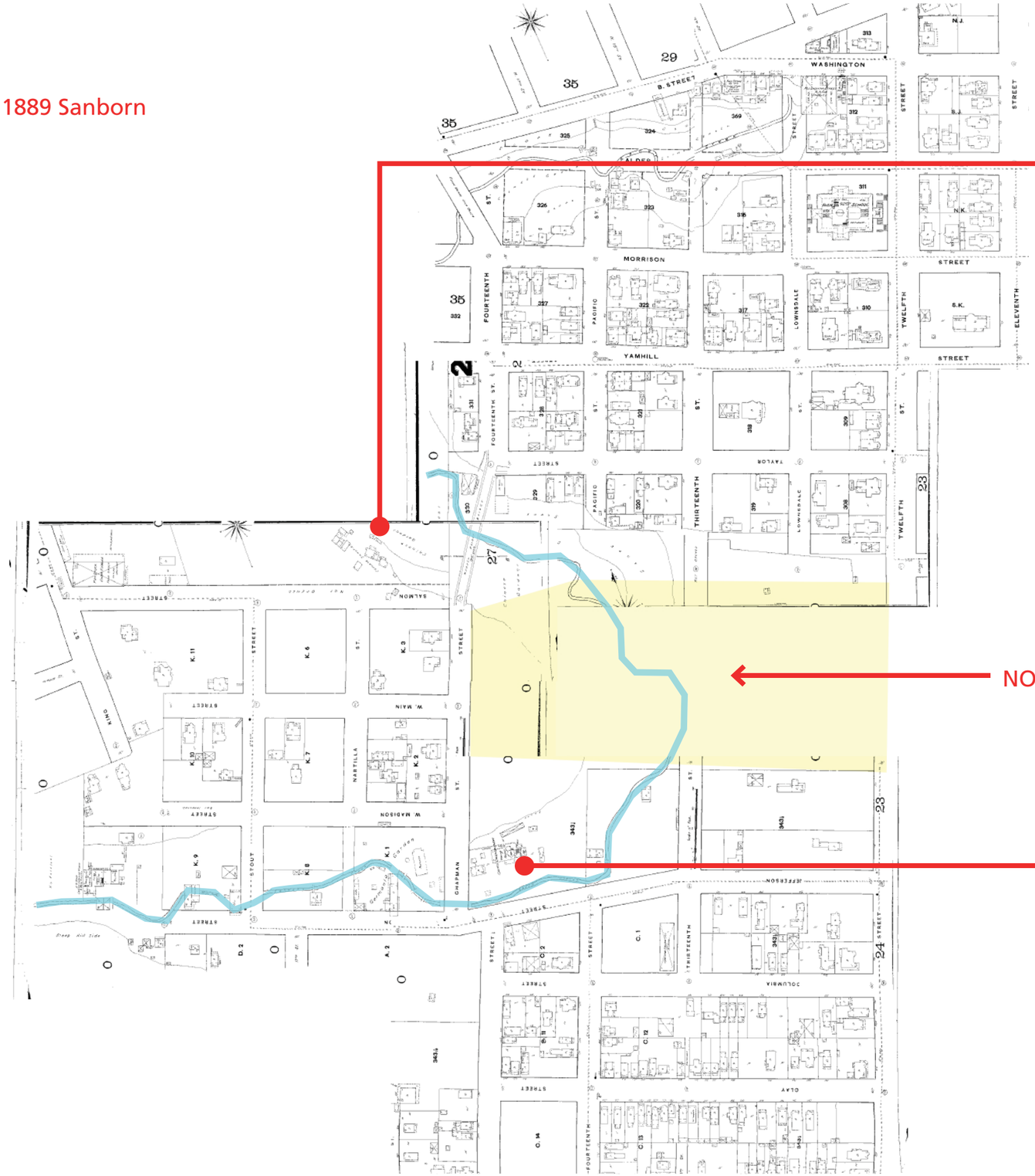
Site Design Diagram



BORA

Site Context and History

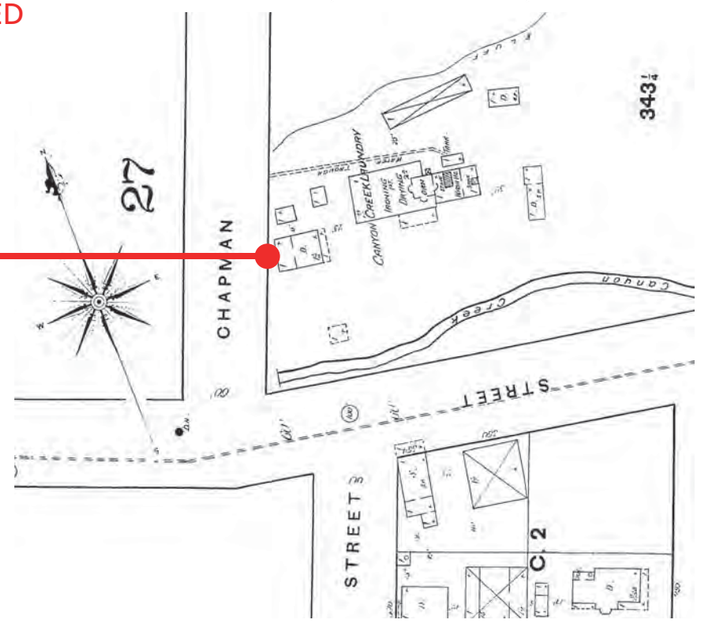
1889 Sanborn



NOT SURVEYED

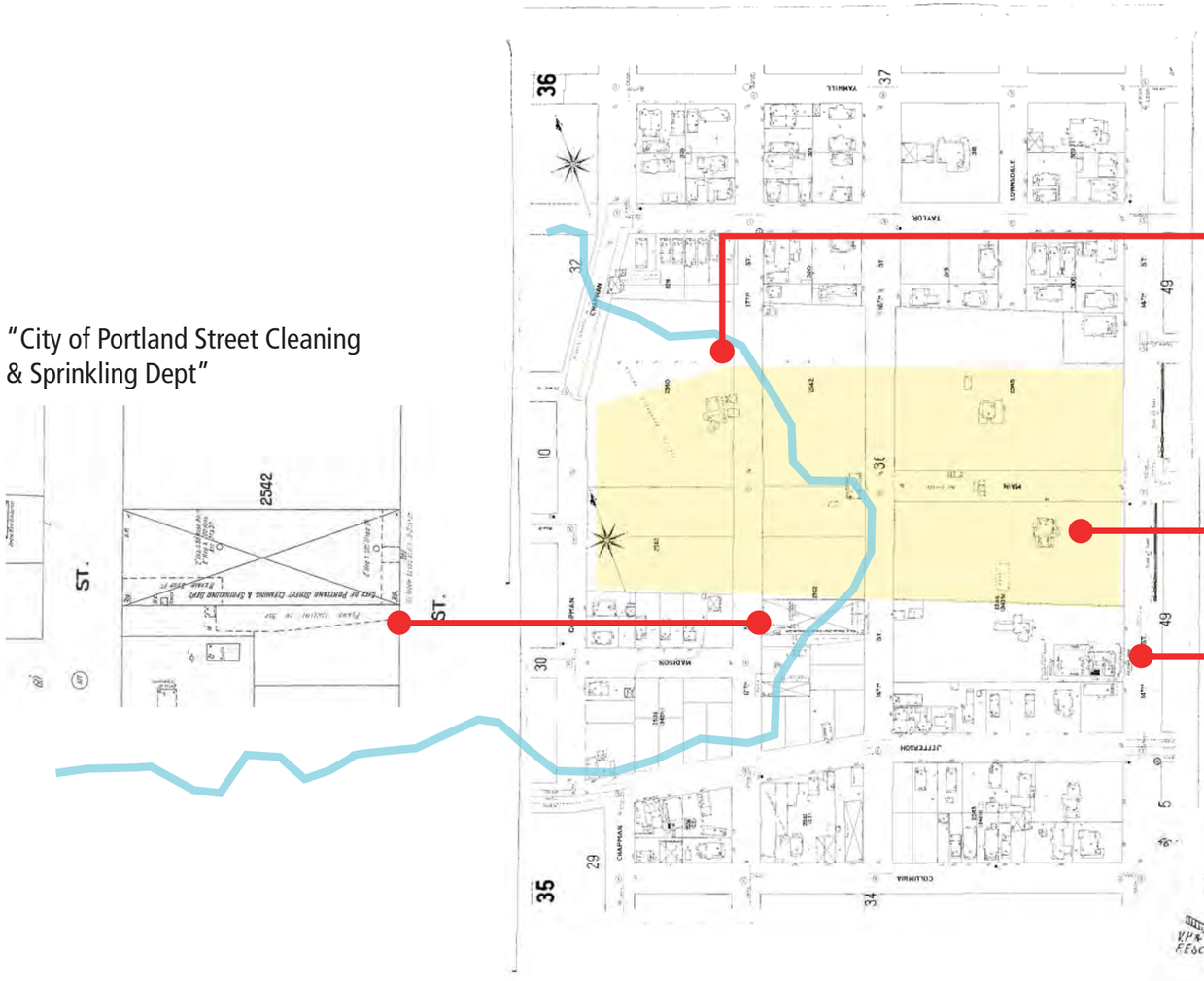
"Chinese Shanties" "Chinese Gardens" "Wooden Bridge"

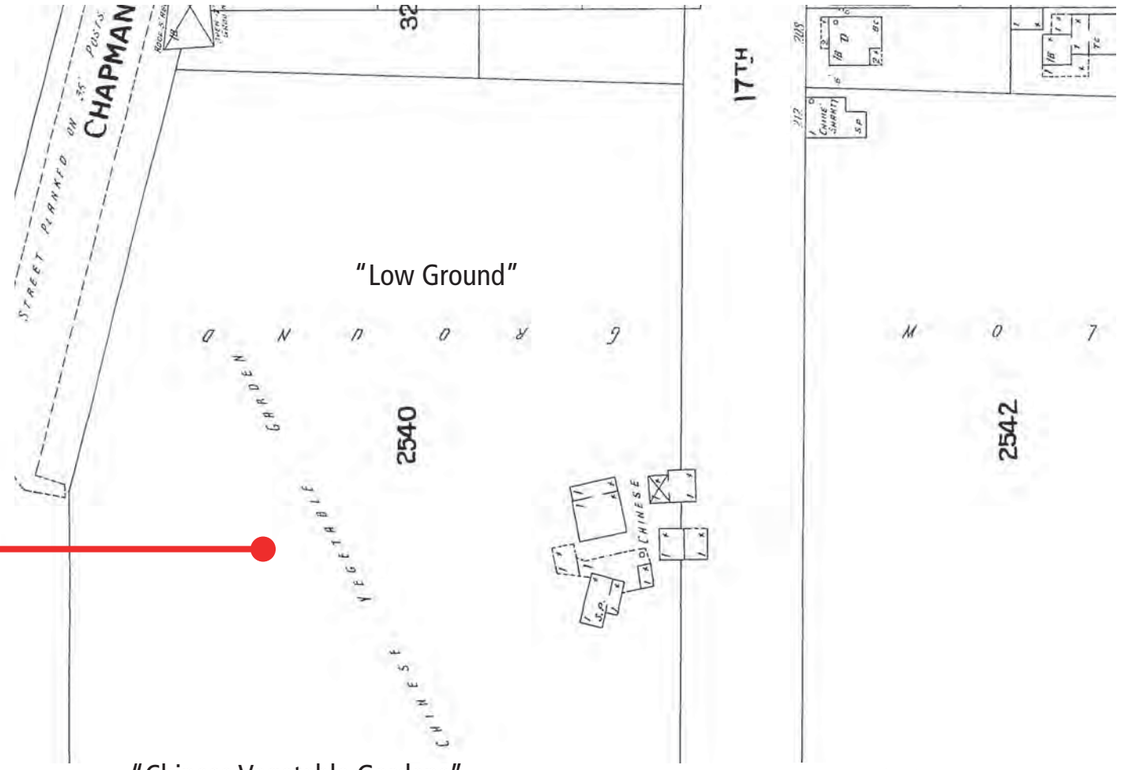
"Canyon Creek Laundry"



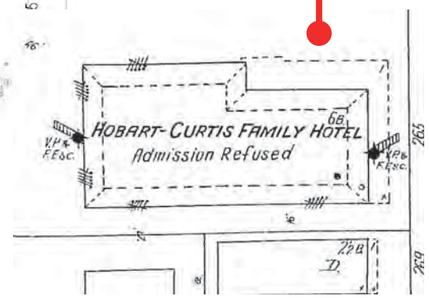
1901

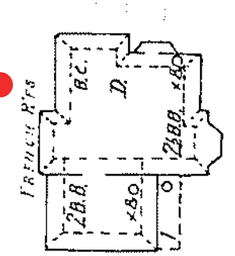
"City of Portland Street Cleaning
& Sprinkling Dept"





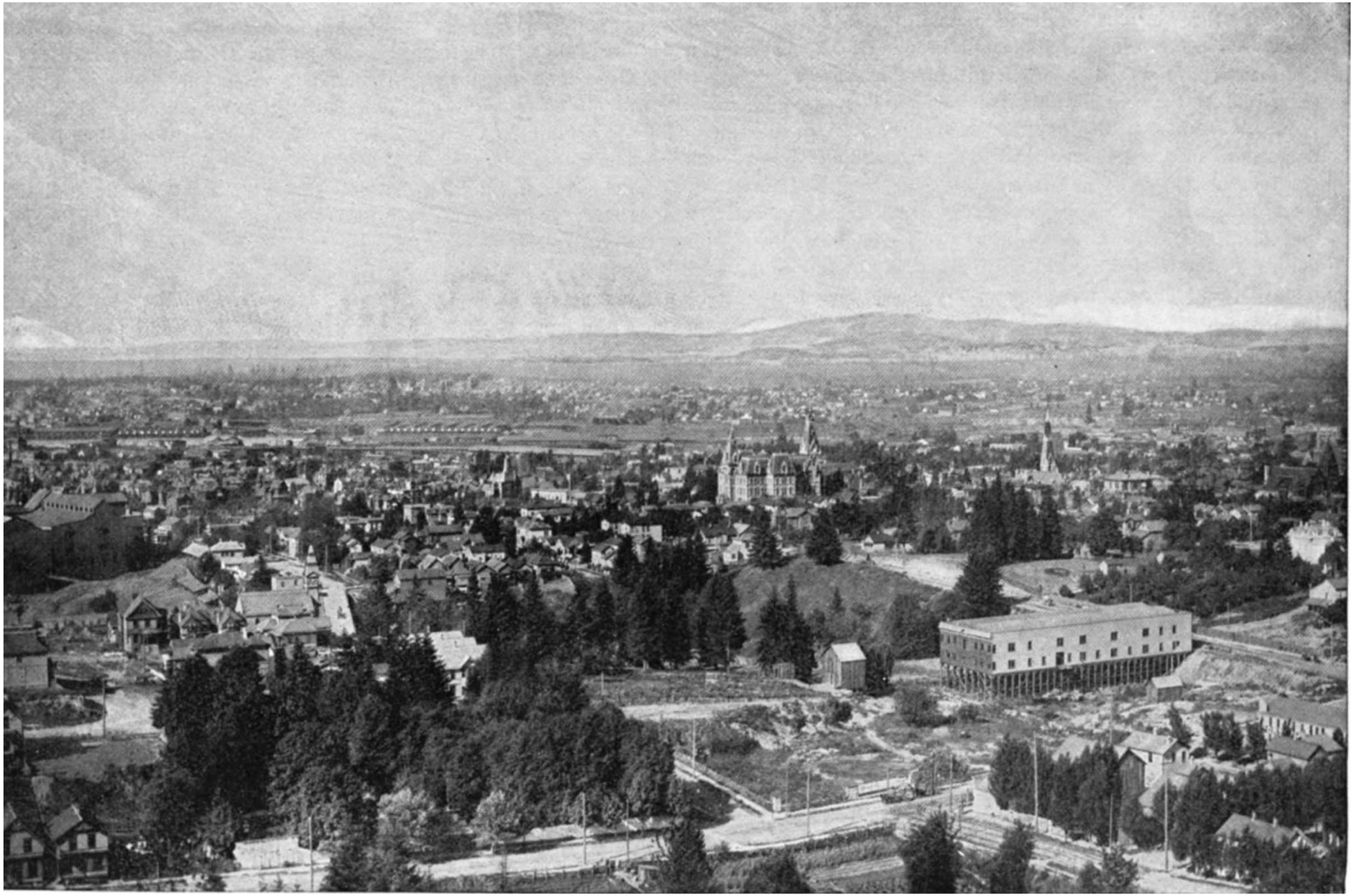
"Chinese Vegetable Gardens"



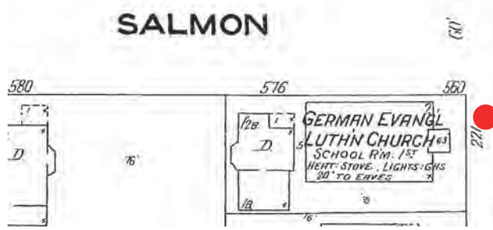


Hobart-Curtis Hotel
(demolished 1977)
aka Marabba West Apartments

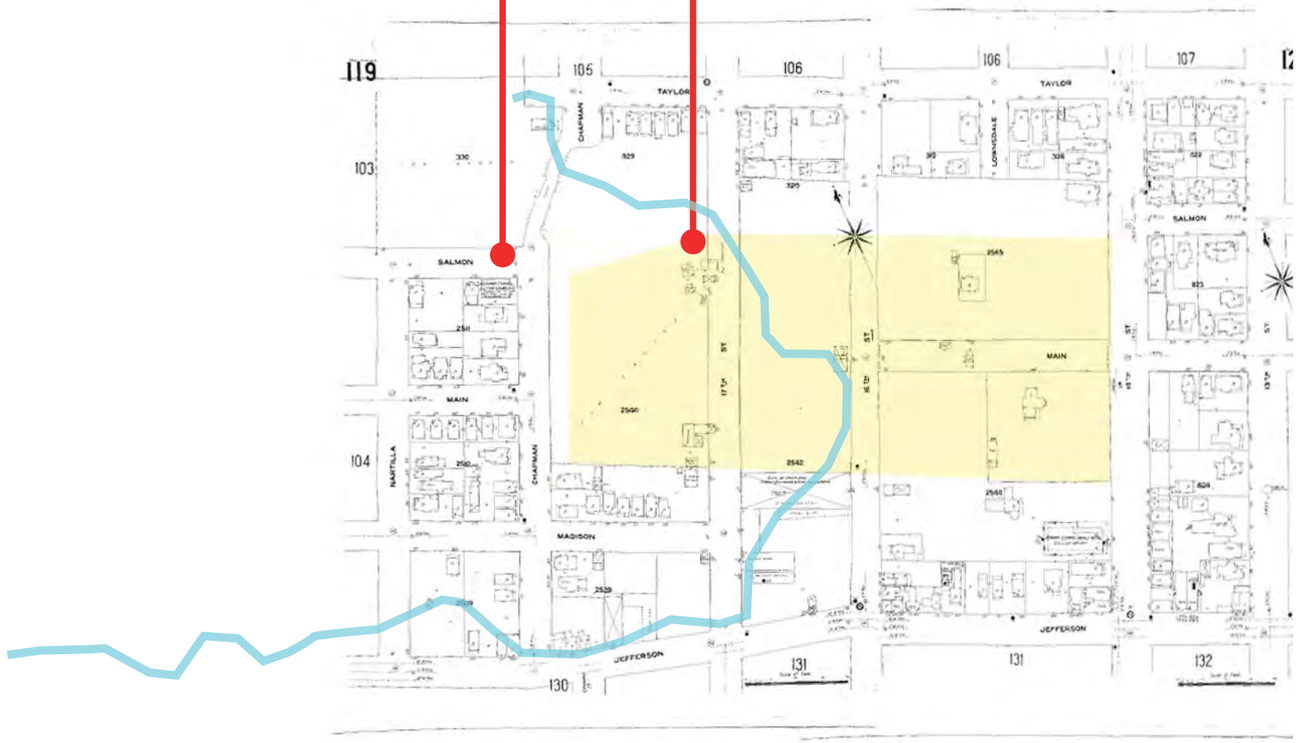
Jacob Kamm House
(relocated to SW 20th)

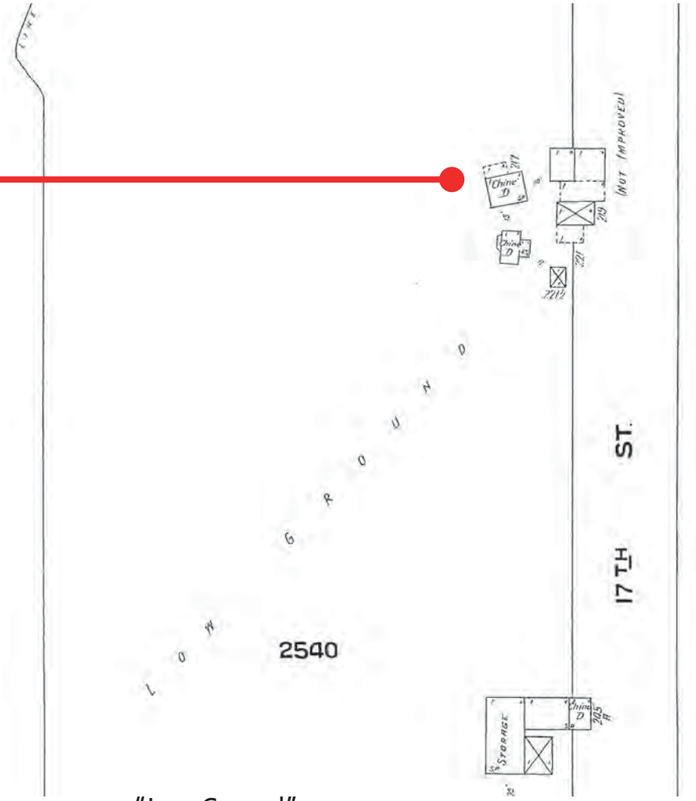


1909 Sanborn



"German Evangl Luthn Church"

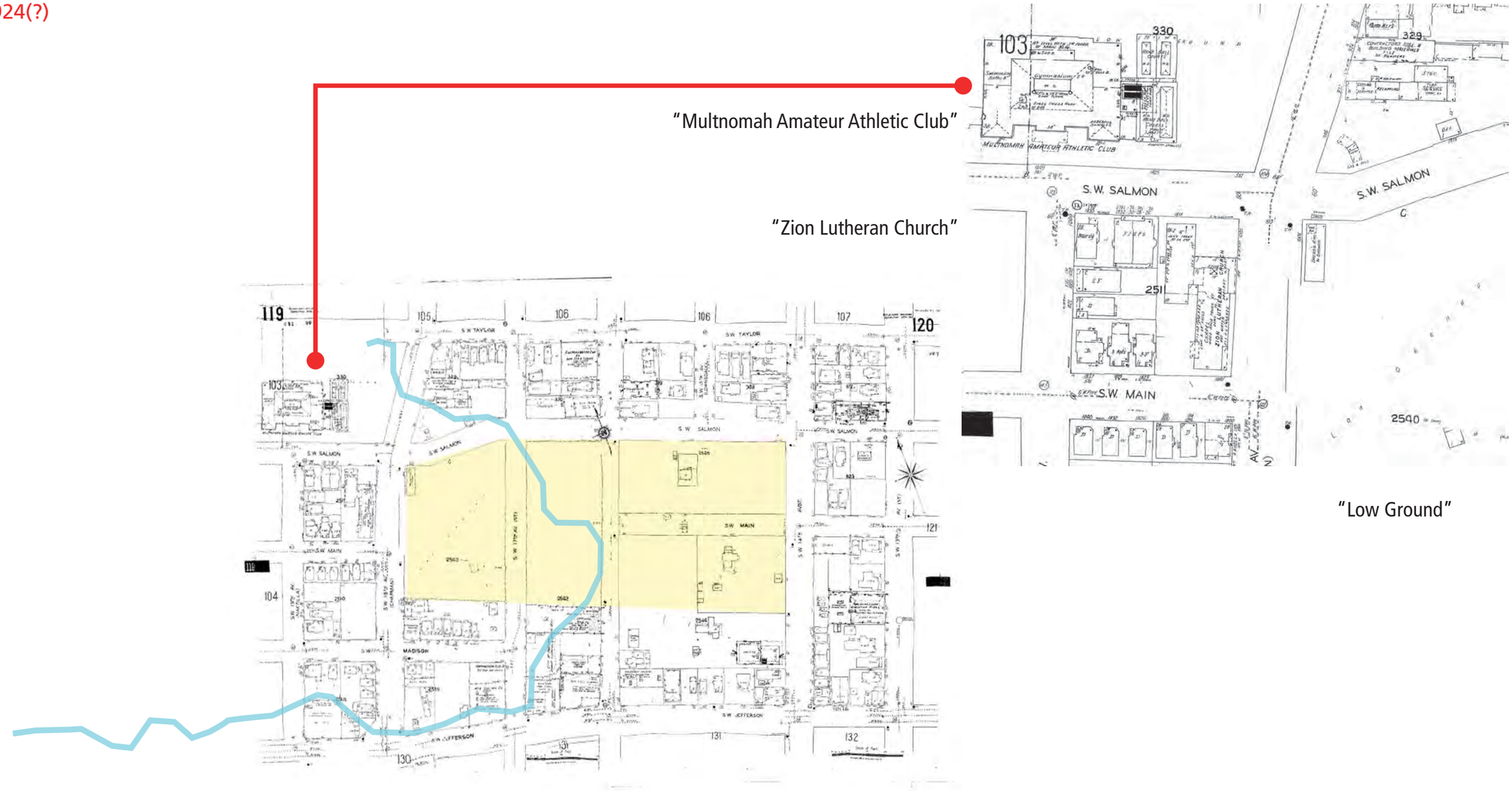


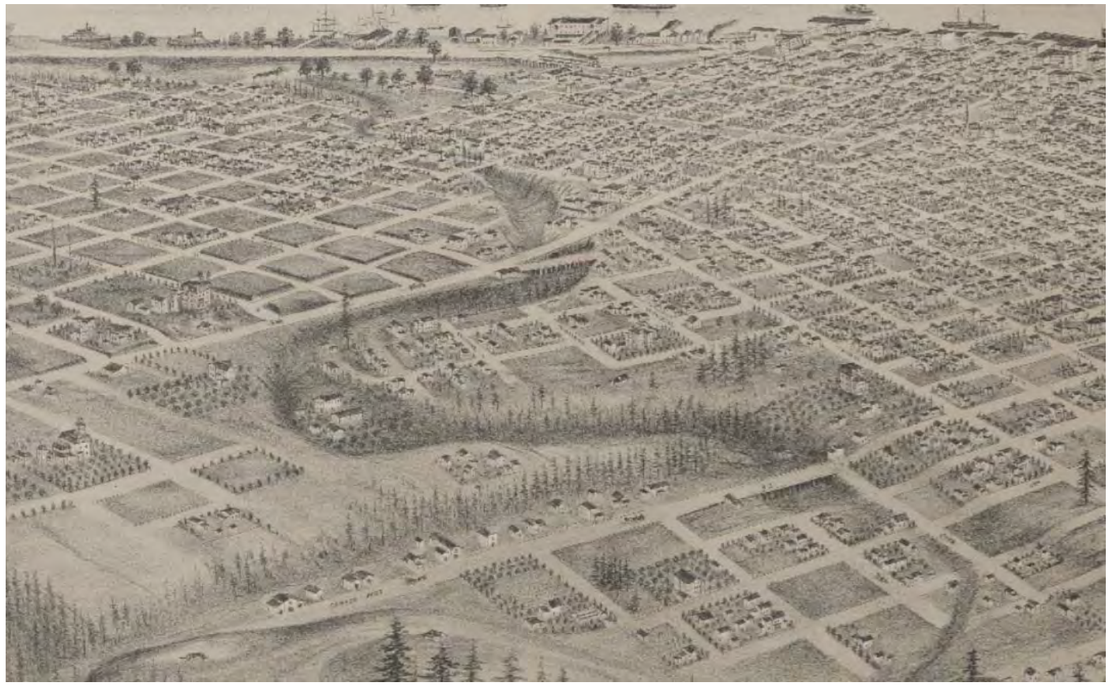


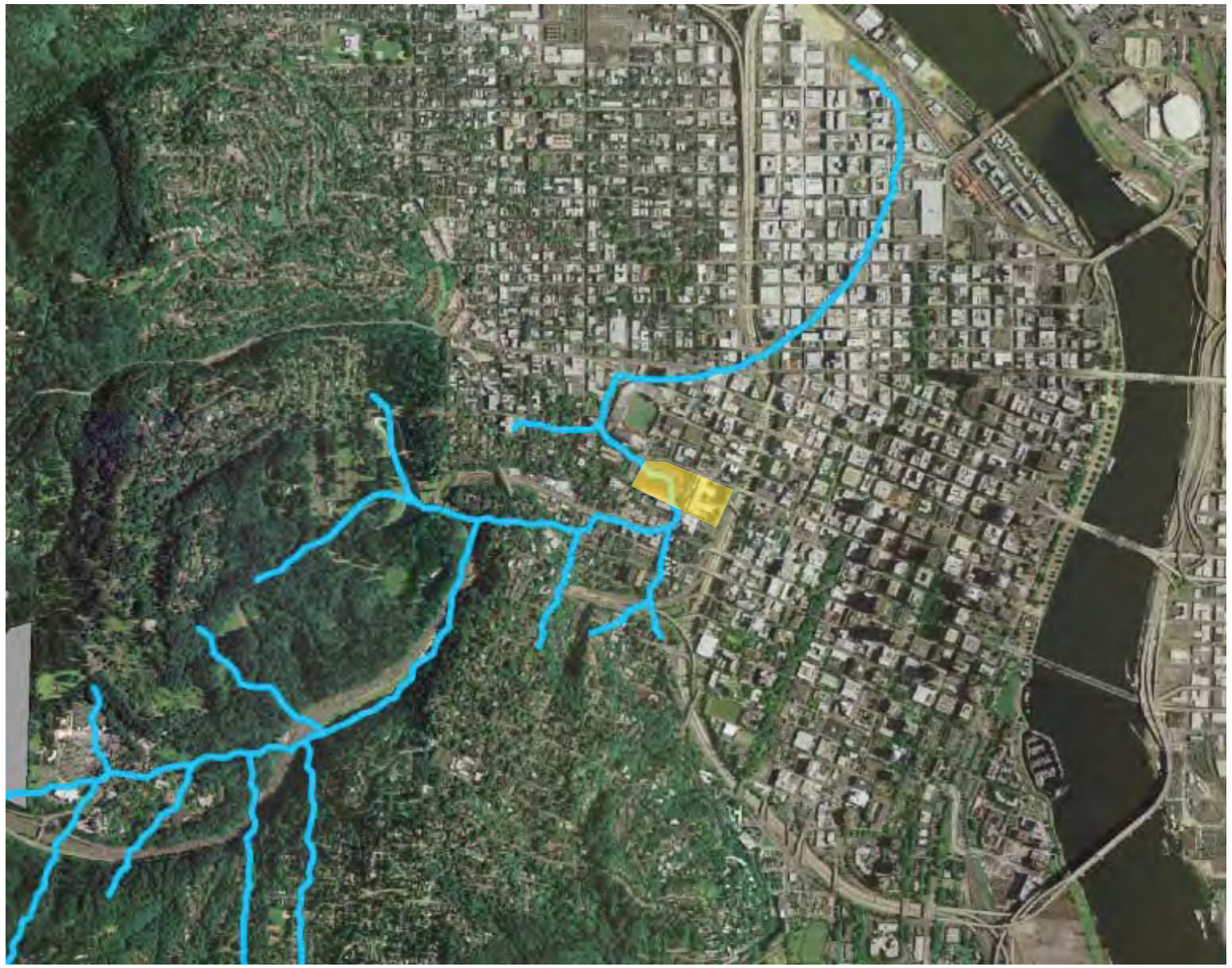
"Not Improved"

"Low Ground"

1924(?)

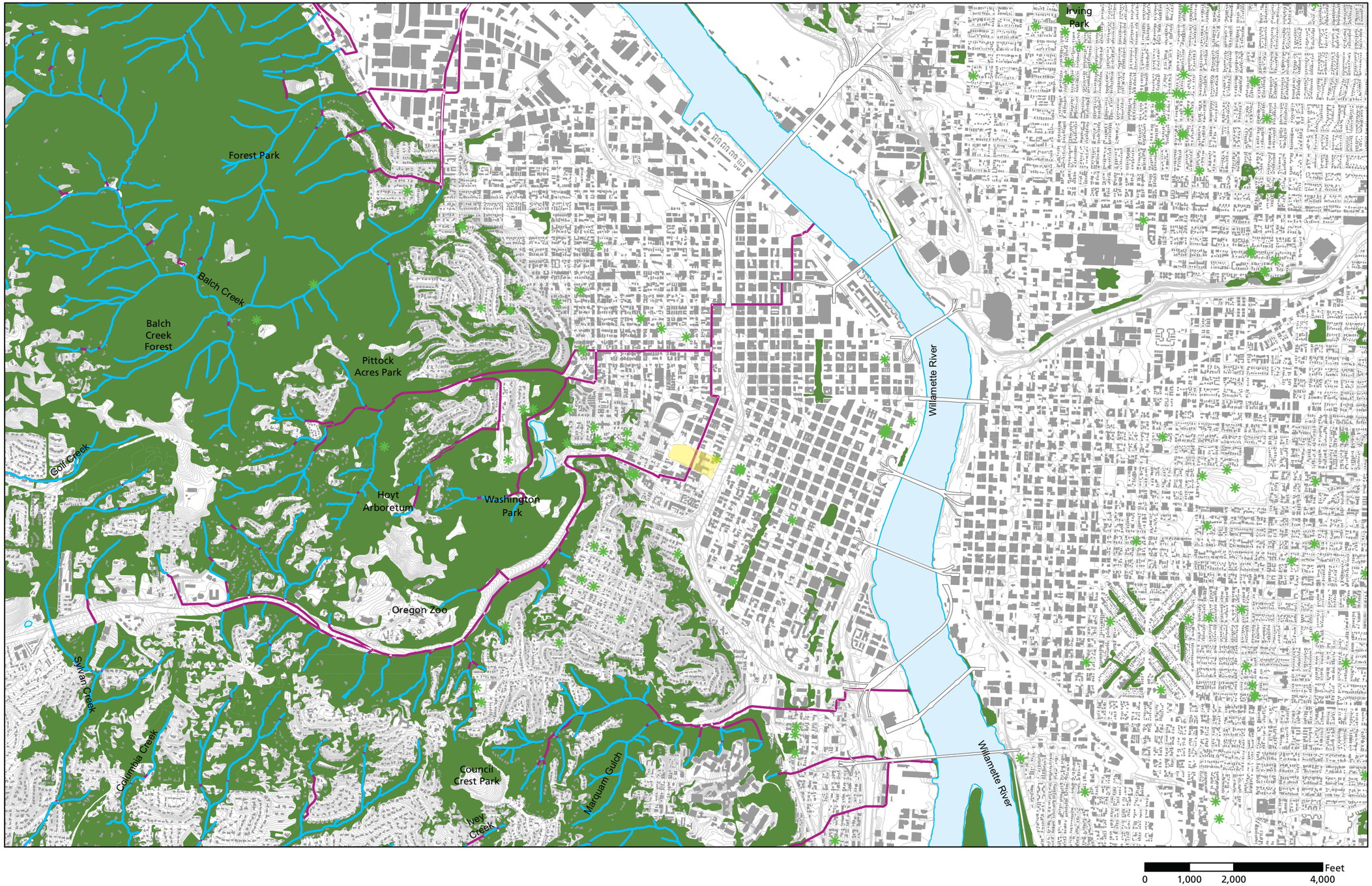

"Multnomah Amateur Athletic Club"
"Zion Lutheran Church"
"Low Ground"
103
330
329
MULTNOMAH AMATEUR ATHLETIC CLUB
S.W. SALMON
S.W. MAIN
251
2540
119
105
106
107
120
S.W. TAYLOR
S.W. SALMON
S.W. MAIN
MADISON
S.W. JEFFERSON
104
130
131
132
121





CHINESE GARDENS AND HOUSES,
IN TANNER CREEK GULCH.


fredhoogervorst.com
©


Forest Park
Balch Creek
Balch Creek Forest
Pittock Acres Park
Irving Park
Willamette River
Willamette River
Golf Creek
Hoyt Arboretum
Washington Park
Oregon Zoo
Sylvan Creek
Columbia Creek
Council Crest Park
Ivy Creek
Marquam Gulch
Feet
0
1,000
2,000
4,000


Wallace Park
Balch Creek
Forest Park
Pittock Acres Park
Hoyt Arboretum
Washington Park
Oregon Zoo
Willamette River
Feet
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500
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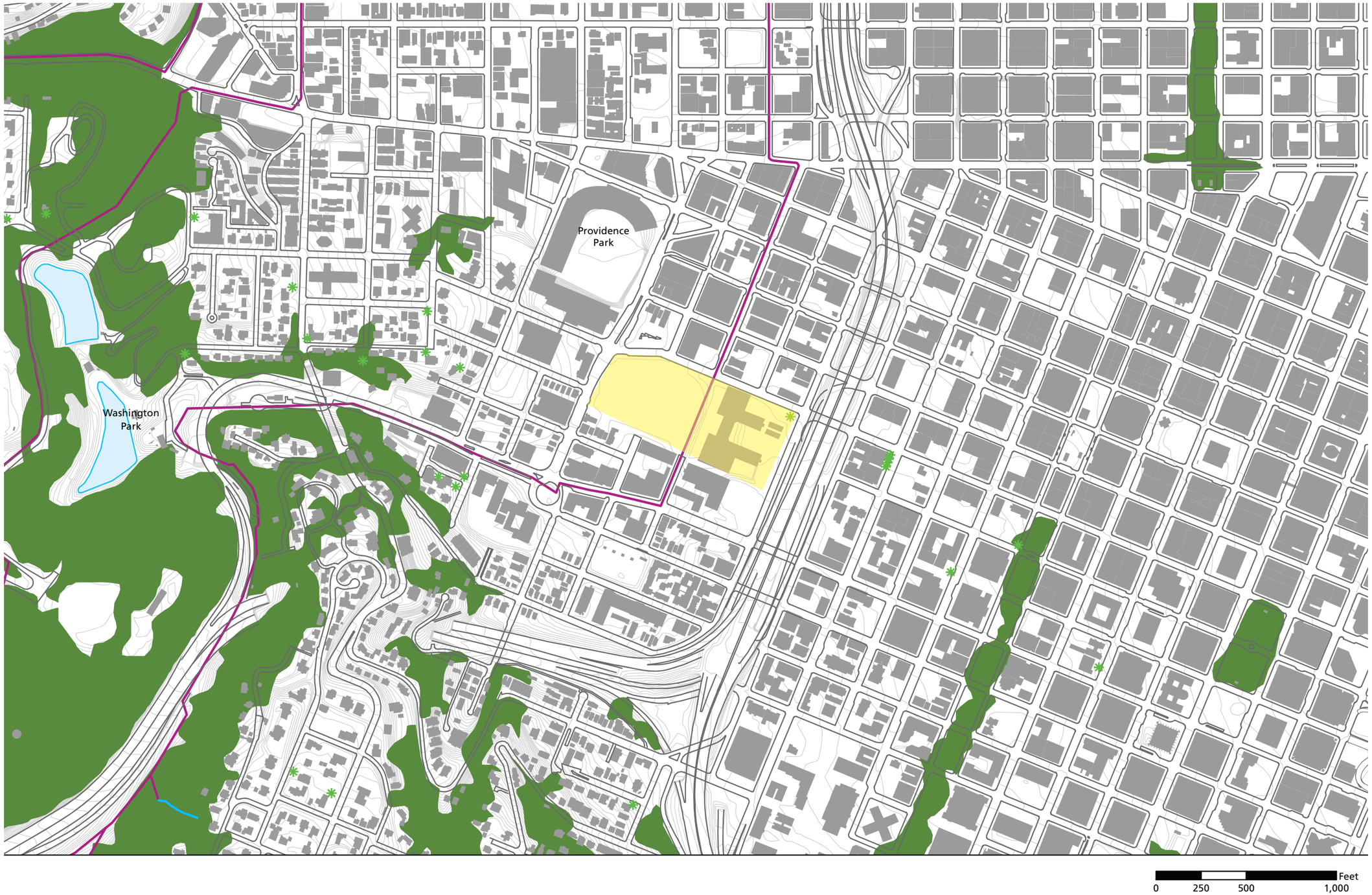
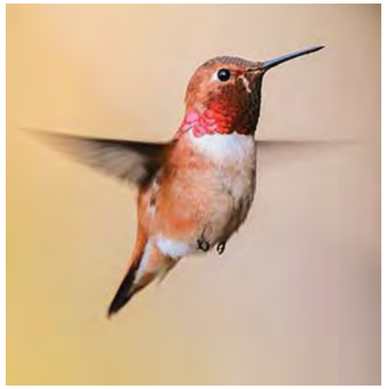
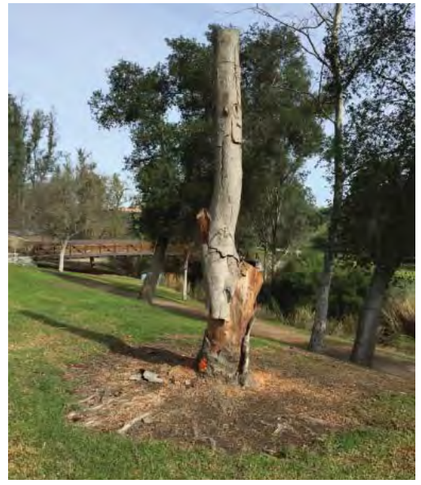
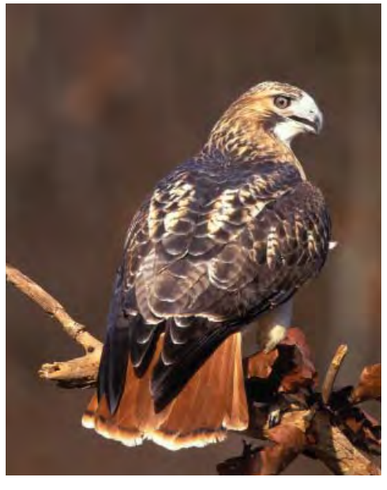

Providence
Park
Washington
Park
Feet
0
250
500
1,000




Pollinator
Habitat





Fencing and Security

Fencing and Security around the Lincoln High School Site will continue with the following groups:

- PPS
- Community Groups (Public Workshop - August 8th)
- PBOT
- Portland Planning & Zoning Department

At the next DAG, the Design Team will present a variety of fencing and security options.

REPORT

PPS LINCOLN HIGH SCHOOL SUSTAINABILITY WORKSHOP

JANUARY 31, 2018

SUBMITTED TO

Becca Cavell, FAIA
Associate

Bora Architects
720 SW Washington Street , Suite 800Portland, OR 97205

SUBMITTED BY

Erin Lauer, AIA, LEED AP BD+C
Consultant

RWDI | Green Building Services
421 SW 6th Avenue, Suite 450
Portland, OR 97204

Green Building Services is a consultancy within RWDI.
We help our clients access their buildings' full potential by pushing the bounds of building science.

1. INTRODUCTION

Green Building Services (GBS) facilitated a sustainability workshop with members of the project team and Portland Public Schools on January 12, 2018 to establish sustainable design goals for the new Lincoln High School.

The sustainability workshop provides an opportunity for key stakeholders, including design professionals, building owners, facility operators and users to strategize sustainable design goals and identify specific actions to achieve them. The workshop process fosters an environment in which participants can contribute ideas, express concerns, and recommend actions for the project.

Outcomes of the sustainability workshop, summarized within this report, will guide future design decisions and serve to assist in the prioritization of strategies to use in the design, construction and operations of the project. A full list of workshop attendees can be found in the appendix.

This sustainability workshop report is composed of three primary sections:

- Sustainable Vision and Goals
- Project Overview
- Green Building Strategies and Practices

Image 1: PPS Lincoln High School Sustainability Workshop Participants at LHS Library

Sustainability Workshop Participants

Owner: Portland Public Schools
Teachers & Students: Lincoln High School
Architects: Bora Architects
Structural Engineer: KPFF
Civil Engineer: HHPR
Mechanical, Electrical, Lighting & Plumbing Engineers: Interface Engineering
Landscape Design: Mayer/Reed Inc.
Exterior System Consultant: Façade Group
Energy Trust of Oregon Outreach Manager
Sustainability: RWDI/Green Building Services (GBS)

2. EXECUTIVE SUMMARY

The new Lincoln High School (LHS) sustainability workshop, led by RWDI/GBS on January 12, 2018, involved collaboration with key stakeholders to implement significant green building strategies during the project's concept phase of design. The workshop was held at the school's existing library in downtown Portland, Oregon.

The day began with an overview of the current state of the environment, project design themes and orientation, and energy and daylighting goals. This was followed by three small group discussions focused, respectively, on the subjects of site and water, energy usage and resiliency, and the learning environment.

A resounding theme from the day was to reuse resources existing on-site for education, site development, energy, building materials, and artwork. The process of designing and constructing the new high school will be integrated into the academic curriculum, with student participation encouraged throughout this process. Featuring the school's rich history and the subterranean Tanner Creek running beneath the site were encouraged for use as education, artwork and even as energy, through a Tanner Creek heat exchange process. Geoexchange via underground piping will also be explored as an energy option. Participants were excited about reducing energy usage by designing a high-performance building envelope, optimal daylight with photocell sensors on artificial lighting, and harnessing the energy of the sun and thousands of students moving through the hallways between each class, via regenerative stair tread energy.

Reusing existing building materials such a brick, the track, the bleachers, and concession stand will be explored as finishes or artwork in the new construction. Bringing the outdoor environment indoors for an optimal learning environment, including simplicity of user controls, and establishing a quiet acoustical environment while promoting excellent stewardship from the students were all key workshop take-aways..

Image 2: PPS Lincoln High School Sustainability Workshop Participants at LHS Library

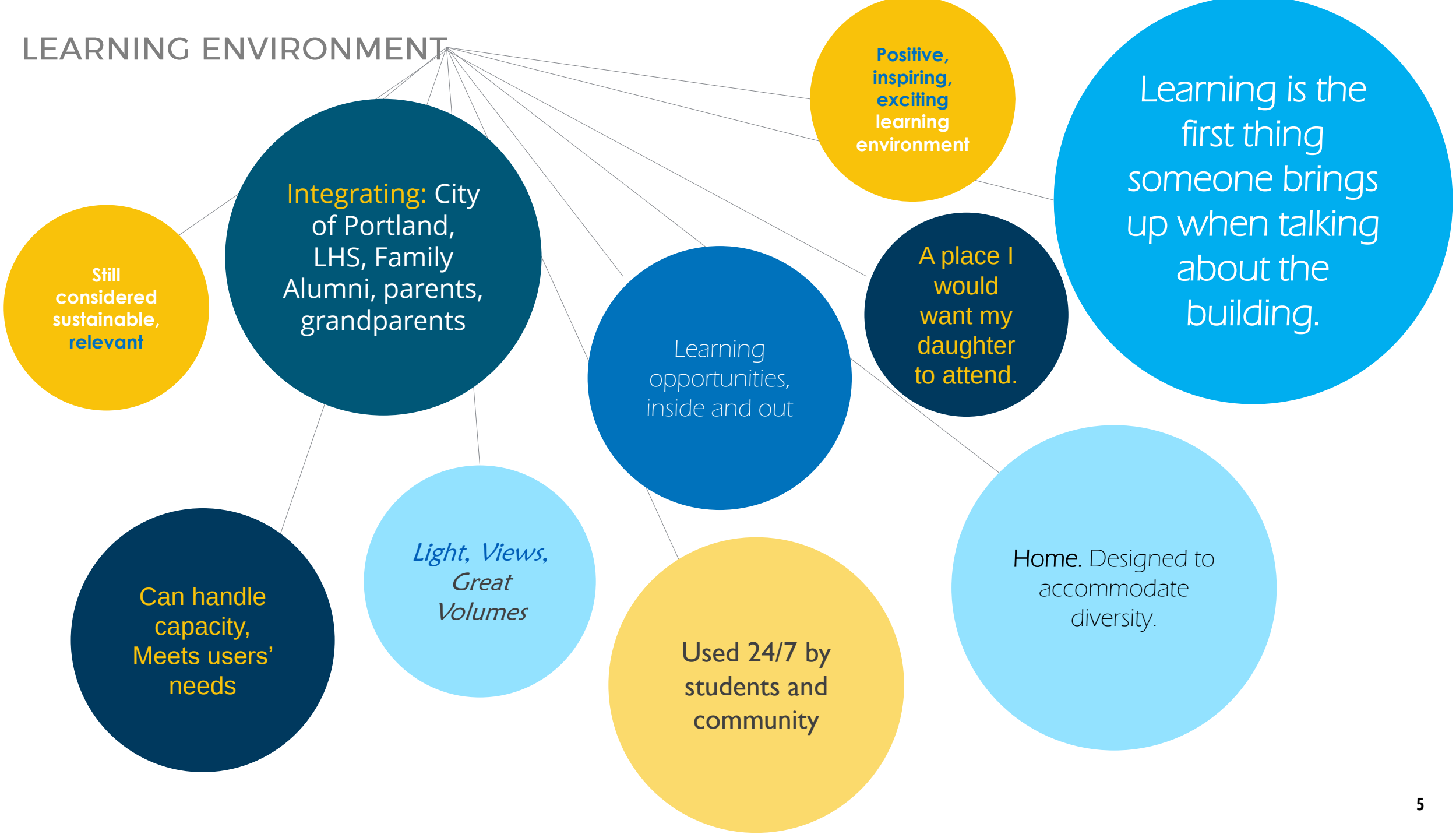
GREEN BUILDING SERVICES

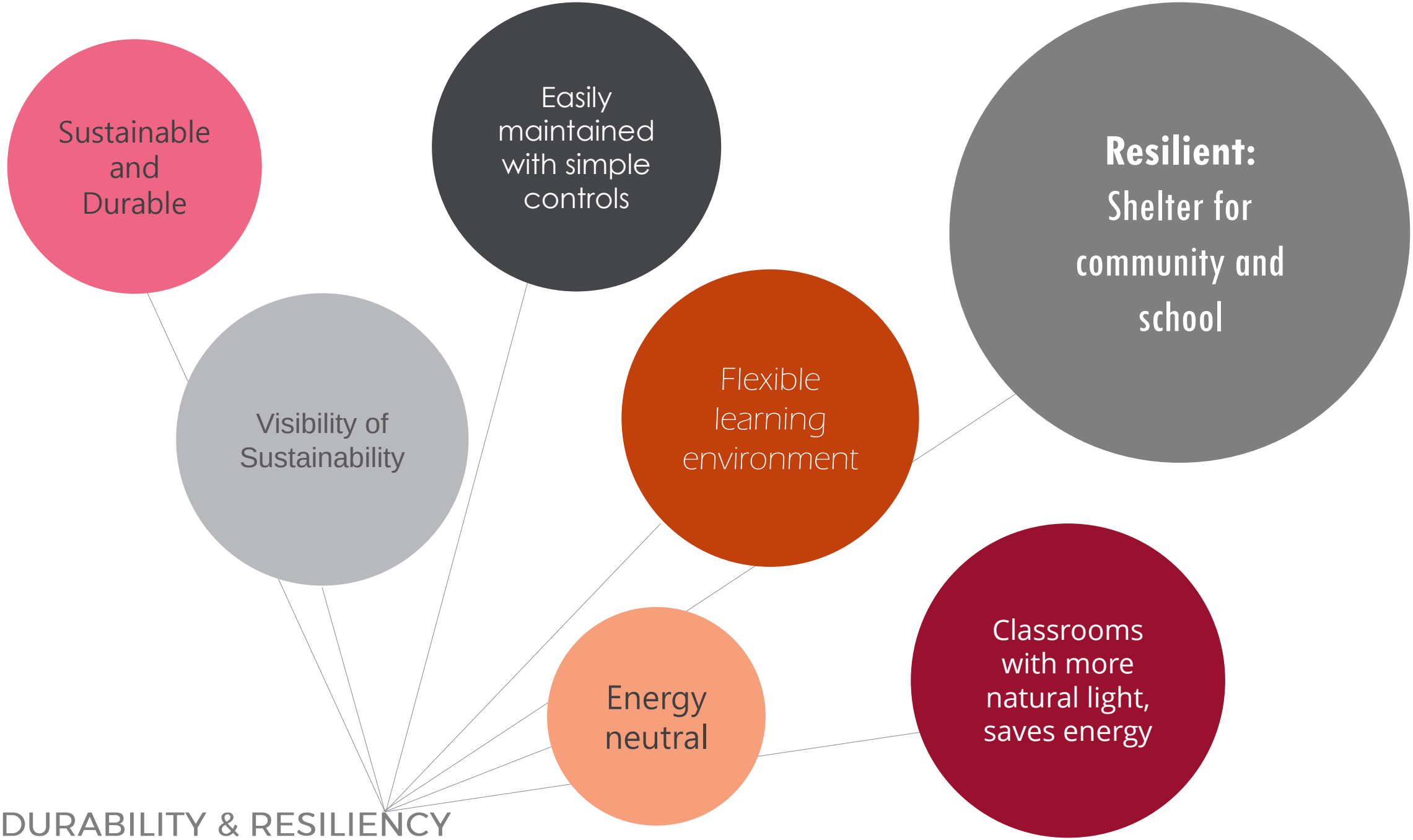
3. VISION

IMAGINE VISITING LINCOLN HIGH SCHOOL
15 - 20 YEARS FROM NOW,
WHAT MAKES IT WILDLY SUCCESSFUL?

To set goals for this project it is helpful to imaging yourself at the building in the future and thinking about why it is successful. Participants were asked to write down their answer to the question above. Responses tended to be grouped into three primary themes - (1) Learning Environment, (2) Durability and Resilience, and (3) a Model for the Future. A summary is included on the following slides.

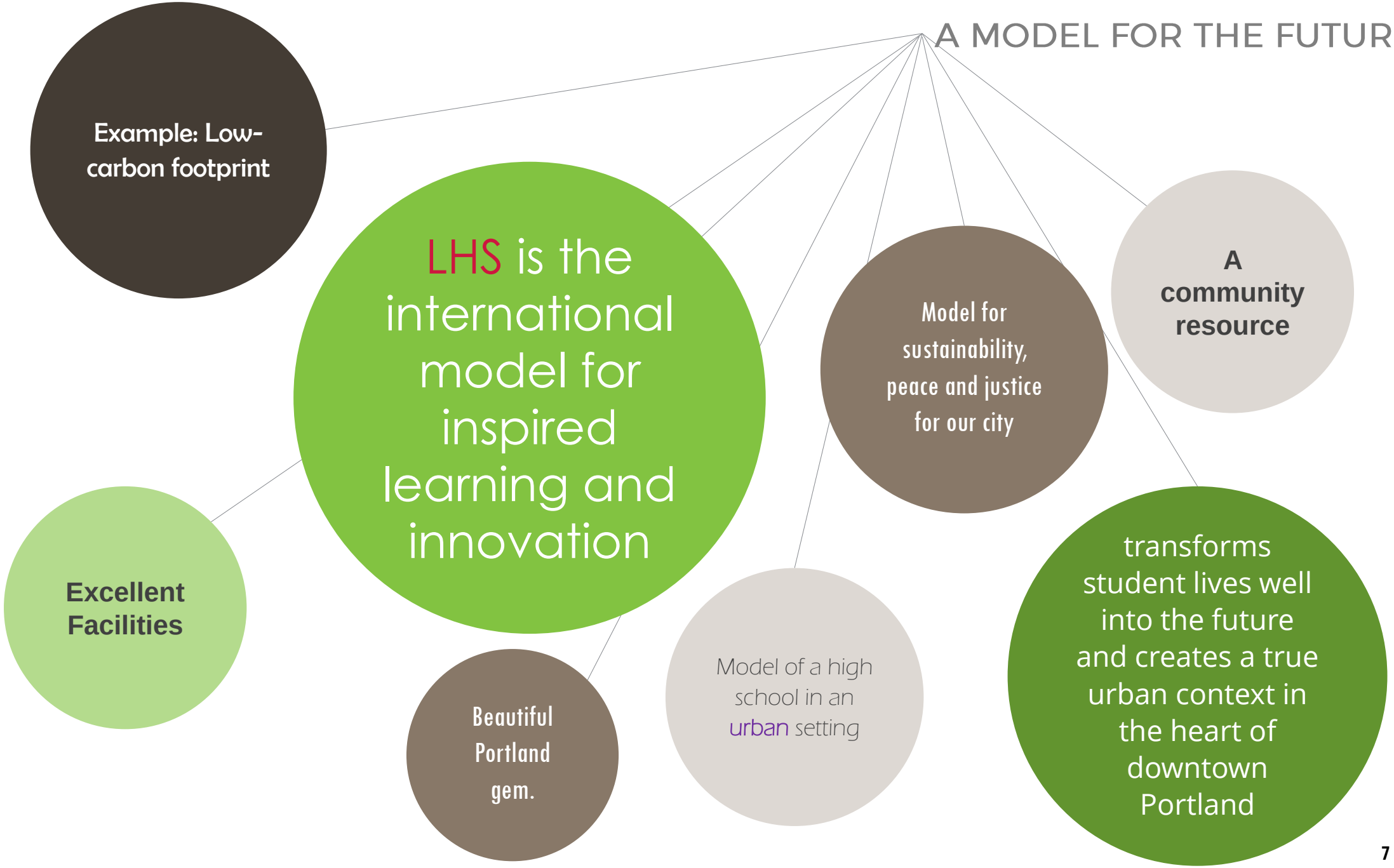
LEARNING ENVIRONMENT





DURABILITY & RESILIENCY

A MODEL FOR THE FUTURE



GREEN BUILDING SERVICES

4. PROJECT OVERVIEW

Christopher Almeida, Bora Architects, provided an overview of the current design, including design goals, site circulation, building orientation, potential constraints and opportunities for the new Lincoln High School.

The project will be located on the existing Lincoln High School campus, bordered by SW 18th Street on the west side of the property, SW Salmon on the north edge and SW 14th on the eastern edge of the site, which runs parallel to I-405. Businesses and residential properties border the southern edge of the site.

The new building will be oriented along the western edge, parallel to the MAX Light Rail, making it feasible to schedule construction of the new facility while maintaining classes in the existing facility. The design teams aims to achieve a visible expression of movement, create an active urban edge, and a cohesive and singular building expressed in both form and materiality.

With the existing facility operating beyond capacity and its urban location, the new high school will be designed to stand eight stories tall, serving as a model for urban high-rise high schools on the West Coast.

VISION STATEMENT

The redeveloped Lincoln campus will be an innovative hub of life-long learning; it will help students reach their goals in a safe, inclusive, and inspiring environment. The campus will be the center of an active, healthy, urban community and will support educationally related public and private partnerships. The project will be an example of schools promoting positive change in our neighborhood, city, state and region.

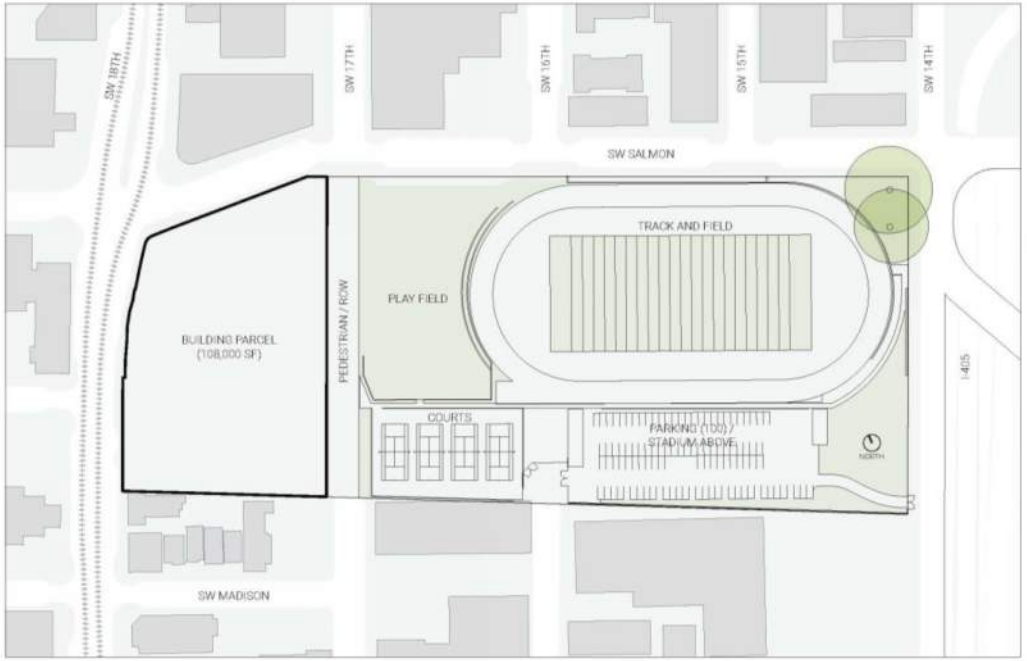


Image 3: LHS Proposed Site Plan

GREEN BUILDING SERVICES

5. ENVIRONMENTAL IMPERATIVE

To ensure the group had a firm understanding of why sustainability is important and part of the District's mission, GBS presented on the environmental imperative. The presentation is included in the appendix of this report but the basic message is the climate in Oregon is changing. Over the past 30 years, average temperatures in the Pacific Northwest have generally exceeded the 20th century average, and the region has seen an increase in temperature of about 1.3 °F. Regional temperature, snowpack, snowmelt timing and river flow changes have been observed that are consistent with projected trends[1].

Carbon emissions are the biggest factor in climate change therefore in order to mitigate increasing levels of climate change carbon emissions must be cut. About half of all carbon dioxide emissions between 1750 and 2010 occurred in the last 40 years. The energy, industry and transportation sectors have dominated these emissions increases[2]. In response to this, the City of Portland and Multnomah County developed a Climate Action Plan that calls for an 80 percent reduction in carbon emissions levels by 2050. The Plan provides a road map for building climate resiliency in Multnomah County. In addition, Architecture 2030 sets goals for energy reduction and calls for a 70 percent reduction in energy usage by 2030.

Buildings are the single largest contributor to carbon emissions in Multnomah County, accounting for nearly half of all sector-based emissions. The Plan calls for reducing carbon emissions from building energy through two strategies:

- Improving energy efficiency
- Reducing the carbon intensity of energy supplies, primarily by increasing renewable sources of electricity such as solar and wind power

1,2 - City of Portland and Multnomah County Climate Action Plan.

> REDUCE LOCAL CARBON EMISSIONS 80% BELOW 1990 LEVELS BY 2050
>
> - City of Portland Climate Action Plan

6. SUSTAINABILITY PRIORITIES AND GOALS

PPS Design Guidelines and Standards, Appendix P, Sustainability established the following as priorities for the design and construction of new schools:

- Facilitate educational mission
- Conserve existing facilities and resources
- Consider life-cycle costs including longevity and maintainability
- Use an integrated design approach
- Use passive systems and simple technologies
- Incorporate biophilic principles
- Incorporate opportunities for passive and active educational tools
- Provide a healthy indoor environment
- Avoid harmful chemicals, provide excellent ventilation, daylighting, create appropriate acoustics

The following are requirements for new schools:

- ✓ LEED v4 for Schools Gold Certification
- ✓ Achieve minimum of 10% additional energy savings above current Oregon energy code
- ✓ Commissioning
- ✓ State of Oregon Requirement: 1.5% for Green Energy Technology

Biophilia describes "the connections that human beings subconsciously seek with the rest of life."

E. O. Wilson, American biologist, researcher, theorist, naturalist and author

7. NET ZERO ENERGY

Given the imperative to cut emissions, it is important to design with the end in mind and consider how to achieve a net zero energy project. Net zero energy buildings have the potential to create as much energy as they consume over the course of a year. RWDI/GBS prepared an overview of the necessary considerations to obtain net zero. This set the stage for workshop participants to explore specific strategies in small group conversations following the morning presentations. Early formation of the integrative team enables the right expertise is present when opportunities for impact are greatest.

Andy Frichtl and Shem Heiple, Interface Engineering, gave a review of the energy resources present on the site, including solar power, geo-exchange, and water-exchange from Tanner Creek. Both discussed key steps to be implemented by the design team to strive toward a net zero energy design, including the following in this order:

- Identify natural resources
- Baseline energy model
- Load reduction
- Energy conservation
- Energy recovery
- Renewable energy

Image 4: Solar-driven combined heat and power (CHP)

8. DAYLIGHTING

Miguel Hidalgo, Bora Architects, discussed the importance of daylight on the human body and the learning environment. Studies on the non-visual aspects of daylighting have shown increase in test scores among school children and improved productivity (1,2.)

A variety of daylighting strategies were presented by Bora Architects showing Special Daylight Autonomy (sDA) and Annual Sunlight Exposure (ASE) for various configurations and orientations. The building will be daylit to the extent possible and will focus the daylighting strategies at the prime learning spaces. The design will rely on sidelights from windows and borrowed light. Skylights may be used at the Commons

- Skylight – light from above, generally parallel with the roof plane.
- Side-light – light from the walls.
- Borrowed light – light received from secondary fenestration on the interior as borrowed from the primary glazing located on the exterior wall.

While daylight contributes to a strong learning environment it is critically important to control Glare through the use of exterior shading devices or interior blinds. Electric lighting systems will have daylight sensors to reduce output when daylight is adequate. Lighting levels at the desk top should be approximately 30 - 50 Foot-candles. While lower levels may be suitable for most students, those with special needs may require the higher levels of illumination.

Image 5: Vernonia High School

1) Windows and Classrooms: A Study or Student Performance and the Indoor Environment. Heshong Mahoney Group 2003

2) PG&E Daylighting in School Report, Heshong Mahoney Group 1999

GREEN BUILDING SERVICES

9. RESILIENCY

One of the themes of the day was the concept of resiliency and how the design of LHS can be adaptive and usable in the event of a disaster. While not a comfortable topic, the reality is a large Cascadia subduction zone earthquake will strike the Pacific Northwest. While we cannot predict or avoid this earthquake, we can ensure that our infrastructure and buildings are designed such that the earthquake is a manageable disaster without lasting impact.

In 2013 the state of Oregon adopted the Oregon Resiliency Plan (ORP) which outlines a 50-year strategy to address the threat posed by the Cascadia Subduction Zone. The central finding of the ORP is that "very large earthquakes will occur in Oregon's future, and our state's infrastructure will remain poorly prepared to meet the threat unless we take action now to start building the necessary resilience." The ORP reviews policy options, summarizes relevant reports, and makes recommendations on policy direction to protect lives and keep commerce flowing during and after a large Cascadia earthquake and tsunami.

One of the key recommendations of the report is to provide ready access to the best available Cascadia earthquake information for emergency responders and planners, architects and engineers, and the general public. It is the responsibility of the Lincoln High School team to design a school that will keep children and the community safe during an earthquake. The ORP's goal is to ensure schools can be reopened thirty days after a Cascadia earthquake and recommends schools be used for community shelters following the earthquake.

> IF WE CANNOT CONTROL THE VOLATILE TIDES OF CHANGE, WE CAN LEARN TO BUILD BETTER BOATS.
>
> - Andrew Zolli and Ann Marie Healy, Resilience: Why Things Bounce Back (2012)

Oregon's seismic design standard for new buildings, the Oregon Structural Specialty Code (OSSC), classifies buildings according to four distinct occupancy categories based on their relative importance to life safety in the event of a natural disaster. Occupancy Categories III and IV are structures with large assembly areas, such as schools. Category type III buildings are designed for a 25-percent higher seismic load than Category I and II buildings. Category IV buildings are designed for a 50-percent higher load.

However, we also understand that OSCC standards are changing. School gymnasiums and cafeterias with an occupancy of 250 or greater people will be defined "earthquake relief shelters" , which would place these structures as Risk Category IV. This increase in Risk Category is intended to provide a higher level of seismic performance, with a high likelihood that these portions of the building will be safe to occupy immediately after an earthquake. In anticipation of this change, the design team might anticipate designing assembly spaces as a Risk Category IV building.

In addition to seismic considerations, workshop participants discussed methods for providing the necessary, heating, cooling, sustenance, and water to the building. This includes implementing utilities with connections to the outside of the building, such as a water pipe that can be tapped into by a water truck for delivering potable water. Consider rainwater collection, water treatment, and potable water on site. Participants also discussed the storage of tents as shelter, or using the field as helipad for supply delivery.

CRITICAL BUILDINGS	Goal for Level of Service	Current Level of Service
Primary K-8	30 days	18 months
High School 30 days	30 days	18 months
Emergency Shelters	72 hours	18 months

Level of Service Goals and Current Performance Expectations for Critical Buildings and Infrastructure that Supports Critical Buildings for Willamette Valley (Oregon Seismic Safety Policy Advisory Commission, 2013)

10. HOOD RIVER MIDDLE SCHOOL – HIGH PERFORMING BUILDING CASE STUDY

The Hood River Middle School was discussed throughout the workshop as a great example of a high-performing school. This school integrated the following in order to produce more energy than the building consumes.

- Solar duct integrated with PV panels for outside air preheat.
- Geo-exchange system integrated with thermally activated radiant slab.
- High performance envelope, including triple pain windows, for reduced HVAC heating and cooling loads.
- Natural ventilation with manually operated roof vents and operable windows.

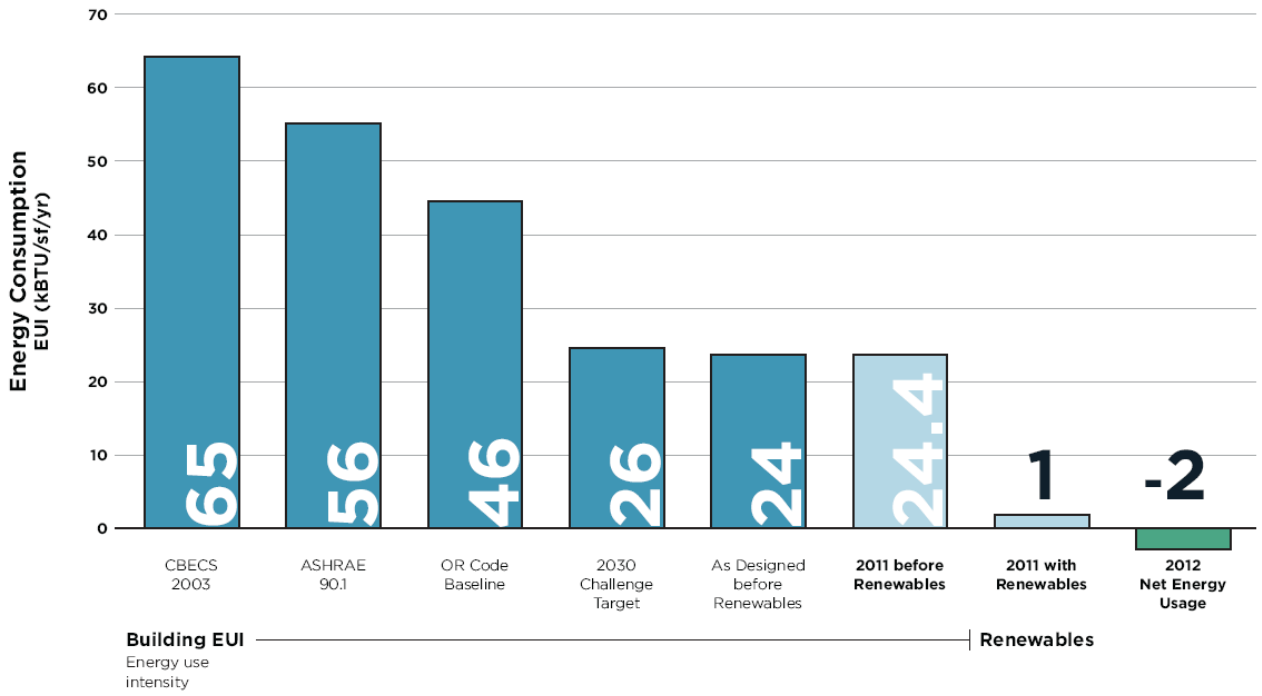


Figure 1: Hood River Middle School 2012 energy consumption data

12. SMALL GROUP DISCUSSIONS

After exploring a sustainable vision and learning about the current design direction, workshop participants (20 in total) broke into four small working groups to take a deeper dive into possible strategies to meet energy and resiliency, site, water and learning environment goals.

Each group spent thirty minutes on each of the three topic areas. In between each of the topics, the groups rearranged themselves so that by the end of the workshop all participants had the opportunity to work with all of the various key stakeholders.

Following the breakout sessions, participants regrouped to share what had been discussed and to find common themes across the various groups.

Finally as a group the team began to prioritize strategies that should receive additional consideration and potentially may become part of the final design.

This process will be ongoing and iterative, with the team considering through the design process whether the decisions support sustainability goals of the project.

Image 6: Workshop participants during breakout sessions

13. SMALL GROUP DISCUSSIONS – ENERGY, CLIMATE, RESILIENCY

Breakout groups were provided with the following topics to facilitate dialogue and generate strategies that could prove beneficial for this project:

What strategies might support a net zero energy goal?

- Building orientation
- Mechanical systems
- Occupant behaviors
- Lighting
- Renewable energy

Consider how this project will…

- Respond to the event of a natural disaster
- Address resiliency and emergency preparedness
- Prepare for long-term adaptability

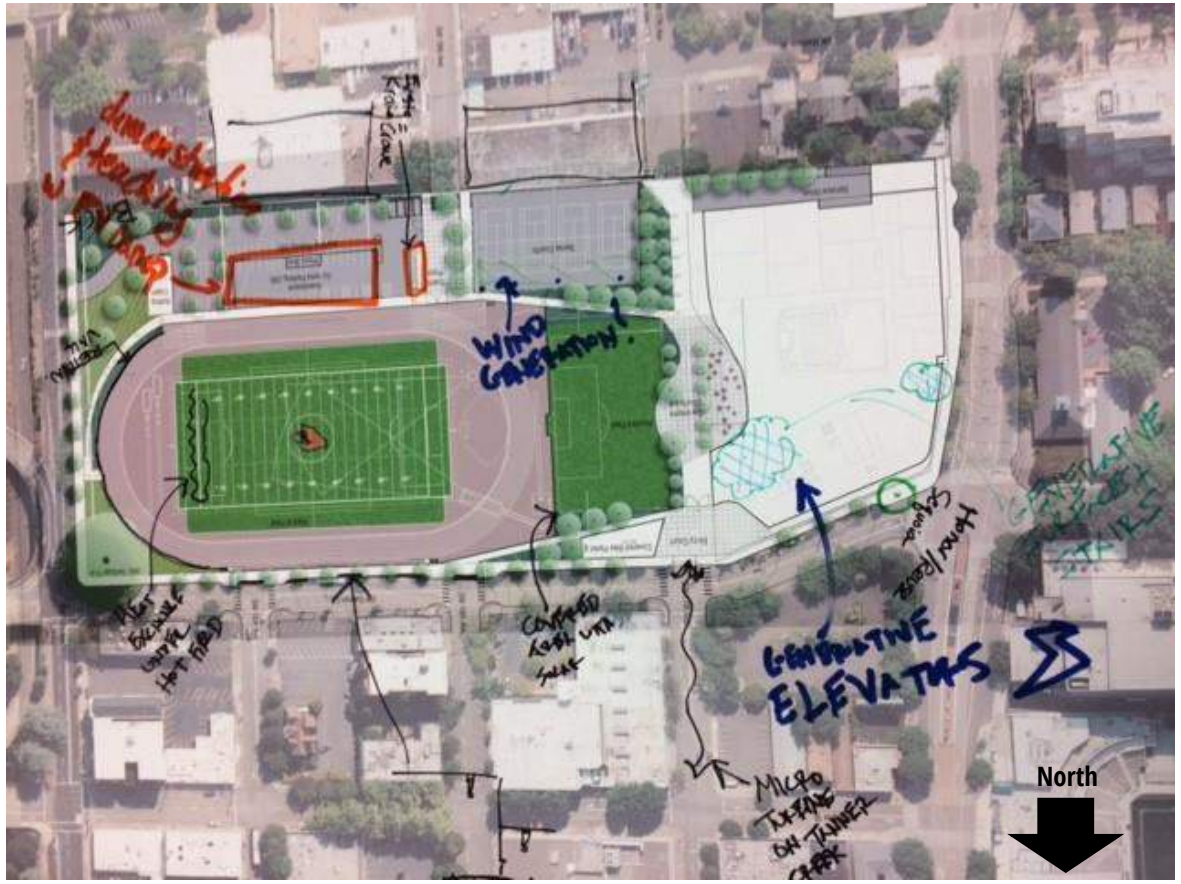


Image 7: Site plan from Small Group Discussions

14. SMALL GROUP DISCUSSIONS – ENERGY, CLIMATE, RESILIENCY

Teams reported back with the following measures or strategies for consideration.

Passive strategies - These measures focus on building orientation and massing to take advantage of the climate and reduce energy needs for heating, cooling and daylighting.

- Efficient building envelope and enclosure.
- Ample daylighting with glare control devices particularly with south facing glazing.
- Smaller fenestration openings that allow ample daylight.
- Combine seismic with thermal storage, such as a shear wall acting as thermal mass or tilt-up walls with built in radiant cooling and heating.
- Solar wall – This system uses the sun to pre-heat air with a solar collector. This solar –heated air is distributed throughout the building via the conventional ventilation system or dedicated fans and ducting.

Image 8: Solar Wall – courtesy of http://www.taitem.com/news/lou-cherry-road-solar-wall-1/

15. SMALL GROUP DISCUSSIONS – ENERGY, CLIMATE, RESILIENCY

Optimized strategies – The next tier of measures after taking advantage of all passive opportunities is to consider using the most efficient, least energy intensive systems.

- Regenerative technology for vertical circulation, including stairs and elevators
- Geo-exchange
- Closed-loop water-exchange from Tanner Creek (for heating only)
- Heat recovery/ventilation
- Individual controls, multiple switches for lights
- Operable windows
- Occupancy sensors in gym and reduced power (not off) when not in use

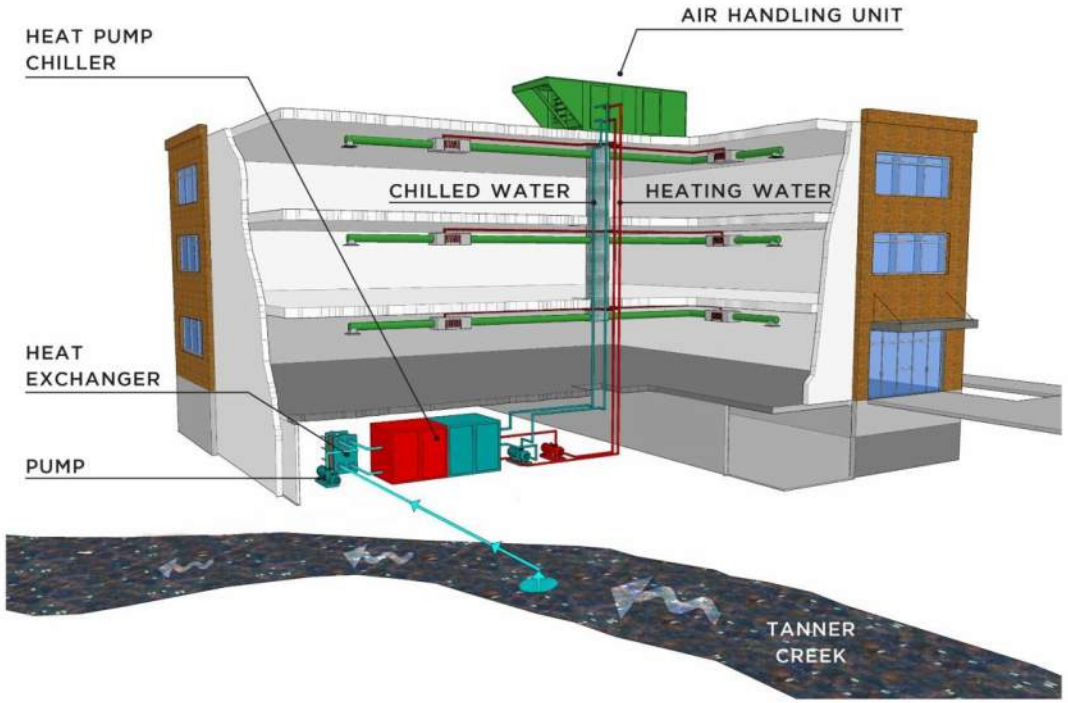


Image 9: Tanner Creek Exchange

16. SMALL GROUP DISCUSSIONS - ENERGY, CLIMATE, RESILIENCY

Renewable Strategies – After implementing all possible strategies to minimize energy use, renewable technologies can be employed to generate energy.

- Solar panels located on canopies, shading devices, over parking and integrated with the building.
- Parallel generator with PV panel to lengthen fuel use. During a power outage, both power sources share the load to help stretch the fuel supply for the generator.
- Solar Photovoltaic array on roof converts sunlight into energy that can be fed to the building. Having storage with a battery would be helpful in the event of power loss from grid. The project is required to spend 1.5 percent of budget on renewable energy.

Reduce Heat Island Effect – Dark colors, like the asphalt on the site, absorb the sun's warmth and radiate heat. Not only does this make uncomfortable outdoor environments but it can increase the building's cooling load. Consider use of light colored paving or pervious paving rather than asphalt.

Image 10: Solar Panel at bleacher seating. University of Arizona

Image 11: Regenerative stair technology

17. SMALL GROUP DISCUSSIONS - ENERGY, CLIMATE, RESILIENCY

Resiliency – The gym and commons can serve as a shelter in the event of an emergency such as a natural disaster. Consider opportunities to passively heat and cool this space as long as possible without energy as would likely be the case in an emergency. The following can be considered:

- On-site water storage.
- Tent storage for placing on the field for emergency.
- Seismic structure for gym.
- Utility connection for water or other resources to be supplied by a truck.
- Field can be used for helicopter landing of supplies.

Image 12: Installation of water storage structure below playing field

18. SMALL GROUP DISCUSSIONS – SITE, LAND, WATER

Breakout groups were provided with the following topics to facilitate a discussion about the strategies that could prove beneficial for this project:

Consider how this project will...

- Protect or restore habitat, soil health, and healthy vegetation
- Manage or restore habitat, soil health, and healthy vegetation
- Manage or restore soils disturbed during construction
- Manage pollution in stormwater and groundwater
- Prevent or minimize disruption to surface water and wetlands
- Minimize potable water use to protect freshwater availability
- Handle rainwater
- Welcome students on foot or bicycle
- Weave into the neighborhood

Image 13: Rain Garden

19. SMALL GROUP DISCUSSIONS - SITE AND WATER

Teams reported back with the following measures or strategies for consideration:

Storytelling of the Site – Tie the past to the future by using the site to tell the story of Lincoln High School and incorporate into student curriculum, including the following:

- **Tanner Creek** – Celebrate the creek via water-exchange for heating the building, by micro-hydro power, or as an art piece that celebrates the sounds or visuals of the creek. These strategies were considered more feasible than daylighting the buried creek.

- **Indigenous Chinese Culture –** Tell the story of the Chinese indigenous culture that previously existed on the site, potentially as curriculum or building and site as a learning tool.

- **Existing School -** Materials from the existing school can be used for finishes, paving, and artwork created by the Lincoln High School students. Some opportunities for material reuse include reusing existing bricks, topsoil, existing trees for landscape materials or mulch, casework, glass for artwork, and bleachers. The existing concession stand was built in honor of Kraig Crowe and should be considered for reuse. Preserve existing trees on site, specifically the heritage tree, and maintain the bird sculpture and statue Abraham Lincoln.

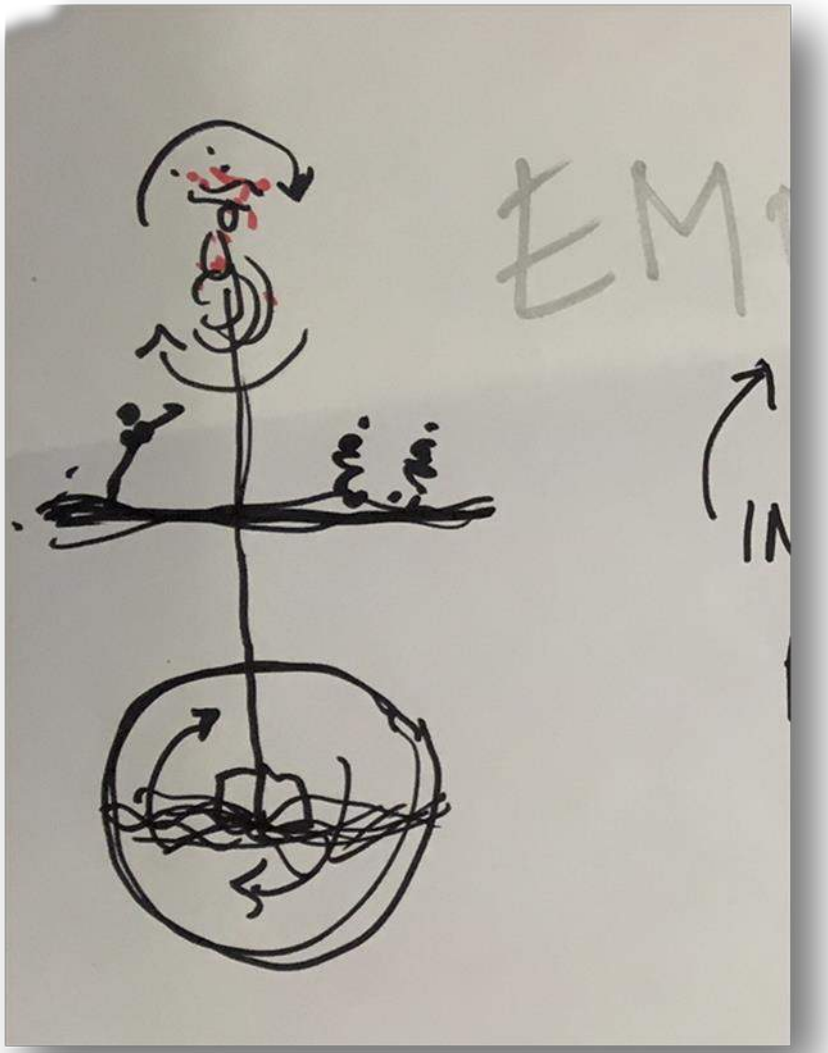


Image 14: Art Impeller illustrating the flow of Tanner Creek. As the flow increases the artwork spins faster.

20. SMALL GROUP DISCUSSIONS - SITE AND WATER

- **Biowsales** – Treat rainwater via small bioswales throughout the site and with stacked vertical swales to allow water to infiltrate and provide learning opportunities. Students can help build as part of the curriculum.

- **Rainwater** - Celebrate, educate, and reuse rainwater. Celebrate the misty environment of "puddle town" by implementing places for reflection off rainwater, focus on the sound or the smell of rain. This can also tie in with celebrating the sounds of Tanner Creek, bringing the sound above ground. Many groups focused on rainwater collection for reuse as fire suppression, toilet flushing, with a potential location to retail and fill the existing basement, pending construction phasing. Fire tank in building can be tapped for drinking, as Interface Engineering mentioned a float device that can be used for potable water storage for fire suppression allowing a portion of that potable water for use in emergencies. An example is in this OHSU Center for Health and Healing.

- **Plantings** – Consider more native and adaptive vegetation, green wall, green roofs on all small and large roof areas, school vegetable garden and greenhouse to be used for learning curriculum. Plant trees, specifically conifers to absorb rainwater on site.

- **Vertical stacking** – Stack as many programming elements as possible, such as the building over water storage, solar PV over parking, tennis courts on the roof, shaded by PV panels, or swimming pool on the roof.

- **Acoustic** – Mitigate the vibrational and acoustical effects of the Trimet MAX rail line due to its proximity to the school.

- **Permeable Surfaces** – Reduce permeable surfaces on site, including parking spaces for faculty, tennis courts, and the track. Parking spaces can be reduced, removed or placed under the field. Tennis courts can be shaded by solar PV panels or placed on the roof. PPS specifies the athletic field to be artificial turf. Design the field to not have a sealed concrete underlayment to allow water to infiltrate.

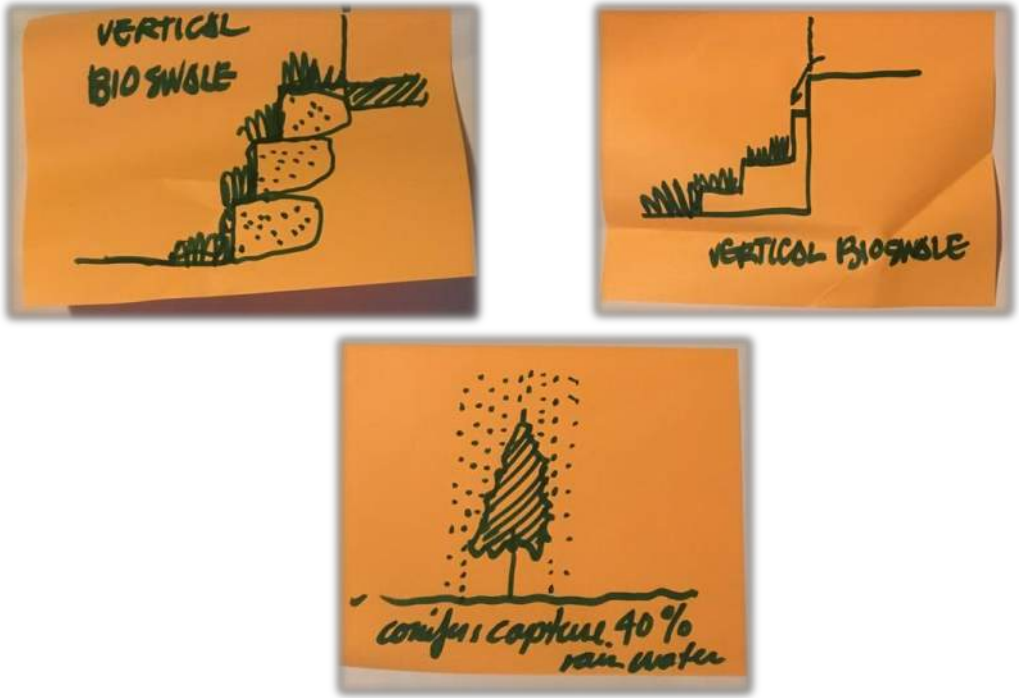


Image 15: Vertical bioswales and rainwater collection sketches by Meyer Reed.

21. SMALL GROUP DISCUSSIONS - LEARNING ENVIRONMENT

Breakout groups were provided with the following topics to facilitate a discussion about the strategies that could prove beneficial for this project:

Consider how this project will...

- Promote students' comfort, well being and productivity
- Establish quality indoor air, thermal comfort, lighting and effective acoustical design
- Connect students with the natural outdoor environment, reinforce circadian rhythms and introduce daylight into the space
- Impact functional aspects of the community such as growth, development, job creation and quality of life
- Address health, wellness and mobility for students
- Maximize the education 'value' of the built space
- Provide a curriculum for students

Image 16: Machias Elementary School in Snohomish, Washington

Image 17,18: Samuel Brighthouse Elementary School Richmond, VA

22. SMALL GROUP DISCUSSIONS - LEARNING ENVIRONMENT

Teams reported back with the following measures or strategies for consideration.

- **Daylighting** – All groups were highly focused on the desire to provide natural light into learning areas, to be balanced with occupant controls, solar heat gain and glare. Daylight can be integrated to fill large volumes of space and as borrowed light. Consider smaller openings to establish this effect while reducing energy used to condition space. Photo sensors can be implemented to automatically turn down artificial lighting when enough daylight is supplied. External shading devices, green walls or trees can reduce glare and solar heat gain, specifically on the west-facing glazing. Automated controls can be implemented for interior shades to place these in the open position every morning. Lighting levels shall be appropriate for the programmed activity, with up to 50 footcandles recommended.

- **Controls** – Consider multiple controls for lighting and thermal comfort, while balancing a simplicity of user-friendly controls. Controllability provides flexibility for each learning experience. An opportunity for occupant sensors is available, so that lighting and HVAC can be turned down or off in a location, such as in the gym. This will automatically turn on with occupants, to reduce necessary staff for after-school activities.

- **Acoustic Considerations** – Noise, whether it is from the MAX rail line or the classroom activity next door, can be a significant distraction for students. Ensure the design provides sound absorptive materials like carpets, acoustic ceiling tiles and clouds. The student request for quiet and "Zen" spaces was reflected throughout the group discussions.

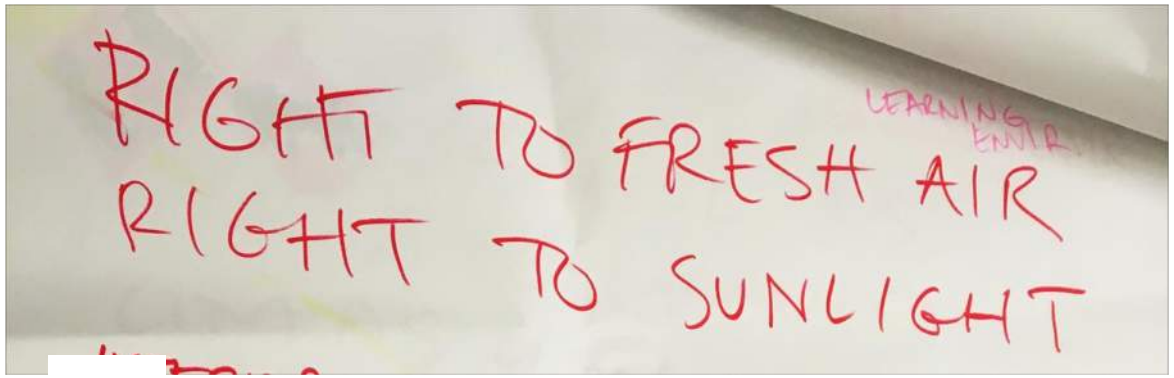


Image 19: Notes from workshop small group discussions
Image 20: Biophilia, http://www.nacarchitecture.com/images/lab/biophilia04.jpg

http://www.nacarchitecture.com/images/lab/biophilia04.jpg

23. SMALL GROUP DISCUSSIONS - LEARNING ENVIRONMENT

- **Bring the outdoors indoors** – LHS students requested the outdoors be brought indoors to create a "Zen" or quiet space to think, including the use of materials that are local to the region, which can aid as building as curriculum discussions. Opportunities exist to connect with the outdoor environment while moving through the building via pathways and stairways.
- **Active learning environment –** Vertical circulation and horizontal circulation on this large site can be highlighted to create active learning environments.
- **School as a classroom –** Design the building to act as a teaching tool, from the history of the site to demonstrating the water cycle and how the HVAC systems work with on-site PV panels and backup generator.
- **Dashboards** – This system can be used for wayfinding, recording energy usage and water usage and explaining the history and archeology of the site.
- **City as a classroom** – Consider ways for the city to act as a classroom, such as math in the city.
- **Commons space** – Allow for commons spaces to support student community and enable students to join each other for eating. Consider external common spaces within the building such as stairwells, hallways, or gathering spaces to allow for fresh air and sunlight.
- **Centralize media center** – The library is a hub of resources that all students visit throughout the day and should be centrally located to reduce travel time between classes.
- **Thermal comfort –** Allow for multiple zones and user controls for each zone.
- **Space –** Design to allow enough space for the necessary programs and capacity.
- **Air Quality** – It is important that students have a healthy interior space that is adequately ventilated with outside air. It is equally important that the outside air being provided has been filtered of outside contaminants. Air testing will be conducted to determine the local air quality. If needed, consider upgrading beyond code to higher filtration media.

Image 21: St. Ignatius Chapel, Seattle, Washington,

24. CONCLUSIONS AND NEXT STEPS

The big ideas from the break out sessions focused on the following:

- Utilize the urban location to stack programmatic elements.
- Celebrate the history of the site, including Tanner Creek, the previous indigenous culture, and the existing building.
- Strive for net-zero energy by first reducing demand with a high-performing building enclosure and then by using energy sources already on site, including Tanner Creek, geo-exchange and solar.
- Include the students in the design and construction of the building, as a curriculum.
- Use the building and site as a teaching tool.
- Consider water collection for reuse, especially as a potable water option.
- Design with resiliency in mind.
- Implement quiet spaces that integrate biophillia into the project, a space where students can think.
- Design to promote a sense of community.

The sustainability workshop can help shape the creation of the Lincoln High School into a leading example of a high-rise high school in an urban setting with sustainable and resilient design for PPS and the West Coast. This workshop helps to foster the interaction of members of the project team and launch the exploration and implementation of integrated design strategies. However, it is most essential post-workshop for all project team members to collaborate together to incorporate the concepts developed in the charrette process.

Next Steps

- Bora and Interface to analyze the acoustical and glare issues at the site, including from the MAX rail and the proposed multifamily housing project across SW Salmon Street.
- Interface to issue early design modeling results at the end of SD.
- RWDI/GBS to schedule meeting with Energy Trust, Interface, Bora, and RWDI/GBS.
- RWDI/GBS to research whether there is any available funding for resiliency.
- Bora to get clarity from PPS about their expectations for a resilient design as it relates to structural, energy and water considerations.
- RWDI/GBS to draft a LEED NCv4 Schools scorecard and approach for inclusion in the concept phase documents.

GREEN BUILDING SERVICES

"Desire to gather students in central spaces for Zen & to create a space for students to claim ownership of those spaces"
-David Chelsey, Interface

"Hearing LHS students speak & share insights"
-Aaron Stocek, KPFF

"Many experienced, smart people in the room generating great ideas & learning"
-Niomi Pavlock, LHS

"So many ideas for moving students indoors to outdoors & creating rich experiences that make this a cool place to go to school"
-Richard Manning, GBS

"Building as teacher, story, culture, tenants of peace"
-Peyton Chapman, LHS Principal

"Verticality options to create energy & integrate ideas!"
-Miguel Hidalgo, Bora

"Lot of potential energy in all of the students moving each period."
-Andy Frichtl, Interface

"Excited about the process & what we generated today, to help bring project to life & add human aspect to it. Potential for kids to arrive early, excited to start the day"
-Erik Gerding, PPS

"Loved to hear all of the site items being talked about"
-Ryan Carlson, Meyer Reed

"Cool everyone could come together in this space. Would like more students' input"
-Deja Preusser, LHS

"Grateful for everyone's time & all of the collaborative ideas!"
-Erin Lauer, RWDI/GBS

"Loved this day & this work. In awe of expertise & knowledge in this room & in this city"
-Kellee Jackson, RWDI/GBS

"Integrate site & building more, saving space"
-Christopher, Bora

"Bringing outdoor into indoor, attaching PV fuel source to generator tank & stretching out that fuel space"
-Shem Heiple, Interface

"Energy Efficiency Goals" – Elin Shepherd, ETO

THE BIG TAKE-AWAY

APPENDIX

1. References:

   - City of Portland Climate Action Plan Link
     https://www.portlandoregon.gov/bps/66993

   - Multnomah County Climate Action Plan link,
     https://multco.us/sustainability/climate-action-plan-progress-report-2017

2. Attendee List

3. PowerPoint Presentation from Sustainability Workshop

Image 22: Workshop participants working in small group discussions

WORKSHOP ATTENDEES

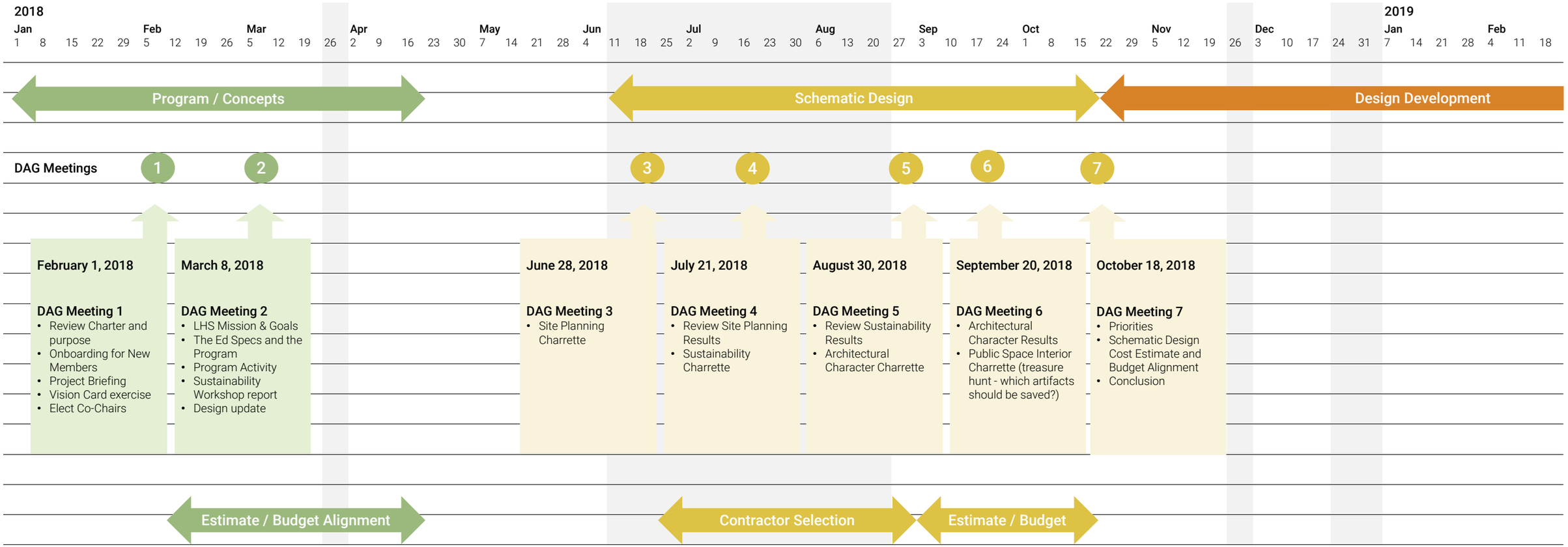
DATE: January 12th, 2018

PROJECT: Lincoln High School

PURPOSE: Sustainability Workshop

NAME	ORGANIZATION	SIGN-IN
Ken Roko	The Façade Group	kroko@facadegroup.com
Erik Gerding	Portland Public School	egerding@pps.net
Brian Taylor	Portland Public School	btaylor5@pps.net
Veronika Demelius	O-LLC	veronika@o-llc.com
Christopher Almeida	Bora Architects	almeida@bora.co
Jack Forman	Student at Lincoln High School	jackforman12@gmail.com
Parker Price	Student at Lincoln High School	parkerprice@me.com
Tim Swinehart	Lincoln High School Teacher	tswineha@pps.net
Miguel Hidalgo	Bora Architects	hidalgo@bora.co
Julie O'Neill	Lincoln High School Teacher	joneill@pps.net
Ryan Carlson	Mayer / Reed	ryan@mayerreed.com
Aaron Stocek	KPFF	aaron.stocek@kpff.com
Jen Sohm	Portland Public School / OSM	jsohm@pps.net
Janelle Brannan	HHPR	janelleb@hhpr.com
Elin Shepard	Energy Trust	elin.shepard@clearesult.com
Nancy Bond	Portland Public School	nbond@pps.net
Deja Peusser	Student at Lincoln High School	dejapnm@gmail.com
Niomi Paulock	Student at Lincoln High School	npaulock7833@gmail.com
Andy Frichtl	Interface	andyf@interfaceeng.com
Shem Heiple	Interface	shemh@interfaceeng.com
David Chesley	Interface	davidc@interfaceeng.com
Peyton Chapman	PPS Lincoln High School Principal	pchapman@pps.net

Upcoming DAG Meetings



PUBLIC COMMENT

THANK YOU