STEM 4

Project Definition
September 30, 2020

LEASE CRUTCHER LEWIS + MITHUN | CASCADIA COLLEGE + UNIVERSITY OF WASHINGTON BOTHELL

PROJECT TEAM

Client
Cascadia College
University of Washington Bothell

Design-Builder
Lease Crutcher Lewis + Mithun

Civil
Otak

Landscape
Mithun

Structural
KPFF

Mechanical / Plumbing
Apollo + Glumac

Electrical / Telecomm
Cochran + Hargis

Lab Planning
RFD

Acoustics
A3

Vertical Transportation
Elevator Consulting Service

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EXECUTIVE SUMMARY

01— EXECUTIVE SUMMARY

INTRODUCTION

Cascadia College and the University of Washington are co-located on the Bothell campus, which opened in 2000. They share many campus facilities but to date have not shared an academic building.

In 2015, the University of Washington was granted funding for a STEM education facility to provide space for its engineering and computer science programs. In 2016, Cascadia College was granted funding for a STEM education facility to provide space for its science and computer science programs. Challenges in balancing scope and budget in an escalating construction market and the potential for a shared facility that would maximize the use of resources and bring the institutions closer together led the two institutions to combine forces and create the Bothell STEM 4 facility.

This report summarizes the work done to evaluate site development, functional and technical requirements and to balance project scope and budget in order to provide foundation for the design and construction of the new building. It is the equivalent of a predesign with the added benefit of engaging the design-build team and the institutional stakeholders, increasing the opportunities to maximize the value of the process and the budget.

BACKGROUND

The shared University of Washington Bothell and Cascadia College campus is the result of a state-wide planning effort in the late 1980's and early 1990's to address population growth and increasing demand for post-secondary education in the Puget Sound region. Today, UWB offers more than 45 undergraduate and graduate degrees to 5,600 full time equivalent students (FTES), and CC offers two-year academic and professional-technical degrees, certificates and two Bachelor of Applied Science degrees to almost 3,000 FTES students.

Since 2014, UWB and CC have separately planned for new academic STEM facilities. Combining these proposals into a single project provides significant opportunities to leverage state funding for STEM growth with the ability to support the objectives of both institutions by maximizing enrollment capacity, creating seamless academic pathways, research opportunities and project learning experiences for students. The new academic facility will provide classrooms, teaching labs, collaborative faculty offices and student collaboration space, to accommodate new FTE students in the quickly expanding STEM curriculum. UWB and CC will jointly manage the STEM 4 Building in an integrated, fluid and sustainable manner. It will provide unique opportunities for students to transition from two-year to four-year programs by providing CC students access to UWB instructors and programs.

PROJECT GOALS

Overarching project goals are defined by the Memorandum of Understanding between the college and the university.

— Maximize space for instruction and research in a manner consistent with program goals and institutional standards and values.

— Create learning environments that support collaboration, active learning, and faculty innovation while building community across students and faculty.

— Design a physical environment that promotes interactions between UWB and CC faculty, staff, and students.

— Display the shared campus's commitment to environmental and economic sustainability, including by seeking to minimize the joint STEM building's life-cycle costs and carbon footprint.

— Redistribute STEM facilities across the campus as appropriate to improve operational efficacy, student access and relationships.

SITE

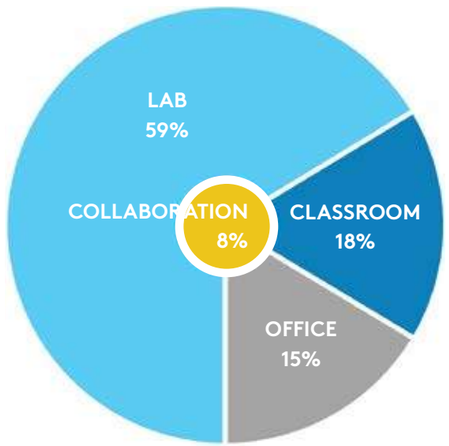
Located at the boundary between university and college precincts, the project will knit together these campus areas. As it steps down the hillside, the facility will also link the upland forest area with the more formal campus core and the north quad. The STEM 4 project will engage major campus circulation pathways and will provide accessible pedestrian circulation from the new west campus garage down the hill to the Crescent Path and Cascadia Quad. Places for gathering, outdoor workspaces and environmental learning will be woven into the hilly project site. Forest restoration and design elements that ensure natural drainage patterns for the site's unique hydrology will provide environmental learning opportunities.

PROGRAM

STEM 4 will maximize space for instruction and research that support collaboration, active learning and faculty innovation, while building community among students and faculty. The project will connect to the broader campus to foster cross-disciplinary study and extend career-oriented learning to serve students' goal of success in the job market. Learning spaces fall into three broad categories: Theory, Practice, Connect. These spaces are further grouped on each floor by similar disciplines or uses to promote connection and collaboration between institutions. Modular planning principles will be used to create flexible and adaptable learning environments

The building will be shared equally between Cascadia College and the University of Washington Bothell. Each institution will have dedicated classrooms, labs and offices and will share study, collaborative and core support spaces.

Space Allocation Summary	
Cascadia College	21,500 ASF
UW Bothell	21,500 ASF
Shared Resources	5,000 ASF
TOTAL NASF	**48,000 ASF**



Program Composition

BUILDING

The building embodies the design principles established by the CMP. The exterior design will be modulated to create a human scale at the base and will use complementary materials and colors to adjacent campus buildings. Transparency inside and out will put programs on display, activate facades and provide views to the campus environments. Interconnection of interior spaces will facilitate access and wayfinding. Public space will allow students, faculty and staff to gather and create a sense of community within the building. Safe, human scale spaces will also provide calm, contemplative environments. Stairs will be prominent and encourage active passage throughout the building. Daylighting will be maximized yet balanced through careful design of fenestration.

PERFORMANCE REQUIREMENTS

The project will display the campus' commitment to environmental and economic sustainability. Systems and design will follow sustainable practices to the greatest practical degree, including energy resource conservation, and healthy materials. Project systems and materials will also be durable and easy to maintain to reduce life-cycle costs. Stormwater management and material selection will support the campus' Salmon Safe certification.

The Owner's Project Requirements (OPR) define high-performance targets for the facility and maintenance. Targets include LEED v4 and the University of Washington Green Building Standards.

PROPOSED SOLUTION

The project will include an approximately 77,500 gross square feet, four story academic facility and related site improvements. As anticipated in the Campus Master Plan, it will be built into the hillside adjacent to North Quad and CC3 building. Around a 60% net to gross floor area efficiency is anticipated.

BUDGET

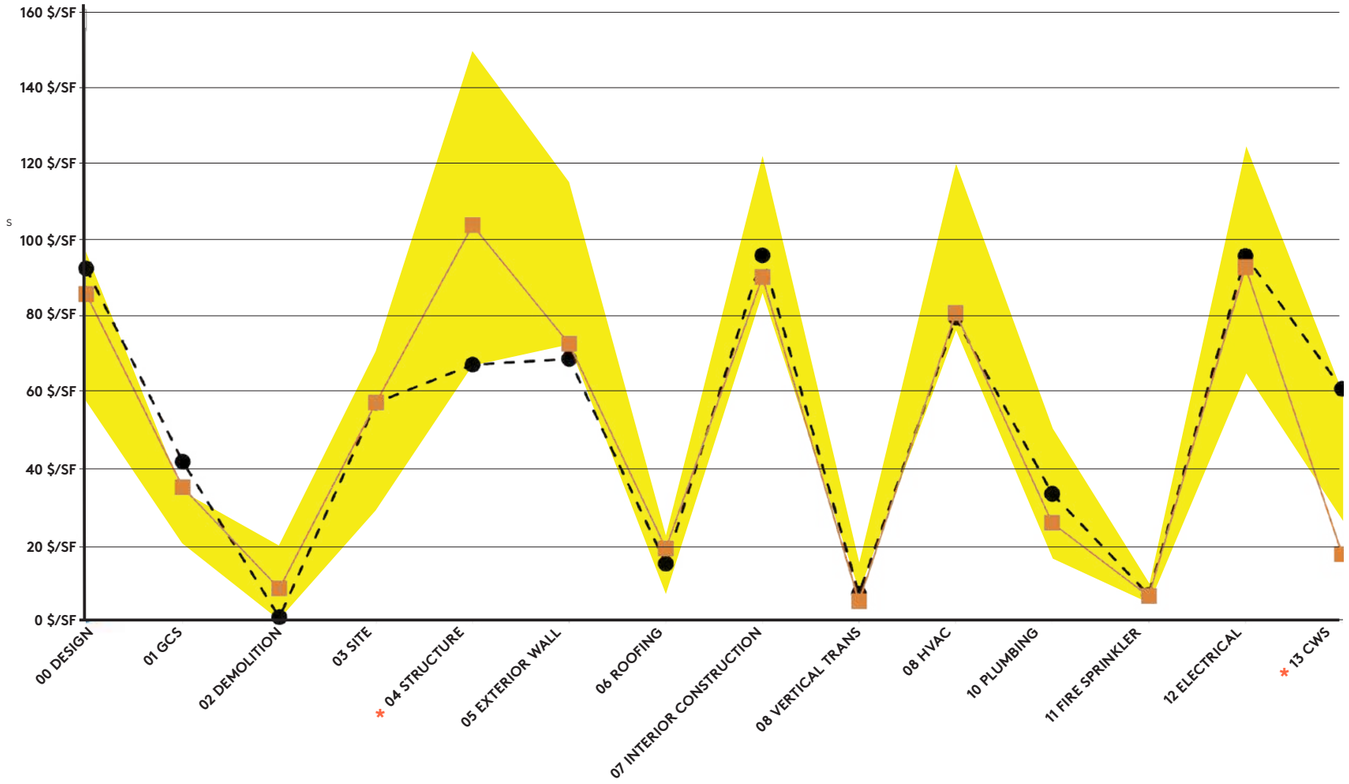
The 2019 Washington State Capital Budget allocated $79.438 million dollars for all project costs for Bothell STEM 4. Cascadia College and University of Washington Bothell have agreed to contribute an additional $1.1 million dollars to meet their programmatic goals. Within these allocations is $62.85 million to design and build an approximately 77,500 gross square foot facility. Base Target scope includes shelling out approximately 10,000 net square feet or $1.8M for fit-out as a "Value Add". The project team's goal is to fund the full interior fit-out through innovation and risk mitigation.

Seven comparable projects were evaluated to provide a frame of reference for understanding scope and cost in terms of performance criteria, program, site development and/or building systems. These studies informed detailed system benchmark costs for each system. To confirm target budgets identified by project and system benchmarking, the design-build team developed a "test-to-fit" scenario. The resulting target budgets for each system will provide a roadmap for the development of the project during the design and construction phases.

TARGET BUILDING SIZE: 77,500 GSF

Design Build Budget	$62,000,000
Additional Funding from UWB & CC	$850,000**
Subtotal	**$62,850,000**

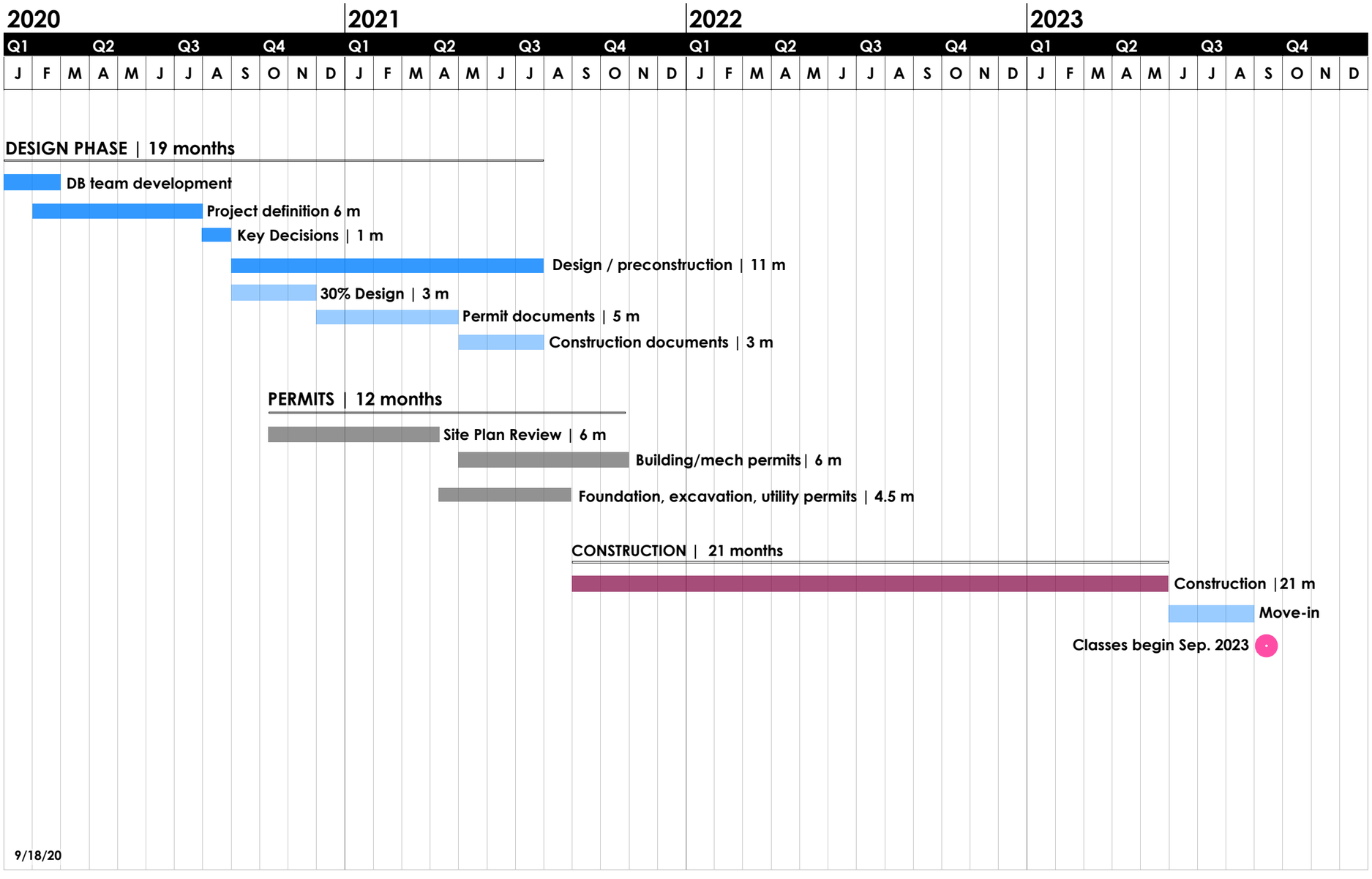
**plus an additional $250,000 for soft costs



* *Benchmark projects include the cost of Construction Work Support (CWS) in Structure costs*

PROJECT SCHEDULE

The project schedule leading up to groundbreaking is partly driven by activities typical for project definition and design/ preconstruction phases and partly, by the unusual permit review process recently adopted by City of Bothell. The first necessary approval is Site Plan Review (SPR) - a land use permit. Unlike most other jurisdictions that allow concurrent review of land use and construction permits, City of Bothell requires SPR to be approved before initiating any construction permit reviews. This approach extends the overall permitting timeline.



PROJECT GOVERNANCE

The UW Bothell and Cascadia College, as owners, are active and collaborative participants, providing clear leadership and direction. A project governance structure has been established to ensure informed decisions are made in a timely manner throughout the course of the Project.

The project team is an organization in its own right, with all team members committed to the Project's goals and values. Leadership is distributed and delivered by individual team members most capable with regard to specific work and services. Roles are clearly defined, without creating artificial barriers that limit open communication and risk taking.

Decision-making is improved by the influx of knowledge and expertise of consultants, trade-partners, and project stakeholders. The involvement of key participants is most powerful during the project's early stages when informed decisions have the greatest effect.

Innovation is stimulated when ideas are freely exchanged among all participants. Ideas are judged on their merits, not on the author's role or status. Key decisions are evaluated by the project team and, to the greatest practical extent, made unanimously.

RESPONSIBLE PARTY

The Chancellor of UW Bothell and the President of Cascadia must jointly approve any changes to the project outside of the established parameters of the Project (site, budget, schedule, financing).

BOTHELL

CASCADIA COLLEGE
BOTHELL

PEC
PROJECT EXECUTIVE COMMITTEE

All major Project decisions, recommendations, and tradeoffs within the established parameters of the Project (site, budget, schedule, financing) will be made by the PEC. The PEC may also engage in collaborative design sessions with the Project Management Team and Project Working Teams. The PEC will meet monthly.

EQUITY

The University is commited to affording the maximum opportunities for Business Equity Enterprises of all types at all tiers.

PMT
PROJECT MANAGEMENT TEAM

Management level project oversight will be provided by the PMT, which shall make decisions by consensus. The PMT will work under the guidance and oversight of the SMT. The PMT reports progress and seeks approval of design, cost, and schedule changes from the PEC. The PMT will meet weekly

SMT
SENIOR MANAGEMENT TEAM

Decisions of the PMT will be overseen by the SMT, which shall also make human resources management decisions in the interest of the project. In the event the PMT cannot reach agreement on an issue the SMT will collaborate with the PMT to resolve the issue by consensus. As needed.

PWT
PROJECT WORKING TEAMS

PWT'S are part of the collaborative process of developing the Target Program, Implementation Documents and other deliverables and may be formed temporarily or for the duration of the project. The PWT's are organized by the PMT and are interdisciplinary groups of Design-Build Team Members and representatives of the Owners. Each PWT shall have at least one representative from UW Bothell and one representative from Cascadia

CTF
COORDINATION TASK FORCE

WG1
WORKING GROUP 1
CAMPUS FIT

WG2
WORKING GROUP 2
INTERIOR PROGRAM

WG3
WORKING GROUP 3
MEP / UTILITIES

02

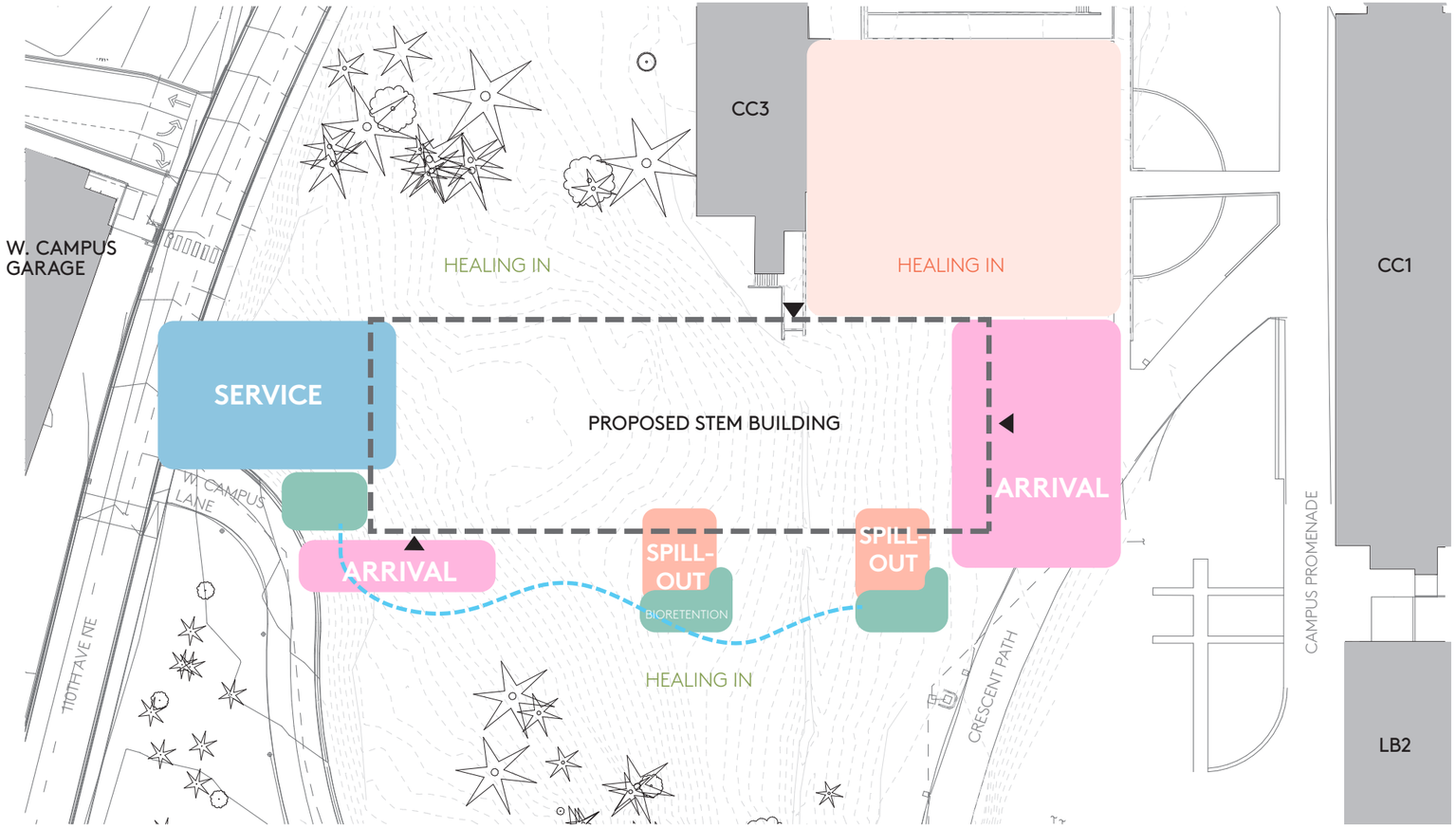
SITE

02.1— VISION & GOALS

MEMORANDUM OF UNDERSTANDING

— **Flexible Learning Environments** - Create learning environments that support collaboration, active learning, and faculty innovation while building community across students and faculty.
— **Foster Collaboration** - Design a physical environment that promotes interactions between UWB and Cascadia faculty, staff, and students.

These goals identify a clear vision of creating interior and exterior spatial relationships that promote community and creativity. A focus on the environmental impacts of the project also clarifies the need to provide effective and sensitive design interventions.



Guiding Principles

Priorities articulated by the campus working group participants are well aligned with the MOU goals.

— Celebrate the forest environment
— Make the formal design language engage with the site
— Make stormwater capture and treatment visible
— Create environmental learning opportunities.
— Connect the site with the Crescent Path and the Cascadia quad.
— Provide places for gathering, outdoor work spaces, and learning opportunities

Campus Master Plan

The 2017 Campus Master Plan reinforces goals of the MOU and those gleaned from working groups. A cohesive campus character can be achieved by celebrating the forest and finding sensitive ways to work within it. The forest itself also serves as an educational tool, as the site fabric knits into it.
The importance of an enriched campus experience for all users is evident in the CMP. A responsibility to develop the site in a sustainable way, another guiding principle, frames the approach to applying the feedback from campus fit working groups.

02.2— ANALYSIS

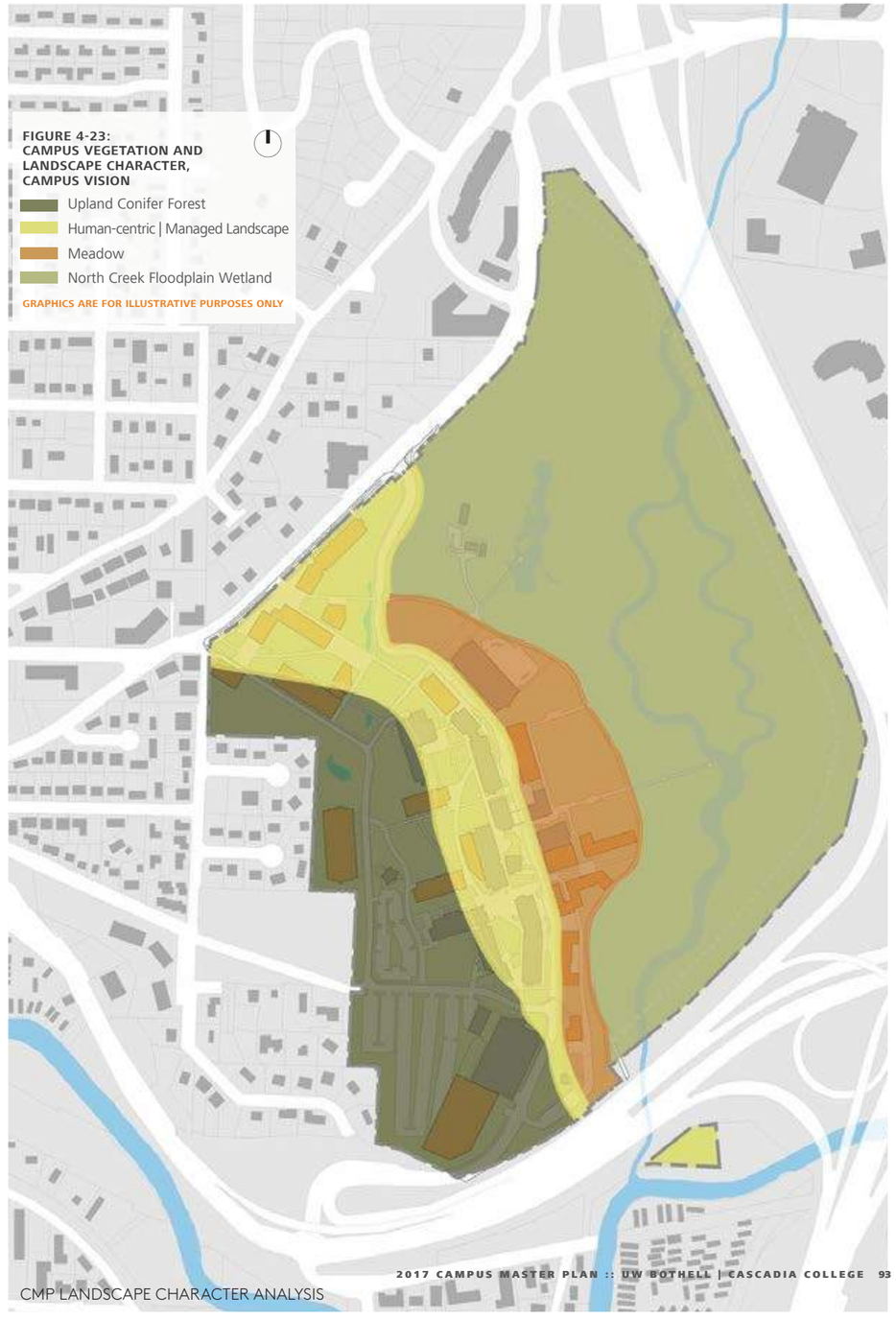
SITE CHARACTER

The CMP identifies four distinct zones of landscape character on campus. There is a gradient originating from the campus core that transitions from a higher level of maintenance to more naturalized landscape types. STEM 4 straddles the human centric campus core and the upland conifer forest. This location verifies the need to integrate with both of these landscapes. Planting character surrounding the site of the new building will contain elements of the forest as well as planting areas with a more articulated presence that will require more frequent maintenance.

UPLAND CONIFER FOREST

HUMAN CENTRIC CAMPUS CORE

NORTH CREEK WETLAND



CMP LANDSCAPE CHARACTER ANALYSIS

SITE CONDITIONS

Within the upland conifer forest, the Douglas Fir and Western Red Cedar dominant canopy is not cohesive and a low crown ratio is typical of the trees there. The understory is also thin and invasive species are often present.
A goal of integrating the site design into the surroundings will be to densify the canopy, stitch disparate parts together and promote a more diverse and healthy understory. Trees to be removed will be salvaged when possible for reuse.

ANCESTORS SCULPTURE

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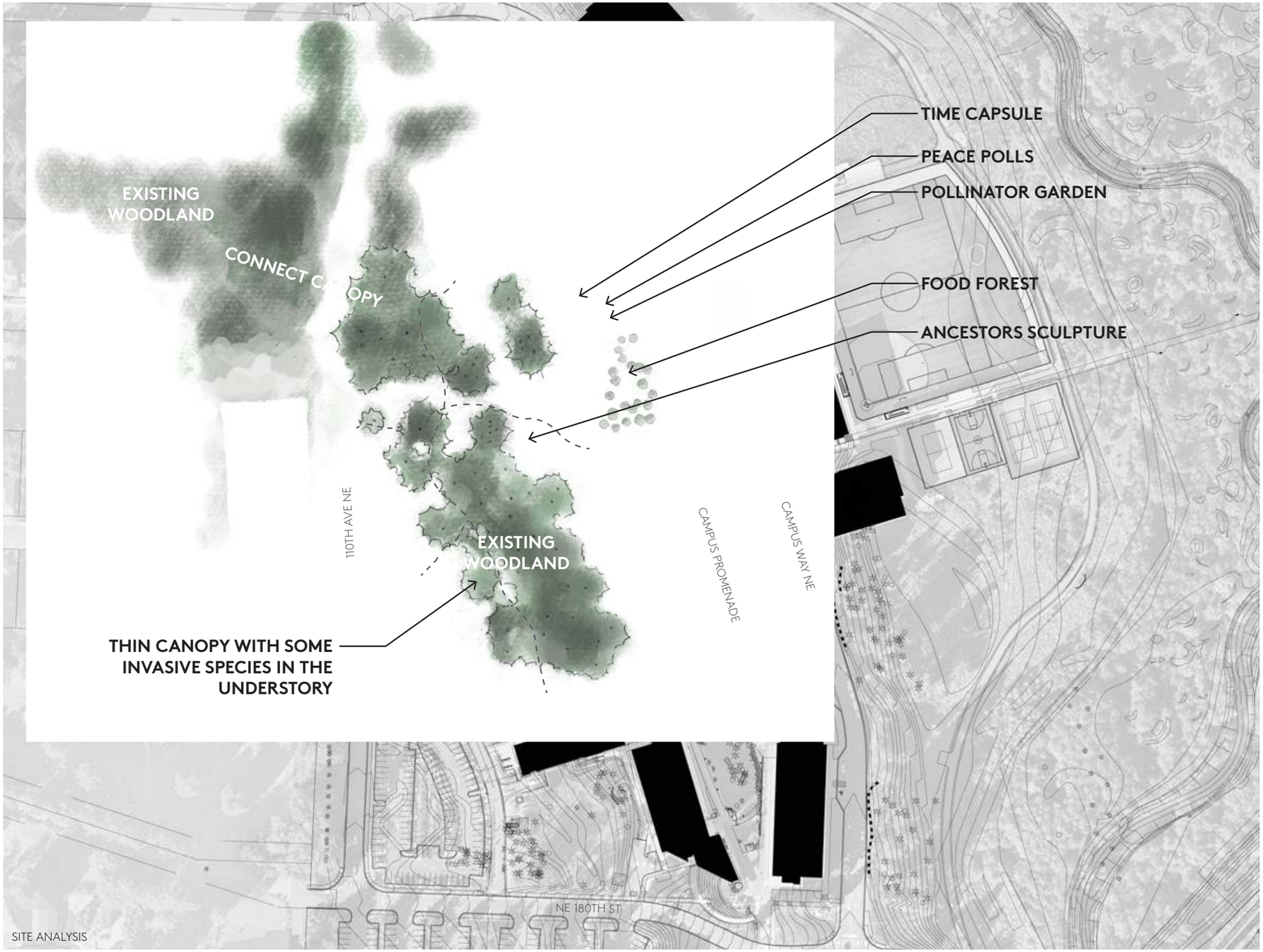

SITE ANALYSIS

REFORESTATION STRATEGY

In order to heal the site development zone into the landscape, reforestation may be considered to maintain forest health into the future. The design team will work with campus staff and an arborist to determine the appropriate methods for replanting new trees and choosing the best locations. Reforestation is an environmental education opportunity that allows the site to function on multiple levels. The strategy for reforestation will be evaluated against site impacts, changes in site hydrology, and existing tree health.

SITE ANALYSIS - UPLAND FOREST

LEGEND

- – – – NEW DEVELOPMENT SITE
- — — DEVELOPMENT AREA

RESTORATION OPPORTUNITIES

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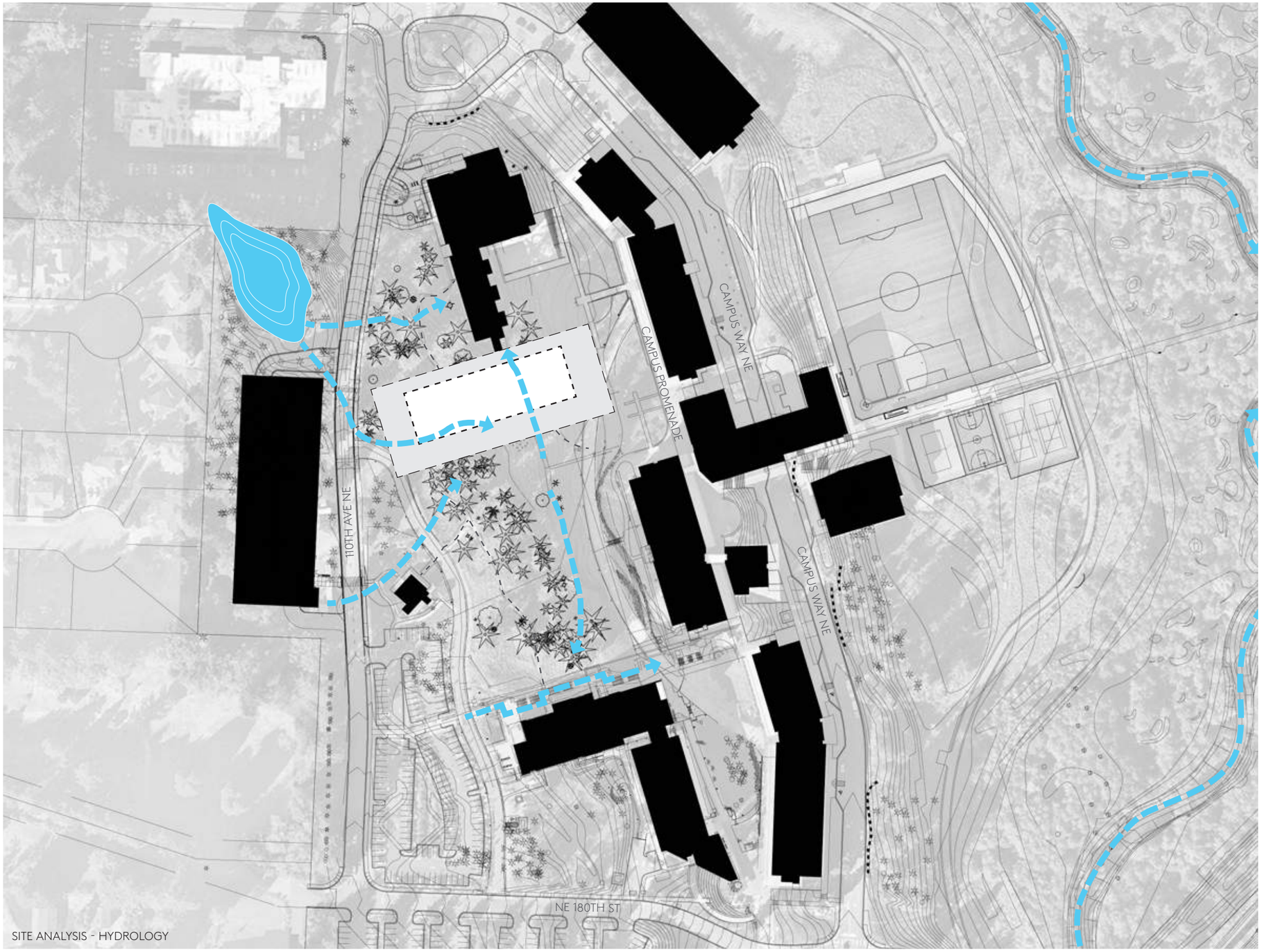
HYDROLOGY

Site hydrology changes have impacted this site in the past, and may be the cause of problems such as tree failure in some instances. As a design principle, the team has minimized changes to the existing hydrologic patterns by orienting the building to limit surface and subsurface drainage. Although large scale infiltration on site is not possible, due to soil conditions and a high water table, the stormwater strategy will slow down the flow of water on the hillside. Capture and on site treatment of runoff will improve water quality before it ultimately enters the wetland of North Creek..

TREE FAILURE NEAR CC3



SITE ANALYSIS - HYDROLOGY

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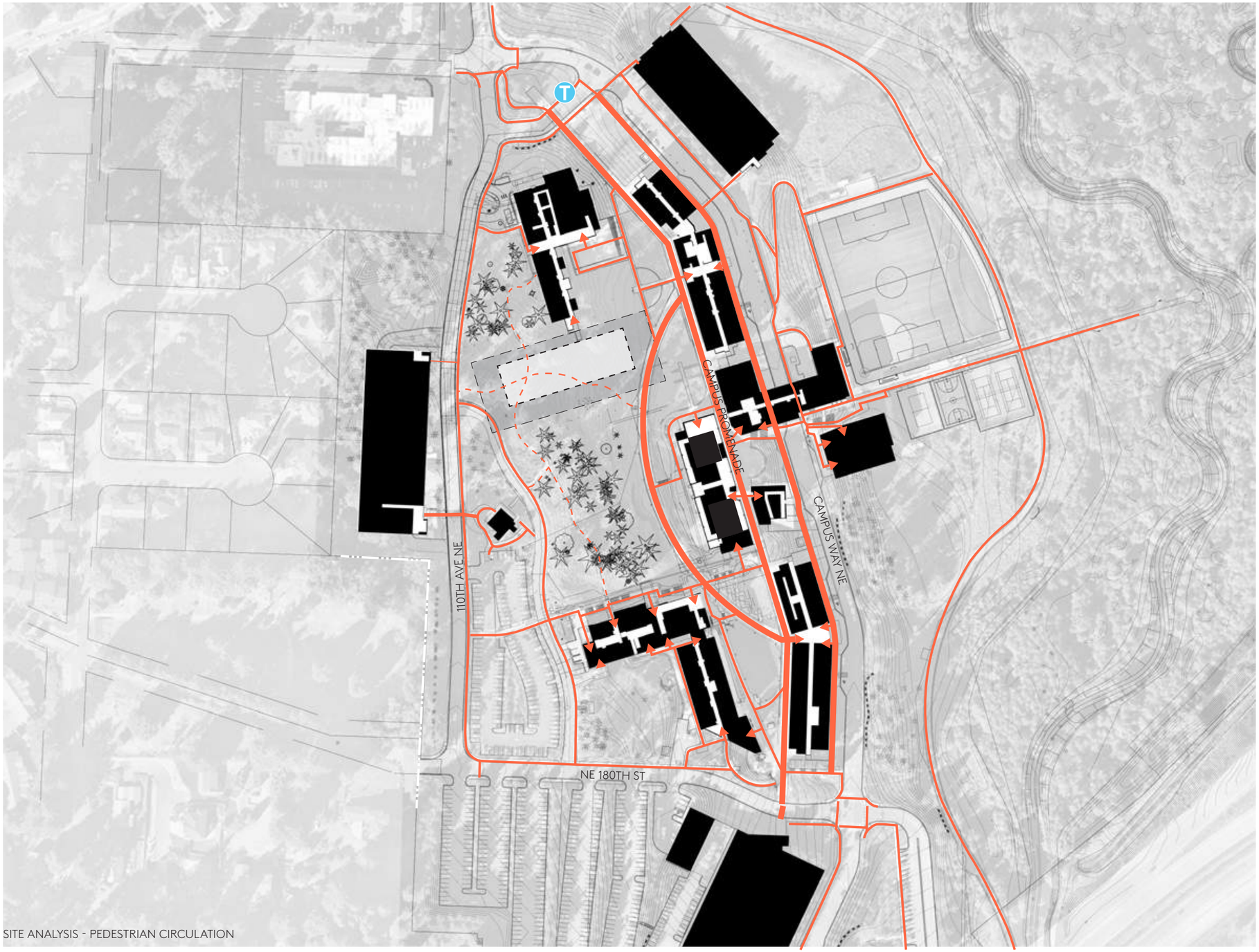
SITE CIRCULATION

The site location for STEM 4 is integral to campus circulation. Its orientation will allow for connections to existing pathways from the west campus garage and west campus ADA route. The east plaza of the building will directly interface with the existing Crescent Path and north campus circulation routes. Accessible connections will be made from the west side of campus to the campus core through the building. The existing trails on the hillside will be realigned to keep the upland forest connection to the pedestrian network of pathways on campus. Fire and emergency access will be provided along the north and south side of the building with gravel pathways.



SITE ANALYSIS - PEDESTRIAN CIRCULATION

LEGEND

- PRIMARY CIRCULATION
- SECONDARY CIRCULATION
- INFORMAL TRAIL
- ENTRANCES
- TRANSIT CENTER
- NEW DEVELOPMENT SITE

0 100 200

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EXISTING PEDESTRIAN ROUTES

The network of pedestrian routes is important to the campus experience and the new site design will make it a priority. This will be accomplished by providing an accessible route from the top of the hillside to the west to the campus core to the east. Existing pathways across the hillside will connect to the new trails and building access points. The pedestrian network of the Cascadia quad is often congested and disruptive to the natural flow of traffic. The east plaza will mitigate this along with a potential update to the quad design.

SITE ANALYSIS - PEDESTRIAN CIRCULATION

LEGEND

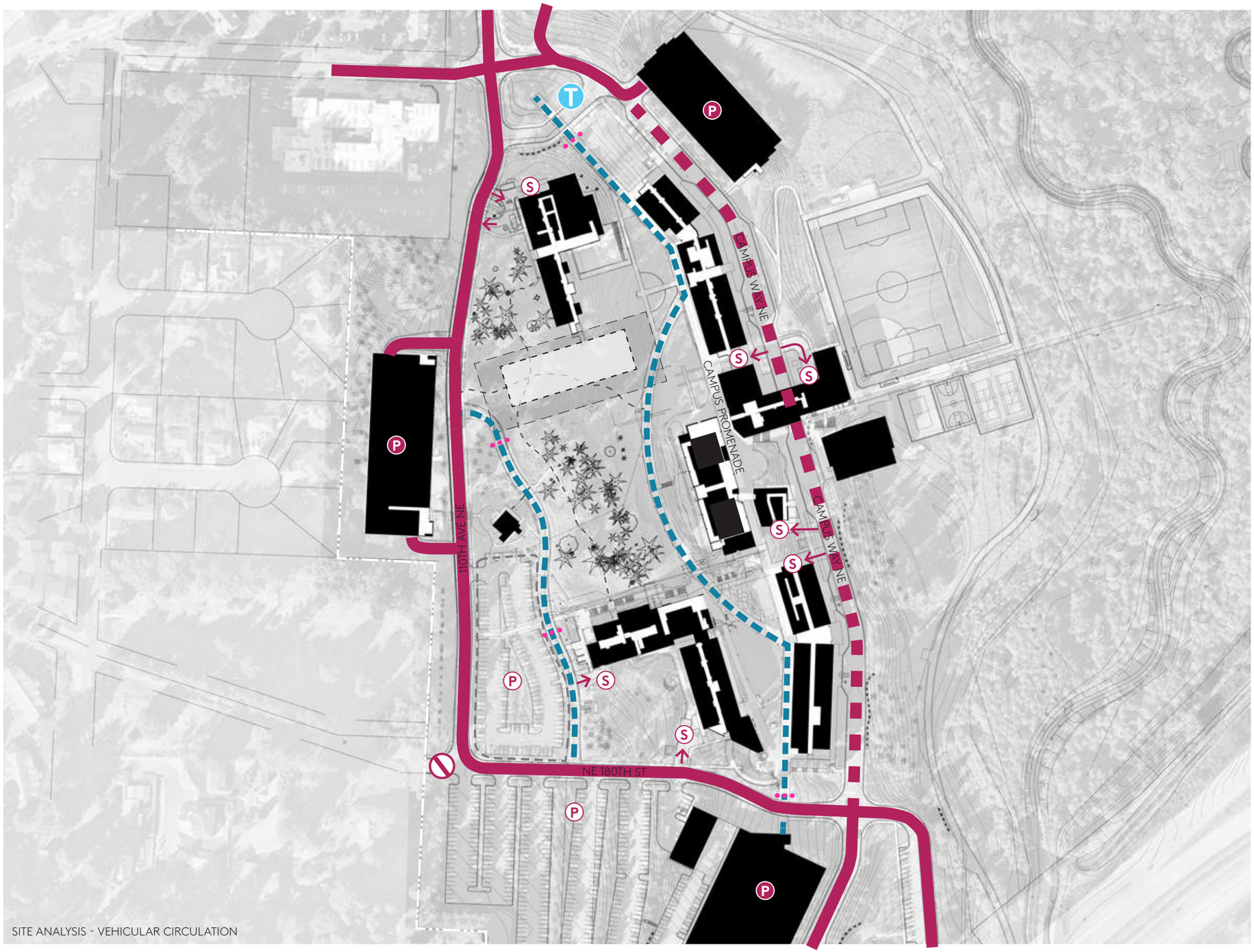
- NEW DEVELOPMENT SITE
- WALKWAYS (WITH SLOPES LESS THAN 5%
- WALKWAYS WITH STAIRS, SLOPES THAT EXCEED 5%
- DESIGNATED ACCESSIBLE WALKWAYS
- INFORMAL TRAIL
- ADA PARKING SPACES
- ENTRYWAY
- ROADWAYS
- TRAFFIC CALMING
- BOLLARDS
- ELEVATOR
- STAIRS

0 60 120

N

VEHICULAR CIRCULATION ANALYSIS

Vehicular circulation around the site is primarily from 110th Ave. West Campus Lane provides access to the building site for service, deliveries, and emergency vehicles. Learning from this analysis, the design team realizes that pedestrian and vehicular routes will need to be carefully managed to reduce conflicts. Bollards and traffic calming measures will be located strategically, to control traffic.



SITE ANALYSIS - VEHICULAR CIRCULATION

LEGEND

- ROADWAY
- TRAFFIC CALMING
- GATE (CONTROLLED ACCESS)
- FIRE ACCESS
- BOLLARDS
- (S) SERVICE ACCESS
- (P) SURFACE PARKING LOT
- (P) STRUCTURED PARKING
- NEW DEVELOPMENT SITE
- (T) TRANSIT CENTER

0 100 200 N

02.3—
WORKING ASSUMPTIONS

SITE

The STEM 4 team recognizes the need to develop a project that fits well into the campus. This project will engage the campus and connect its core to the edge. The following working assumptions are a part of the project scope.
A temporary change to campus circulation will be required in order to provide safe route of travel during construction. Additionally, the replacement of removed or disturbed site appurtenances such as lighting elements, bike racks, and furnishings is planned.

CRESCENT PATH THROUGH THE CAMPUS CORE


CASCADIA QUAD AND CC3

UTILITIES

DOMESTIC WATER SYSTEM

The improvements to the STEM 4 site assume that the existing water system provides adequate flow and pressure for the new domestic water system that will be required for service, fire protection for the building, water supply for newly installed hydrant(s), and an interior sprinkler system.

Water service for the building is based on an assumption of 80,000 GSF. If the building becomes larger, then a larger service meter may be required. The water service meter assembly includes a reduced pressure backflow assembly (RPBA).

SANITARY SEWER

It is assumed that the new building will require a sanitary sewer system to connect to the existing main line. A portion of this installation may be done with trenchless boring to minimize imapct to the site. The approach is diagramed in the upper right image. Additional equipment and system components will need to be installed and are further explained in Utilities.

FIRE & SAFETY

Fire and safety considerations for site development include fire access and circulation along with water system improvements that provide adequate flow and emergency coverage. See Utilities for further details regarding the proposed domestic water system improvements.

STORMWATER MANAGEMENT

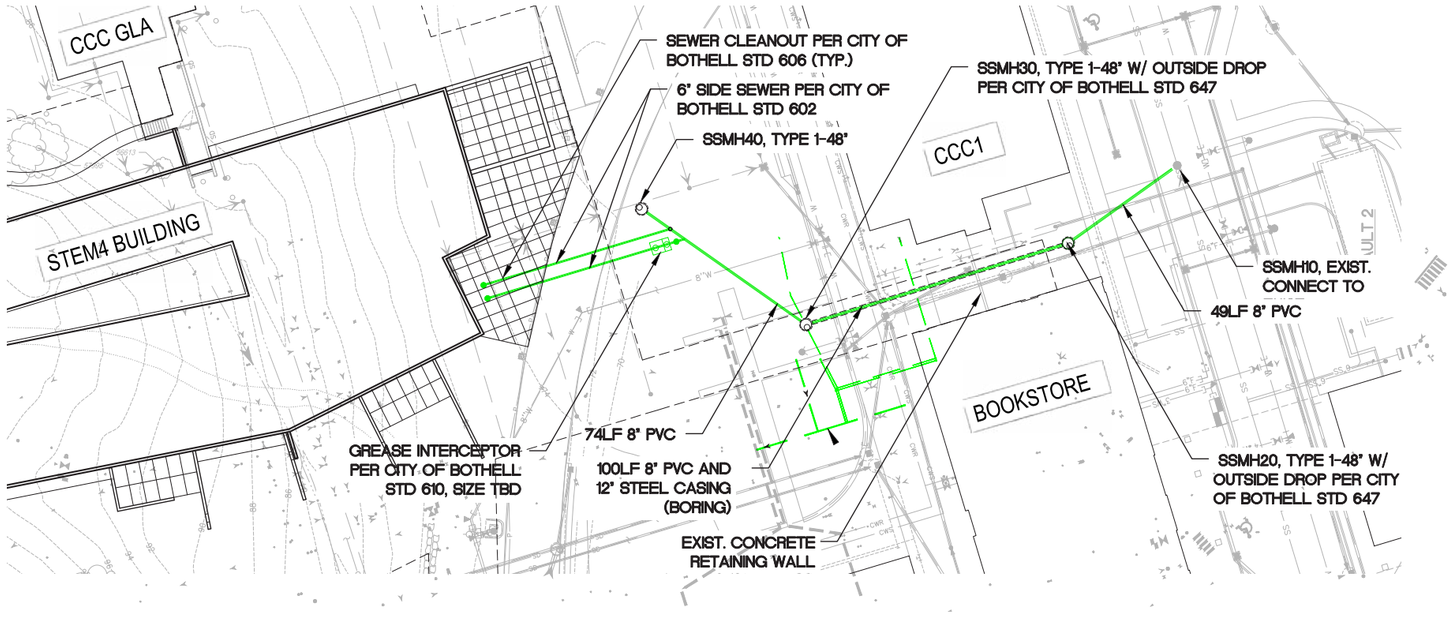
Stormwater management is assumed to be handled through conveyance, water quality treatment, and flow control. “Daylighting” storm drainage, as identified by the CMP will be possible as a learning element.

It is anticipated that stormwater flow control (detention) will be required to mitigate for the additional impervious area that will be added to the site as part of the project. Stormwater flow control will be handled utilizing a regional campus-wide approach through the creation of a detention pond described in the Utilities section and identified in the lower right image.

Rainwater harvesting will also be evaluated during design development phase for re-use in the building plumbing system and/or for landscape irrigation.

GROUNDWATER MANAGEMENT

Maintaining existing hydrological flows is important to ensure natural drainage patterns to support existing trees and vegetation. This can be achieved by dispersing new flows in a controlled manner to maintain flow rates and by providing grading that preserves natural drainage patterns. Utilizing natural BMP’s like raingardens, biofiltration, and bioscape provides additional opportunities to control natural drainage and to provide water quality treatment.



CONSTRUCTION LOGISTICS

All construction access will come from the west, off of 110th Ave NE. Pumping and laydown will primarily occur along the west. A secondary laydown area will be located at the east side of the site, to provide concrete pumping and construction stormwater treatment. Construction clearance and access will be required around all sides of the building. A temporary access road will be stabilized with quarry spalls.

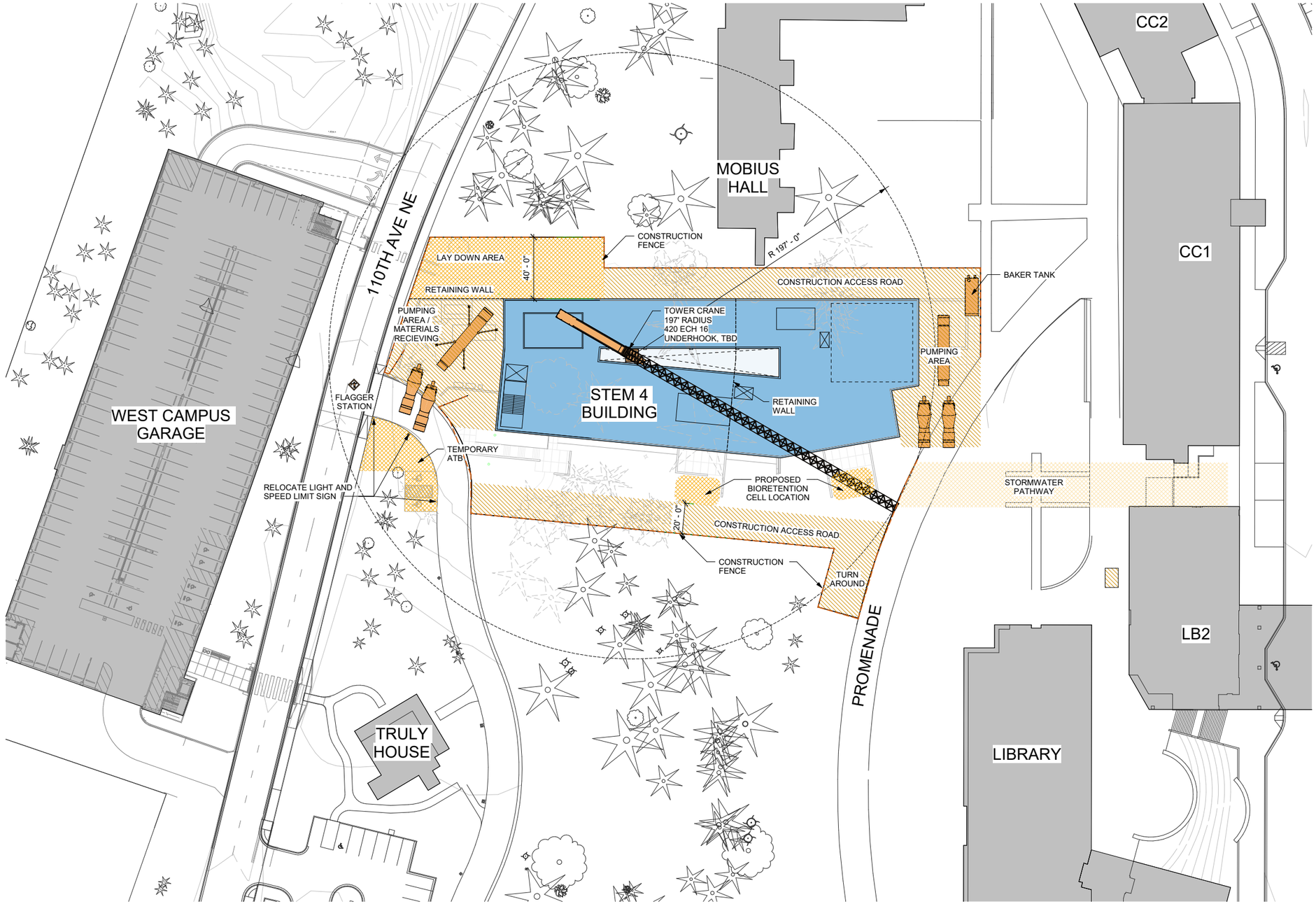
A tower crane will be required for the project. The location will be dependent on the final building form. The footing for the crane will be situated so it will not inhibit future utility or site work. The foundation will be left-in-place.

Construction parking will be worked out with the campus.

EARTHWORK & SHORING

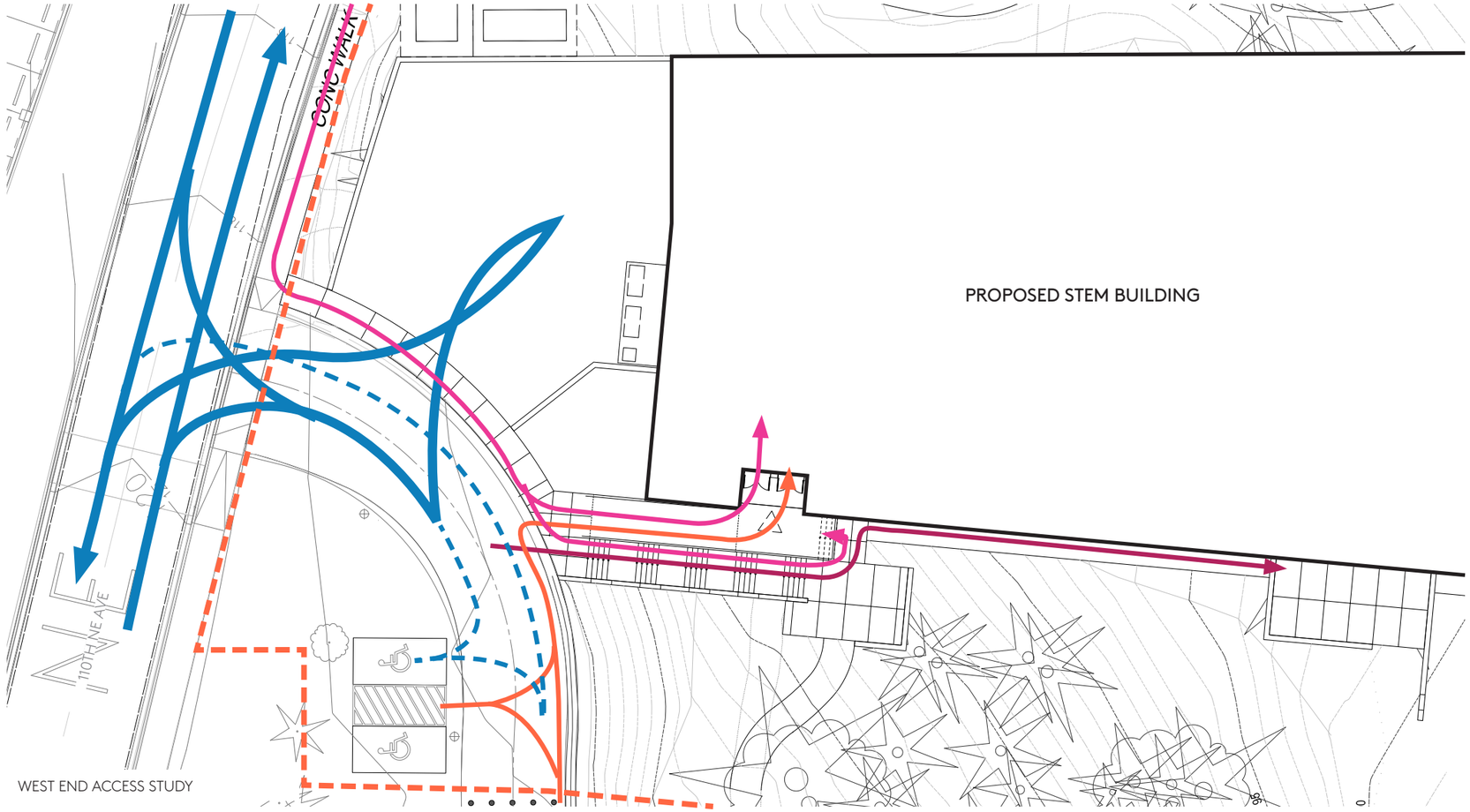
Excavation will be required for the buildings with spoils mostly trucked off site. Fill is anticipated at the west end of the building to provide a level service yard and building entry and will be mechanically stabilized. If possible, existing soils will be reused.

Construction shoring is anticipated to minimize site impacts. The preliminary geotechnical report indicates soil nails are feasible. These will not be part of the building's structural system.



WEST END ACCESS

Access to the west end of STEM 4 has been studied from a number of perspectives. Utilizing the existing West Campus Lane service road proved to be the most logical way to accommodate service, emergency, pedestrian and ADA access to this side of the building. A paved service yard can accommodate delivery vehicles, trash and recycling collection. Pedestrians are protected by the addition of a new sidewalk connecting to the north access to the West Parking Garage and moving the existing bollards to block vehicular access further down the service drive. By connecting to the service road, an accessible grade can be achieved to the 4th floor entrance to the building.



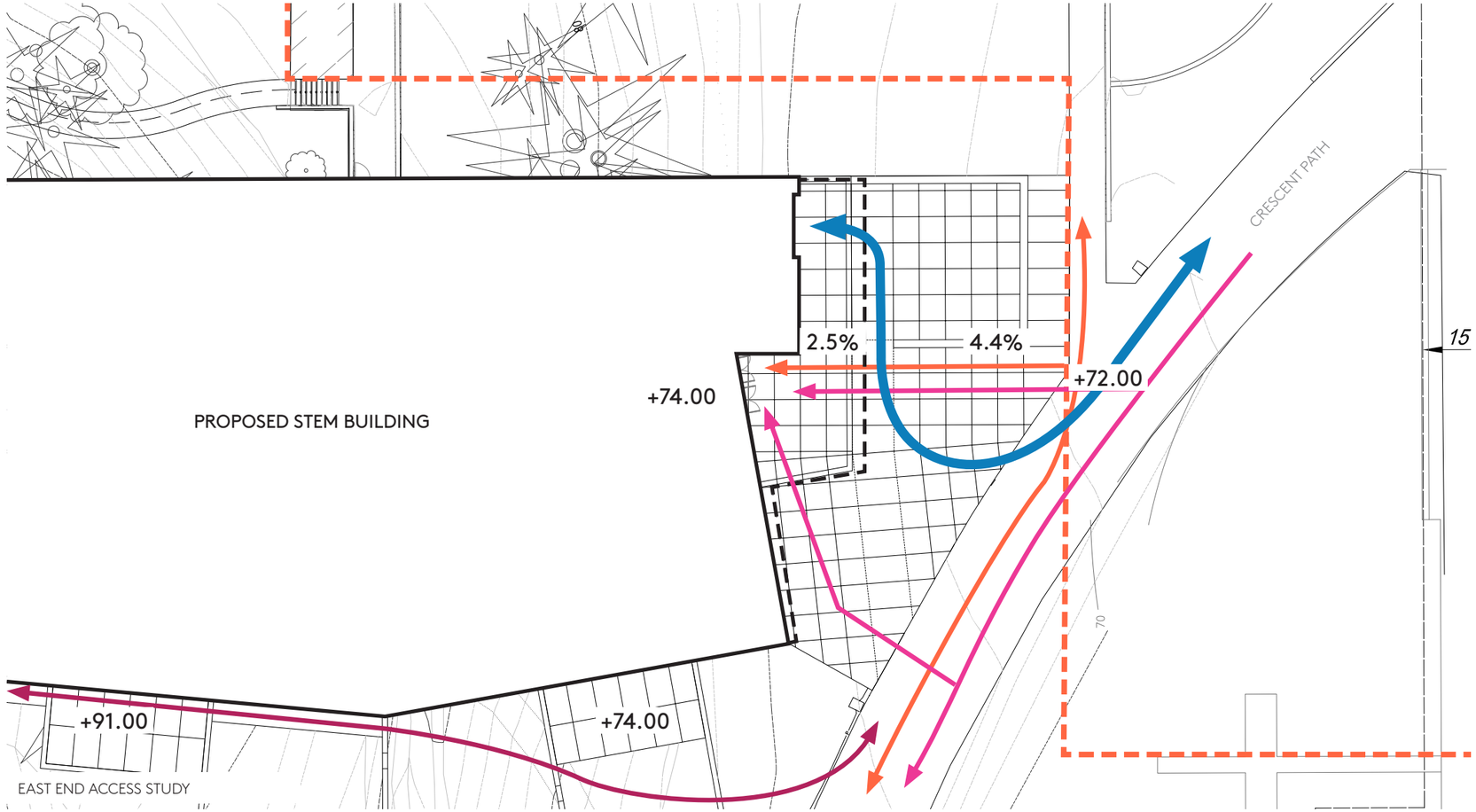
WEST END ACCESS STUDY

LEGEND

- FIRE ACCESS
- ACCESSIBLE ROUTE
- PEDESTRIAN ROUTE
- VEHICULAR ACCESS
- ADA VEHICLE ACCESS
- SITE BOUNDARY

EAST END ACCESS

The east end of the building faces the campus core, and will include a larger paved and planted area with site furnishings and lighting. An accessible route through the building to the campus core passes through this area. The plaza space opens up to Cascadia quad and provides opportunities for program visibility through integration of outdoor project work areas. The connection to the Crescent Path and the quad make this an important space for integrating the building into the campus.



EAST END ACCESS STUDY

LEGEND

- FIRE ACCESS
- ACCESSIBLE ROUTE
- PEDESTRIAN ROUTE
- VEHICULAR ACCESS
- SITE BOUNDARY

02.4—
BASE TARGET SCOPE

The STEM 4 design team has worked with the campus Site Fit group to create a baseline scope that will allow the new building to meld into the existing campus and landscape. The following sections outline the target scope areas, value add items, working assumptions and exclusions that pertain to the site development.

BASELINE IMPROVEMENTS

— **East Plaza**

» A gathering space with a mixture of hard and softscape will be located on the east side of the building. The plaza will make a connection to the Crescent Path and Cascadia quad and be flexible enough for varied use.

— **Upland Forest South**

» South of the site, the upland forest covers most of the hillside. At a minimum, the site development will blend planting into the forest to heal the site back into the existing landscape. Outdoor spill out spaces adjacent to the building will allow for a outdoor learning while having a visual connection to the stormwater management system. Connections to the existing path network will be made and new emergency access pathways will be added.

— **Upland Forest North**

» Planting from the building to the existing forest will blend the site development area back into the campus fabric. To the northeast, STEM 4 will be connected to CC3's egress stairwell.

— **West Entrance and Service Area**

» A service area located at the west end of STEM 4 will meet the needs of the building for service and delivery access. The paved area will be separate from the pedestrian entrance to STEM 4. Trash and recycling pick up will be done within the service yard and the building generator will be located outside the service area. A bioretention area west of the building entrance will accept and treat runoff and pollutants from the service yard and provide a small planting buffer between the two spaces.

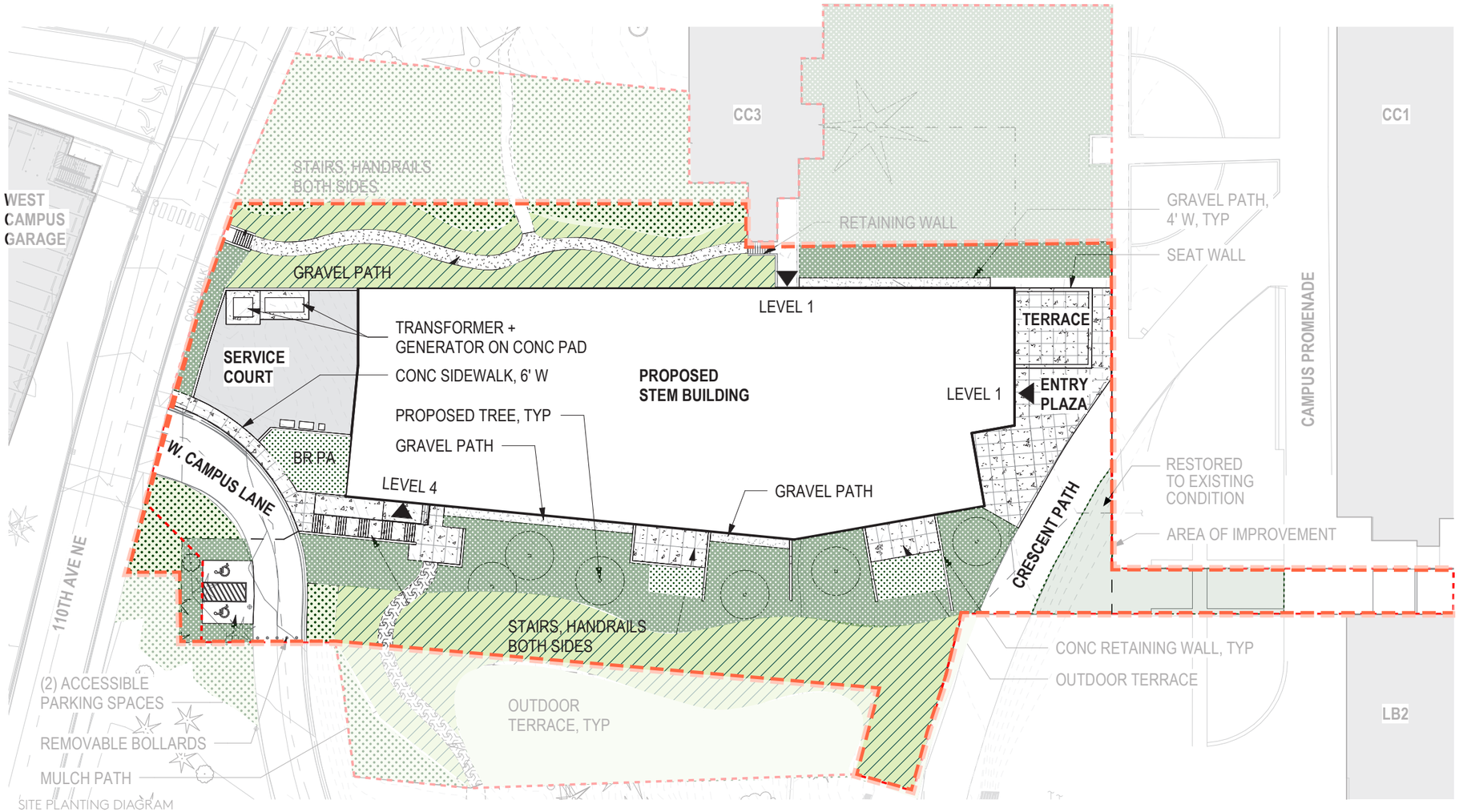
— **Circulation**

» The campus ADA route and new ADA parking spaces will be linked to the west end of the building. The existing trail leading from Discovery Hall will connect to the west end of STEM 4.

SITE PLAN SKETCH

PLANTING CHARACTER

The Bothell campus includes its unique landscape features that help define character. The building location crosses the upland conifer forest and the more managed landscape of the campus core. Selecting native species to heal in the disturbance of the construction process is part of the newly formed character of the site. Plants and trees from the Western Red Cedar and Douglas Fir dominant forest will compliment the existing ecology. Some areas of more highly maintained planting near the building may be composed of both native and adapted species, while bioretention and water treatment areas will be planted with species suitable for those purposes from the native palette.



Base Scope

Bioretention / Specialized Planting

Intensive Planting


TECHNOLOGY CAMPUS

Less Intensive Planting

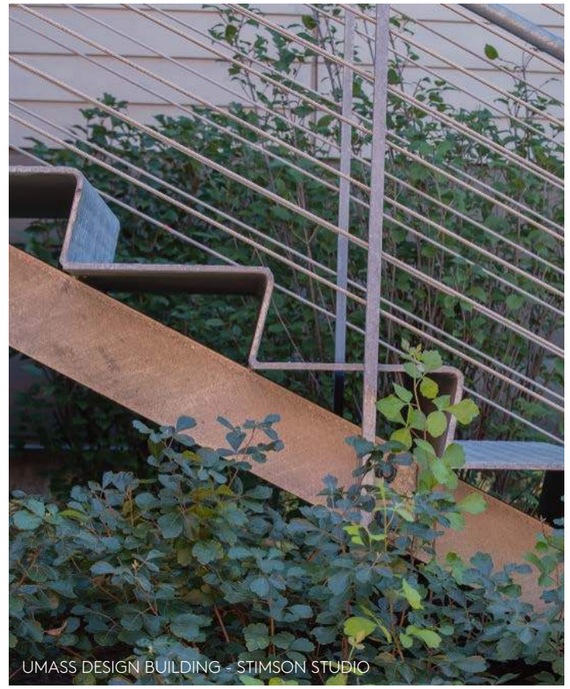

SUQUAMISH MUSEUM

Restoration


BLAKELY ELEMENTARY SCHOOL

UPLAND FOREST PRECEDENTS


SAINT MARY'S ON THE LAKE


UMASS DESIGN BUILDING - STIMSON STUDIO


UMASS DESIGN BUILDING - STIMSON STUDIO


GOODWILL JOB HEADQUARTERS


KITSAP ADMINISTRATIVE BUILDING - SITE WORKSHOP

EAST END ENTRY PLAZA PRECEDENTS


SKY UK HEADQUARTERS - URBAN


SEATTLE UNIVERSITY LEMIEUX LIBRARY - BERGER PARTNERSHIP


STANFORD MEDICAL SCHOOL - TOM LEADER STUDIO


WALLER PARK - MSLA


UNIVERSITY OF PENNSYLVANIA NEW COLLEGE HOUSE - MVLA

SITE APPURTENANCES

As part of the site design, the outdoor spaces will be augmented with accessories to provide greater comfort, accessibility and promote sustainable practices.

Site furnishings such as seating elements such as benches and chairs may be a part of the east plaza or spill out spaces. Trash and recycling receptacles and bike racks will be located near the paths of travel.

Path and public space lighting will be arranged on site to ensure safe levels of light are provided, meeting campus standards. All fixtures will comply with campus design standards.

Artwork is currently located within the site boundary and will be part of the project. A portion of the budget has been designated for artwork and the design team will collaborate with an artist and campus representatives to determine a location and design integration. Existing artwork that needs to be relocated will be reviewed with campus representatives and the artist to determine a suitable relocation site.

Bike racks will be required to achieve LEED accreditation and the quantity will be based on the building occupancy. Approximately 20 stalls will be required and will primarily be located on the east end of the building, potentially closer to the Campus Promenade.

SUSTAINABLY SOURCED WOOD FURNISHINGS

THE ANCESTORS - SITE ARTWORK

CORA BICYCLE RACK

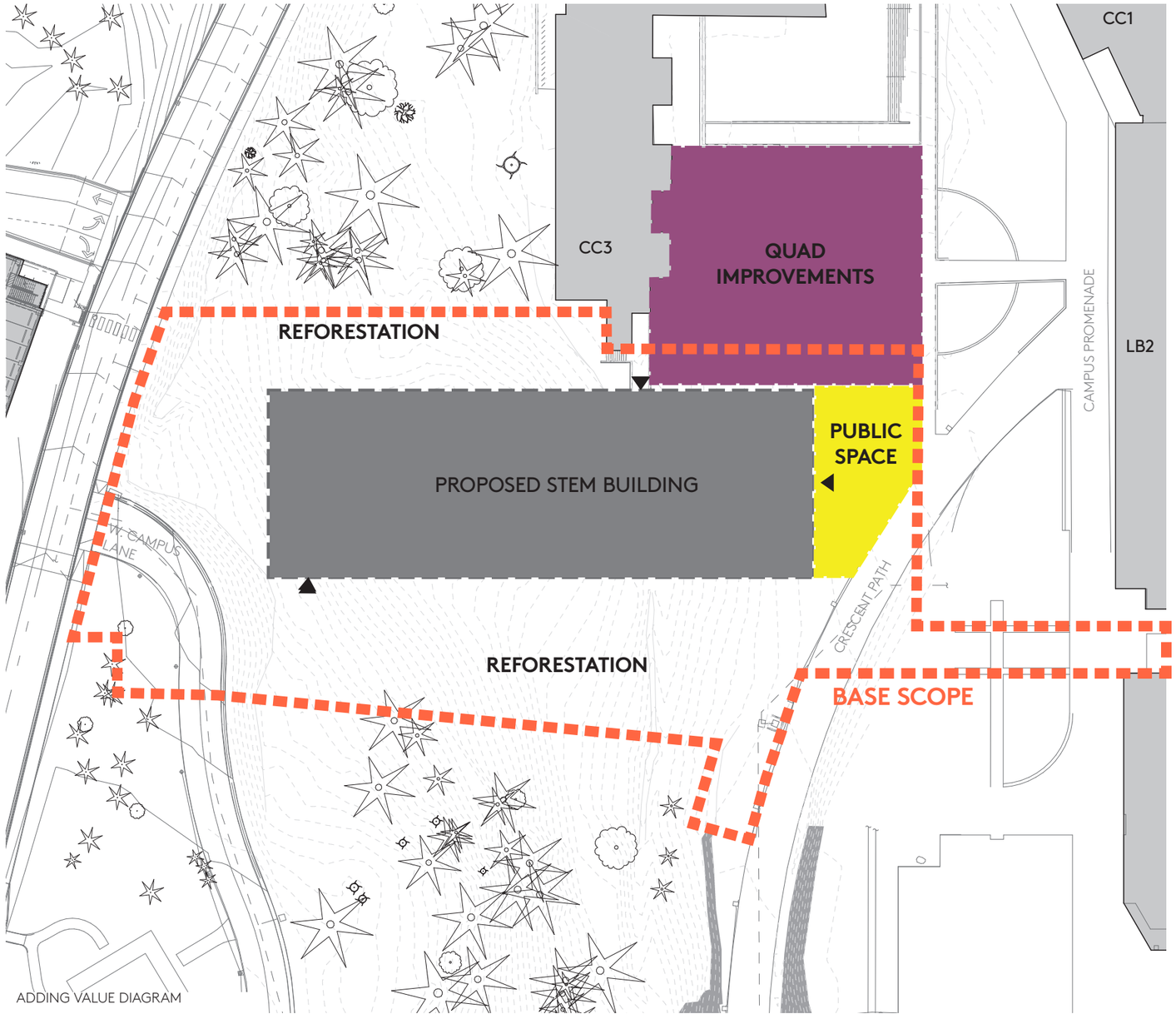
CAMPUS STANDARD LIGHT FIXTURE

VICTOR STANLEY SD-35

02.5— ADDING VALUE

The site scope definition process identified a list of project opportunities that are not currently included in the Base Target Scope. The following may be considered opportunities to add to the site design. See Value Add Log in the appendix for a complete list.

Public Space at the Crescent Path
The east plaza that is a part of the baseline scope for the project will provide public space between the Crescent path and the building. Additional value can be added to the project by enhancing this design with higher quality materials, additional square footage, expanding planting areas or additional site appurtenances.



ADDING VALUE DIAGRAM

Reforestation
The forest that remains on the upland portion of campus will be affected by the construction of STEM 4. A reforestation strategy for portions of the upland forest is an opportunity to extend the renovation of this landscape. By infilling the landscape with trees that will begin to knit together the forest canopy, the existing site character can be preserved, and its ecological value can be enchanced.

Cascadia Quad Open Space
Site disturbance from construction will impact areas on all sides of the future building. The southern portion of the Cascadia quad to the north of the site will be partially impacted. A full renovation of the quad may be considered as a value add. The improvements would be selected to add connectivity and functionality. Regrading the lawn surface to be more level and connecting STEM 4 and CC3 would be the primary improvements to the open space.


REFORESTATION

EAST END STUDY C

03

PROGRAM

03.1— VISION & GOALS

MEMORANDUM OF UNDERSTANDING

— **Program Growth** - Maximize space for instruction and research in a manner consistent with program goals and institutional standards and values.
— **Flexible Learning Environments** - Create learning environments that support collaboration, active learning, and faculty innovation while building community across students and faculty.
— **Foster Collaboration** - Design a physical environment that promotes interactions between UWB and Cascadia faculty, staff, and students.
— **STEM Presence** - Redistribute STEM facilities across the campus as appropriate to improve operational efficacy, student access and relationships.

Eden Hall Campus, Chatham University

GOALS

— Create a national example for STEM education and collaboration between institutions.
— Provide learning environments that inspire students.
— Create academic pathways, research opportunities, and project-based learning experiences
— Support faculty collaboration between institutions.
— Connect STEM 4 to the broader campus to foster interdisciplinary study
— Enable students of both institutions to benefit by sharing ideas and working with each other
— Extend career-oriented learning to serve students' primary goal of success in the job market
— Provide spaces that foster collaboration with external partners in industry.

03.2— ANALYSIS

PROGRAMMING PROCESS

— Program information was collected through workshops with college and university faculty and staff. Workshops were organized and led by RFD (lab design consultant) and Mithun.
— Although space for teaching labs, classrooms and offices are institutionally dedicated, the design/build team took a joint approach to programming for these spaces.
— Faculty from both institutions attended programming meetings for related disciplines, such as engineering and computer science.
— General use classrooms dedicated to each institution were programmed jointly to identify common themes related to contemporary pedagogies.
— Office suites were also programmed jointly.
— Meetings with student leadership were held.
— A plan for outreach to a variety of students for input during the design process was discussed with each leadership group.
— Both student groups commented on students' needs for informal study spaces.
— The design/build team produced detailed room data sheets and room layouts for labs, classrooms, student projects spaces, and office suites.
— Room planning for labs and classrooms utilizes a typical lab module of 10.5 feet by 30 feet.
— Room layouts were then used to calculate and verify space needs.

THEMES

Common program objectives that support project goals were identified during the programming process.

Program Growth
— The project should take advantage of options to teach in labs where possible.
— Look for multi-use of space within each institution's assigned spaces.
— Labs that are not dual use for teaching and lab use could be used by student clubs.

Flexible Learning Environments
— Flexibility for multiple pedagogical approaches is desired by both institutions.
— Class structures include periods of lecture interspersed with group work.
— The layout of furniture needs to facilitate small groups of students working together.
— Simultaneous use of digital and analog tools will provide flexibility for multiple pedagogical approaches.

— **Foster Collaboration**
— Adjacencies between formal learning spaces and informal study will foster desired interactions between students and faculty and between students and their peers.
— Informal student study space used by students of both institutions should give students choices of social space, group study space, and individual study space.
— Office adjacency to student study spaces fosters interactions between faculty and students.
— Adjacent Cascadia and UWB office suites would facilitate sharing faculty breakrooms encouraging faculty interactions between institutions.

Learning Across Disciplines

The PEC noted that extending career-oriented learning would serve students' #1 goal of success in the job market
— UWB and Cascadia College articulated the need for dedicated student projects space for interdisciplinary learning.
— The intended learning outcome of student projects spaces is to prepare graduates for the workplace by enabling independent student-directed learning.
— Students will work on capstone projects and interdisciplinary projects that take place over multiple quarters.

CC Student Project Center
— Cascadia College proposed an open interdisciplinary lab space for student directed learning in addition to a student projects lab for chemistry.

UWB

The learning environments in STEM 4 should promote cross-disciplinary learning.
— Teaching labs are to be configured to enable the growth of cross disciplinary programs.
— The student projects lab for mechanical and electrical engineering capstone projects will be arranged to foster collaboration between disciplines as well as to emulate the workplace where engineering disciplines
— regularly collaborate..

03.3— WORKING ASSUMPTIONS

Program Distribution

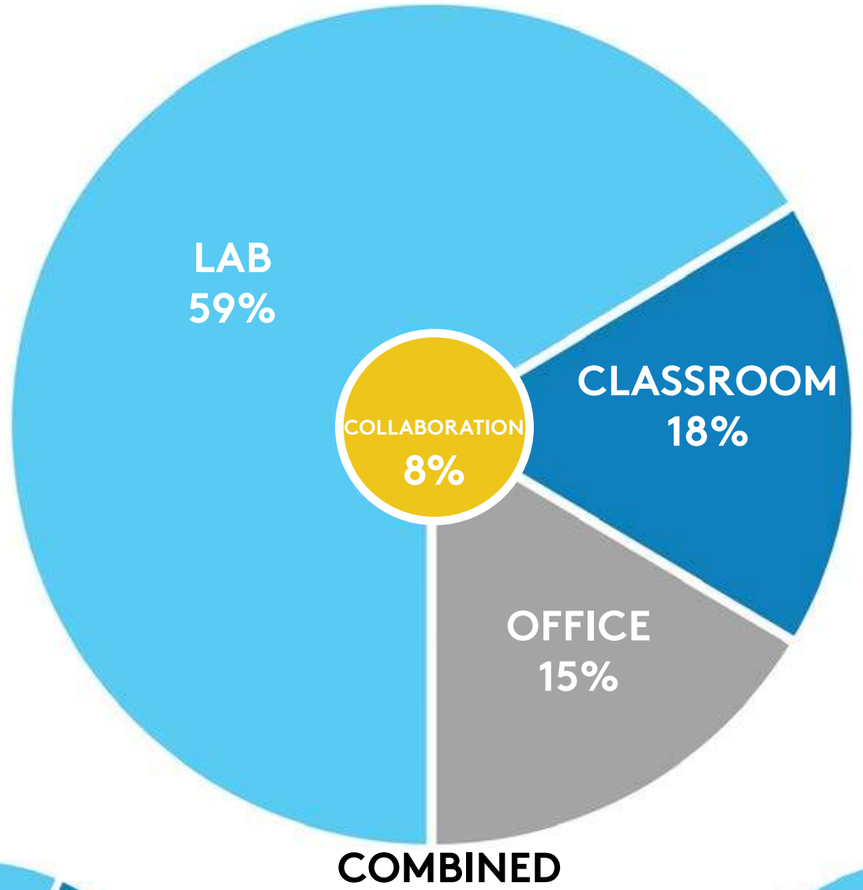
— The types of institutionally dedicated space align with the MOU between Cascadia College and UWB.

— Net assignable institutionally dedicated space will be evenly divided between the two institutions.

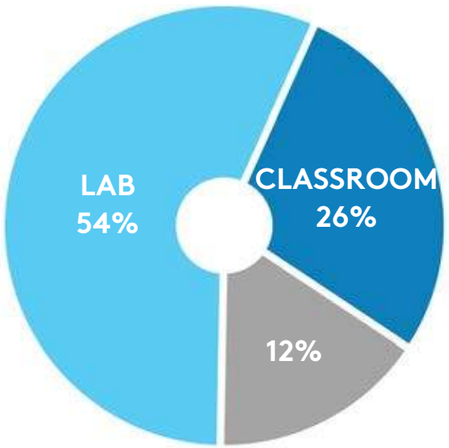
— Dedicated space includes labs, classrooms, and faculty offices.

— The remainder of the net assignable square footage will constitute the shared space.

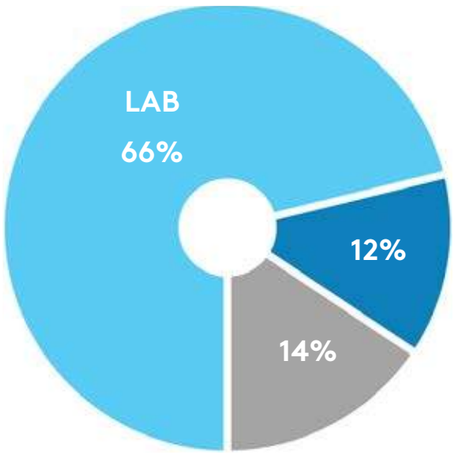
— Shared space is limited to non-scheduled space, including informal student study areas and shared faculty break rooms.



COMBINED



CC



UWB

TARGET SPACE ALLOCATION

The following space allocations indicate occupant capactiy and nominal assigned square feet (NASF). Room sizes are based on a 10'-6" x 30'-0" (315 SF) lab module. During design, squre footage will be calculated by 'net square feet' measuring actual floor area, taking into account wall thickness, structure, etc. and will differ from the ASF stated in the tables below while maintaining room capacities.

Space Allocation Summary	
Cascadia College	21,500 ASF
UW Bothell	21,500 ASF
Shared Resources	5,000 ASF
TOTAL NASF	**48,000 ASF**

UW Bothell

SPACE ID	SPACE NAME	OCCUPANTS	LAB MODULES	NASF	NO.	TOTAL NASF
Engineering Labs						
2.03	Engineering Wet Lab	24	3	945	1	945
2.04	Engineering Dry Lab	24	4	1,260	1	1,260
2.05	Materials Testing Lab	12-24	2	630	1	630
2.06	Student Projects / Capstone Lab	96	9	2,835	1	2,835
2.23	Engineering Lab Support Room	-	2	630	1	630
2.24	Machine Shop	-	5	1,575	1	1,575
Biology						
2.12	Teaching Lab	12	2	630	1	630
2.47	Research Lab, Suite A	12-16	4	1,260	1	1,260
2.48	Research Lab, Suite B	9-12	3	945	1	945
2.25	Sterilization/Autoclave Room	-	0.5	158	1	158
2.26	Microscopy Room	-	0.35	110	1	110
2.27	Cell/Tissue Culture Room	-	0.5	158	1	158
2.28	Equipment Room	-	0.35	110	1	110
2.29	Storage Room	-	0.25	79	1	79
2.30	Specimen Storage Room	-	0.5	158	1	158
2.31	Field Equipment Storage/Mud Room	-	0.5	158	1	158
Computing & Software Systems (CSS)						
2.08	Computer Lab - Medium	24	2.65	831	1	835
2.09	Computer Lab - Large	48	6	1,890	1	1,890
2.50	Research Lab	18-24	3	945	1	945
General						
2.51	Classroom, 48 seat	48	4	1,260	1	1,260
2.52	Classroom, 60 seat	60	5	1,575	1	1,575
2.61	Offices (in suite)	24	n/a	3,360	-	3,360

Cascadia College

SPACE ID	SPACE NAME	OCCUPANTS	LAB MODULES	NASF	NO.	TOTAL NASF
Chemistry						
1.01	General Chemistry Laboratory	24	8	1,260	2	2,520
1.02	Organic Chemistry Laboratory	18-24	5	1,575	1	1,575
1.21	Chemistry Prep/Storage	-	3	945	1	945
1.22	Analytics/Instrument Room	-	1.5	473	1	473
1.23	Student Project Lab	8	1.5	473	1	473
Physics & Engineering						
1.04	Engineering Laboratory	24	4	1,260	1	1,260
1.24	Physics & Engineering Prep/Storage	-	1	315	1	315
Business Information Technology & Computer Science						
1.09	Network Lab	33	5	1,575	1	1,575
1.10	Server Room for Network Lab	-	1	315	1	315
1.11	Computer Programming Lab	30	4	1,260	1	1,260
General						
1.07	Interdisciplinary Lab & 3 Team Rooms	36	6	1,890	1	1,890
1.42	Flexible Classroom - Medium	24	19	1,000	6	6,000
1.61	Faculty (in suite)	14 FTE & 21 Part Time	n/a	2,800	n/a	2,800
1.62	Storage (instructional)	-	-	100	1	100

Shared

SPACE ID	SPACE NAME	OCCUPANTS	LAB MODULES	NASF	NO.	TOTAL NASF
	Informal Student Study	-	-	2,700	-	2,700
	Shared Conference Room	-	-	300	1	300
	Shared Classroom	-	3	945	1	945
	Faculty Work Room / Lounge	-	-	320	2	640
	Receiving Area	-	-	415	1	415

PROGRAM ADJACENCIES

Target program adjacencies are conceived to support the project's goals and vision.

— Adjacencies of similar and related disciplines support project goals for collaboration.
— Adjacencies between UWB and Cascadia dry labs or computational labs will enable students and faculty to share ideas between institutions.
— Adjacencies between practice lab spaces and general purpose classrooms will make academic and career pathways visible to non-STEM students.
— Adjacencies between interdisciplinary student project labs will display opportunities for interdisciplinary study to students of both institutions.

Shared spaces will be the connective tissue between the institutions.

— Shared nonscheduled student study space will encourage interaction between students of both institutions.
— Adjacencies between faculty offices and informal student study space will foster engagement between faculty and students.
— Adjacent institutionally dedicated faculty suites with shared break rooms will encourage faculty collaboration between institutions.

THEORY, PRACTICE, CONNECT

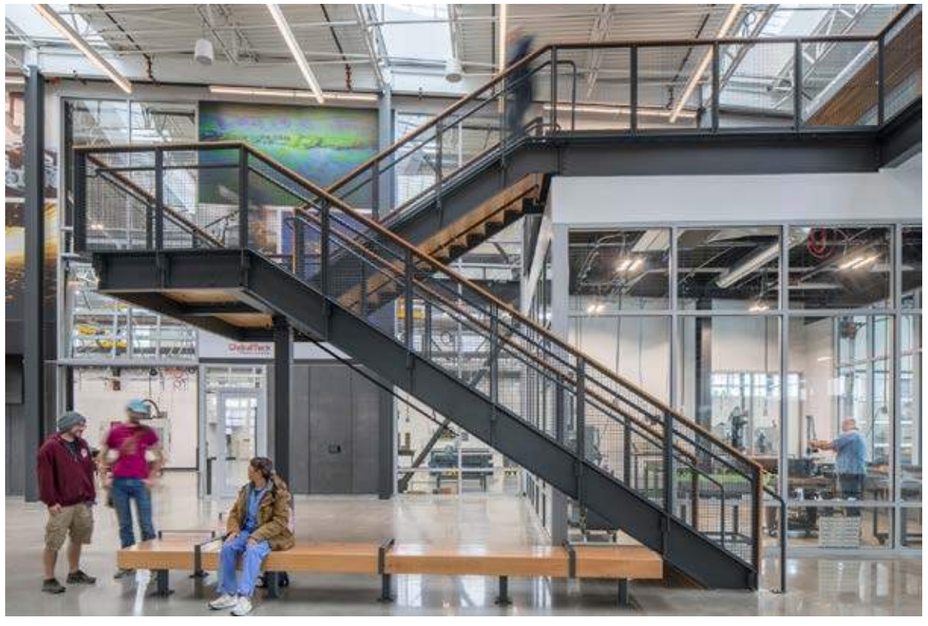
The program is organized into three broad categories.

Theory
— Classrooms are where subject matter is taught.

Practice
— Laboratories which are both teaching labs and open labs are where students practice the theory they learn in the classroom.

Connect
— Shared spaces enable students to engage with peers, faculty, and industry partners.

THEORY	PRACTICE	CONNECT
		— I nspire stud — C reate and c cademic p — F oster stude f aculty engc i and betw c nd CC — F rovide spac s tudent proj s pace, colla w ith partne — F acilitate ac c nd use by c s tudents on



THEORY

Teaching in Labs

Active Learning

General purpose classrooms will provide student centered, active learning to students across campus including:

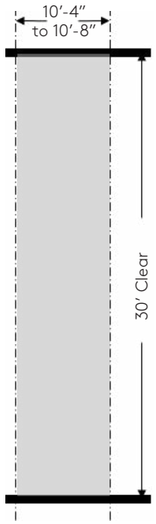
— lectures interspersed with small groups learning,
— facilitated project-based learning,
— case studies and
— Digital work sharing

Classrooms will be configured and equipped to support a variety of pedagogies.

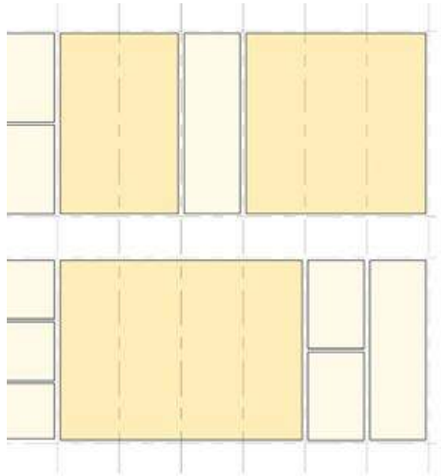
— moveable desks for two students provide flexibility for configuring the classroom to support groupings of four, six or eight for small groups learning;
— audio visual support will enable instructors to deliver content to students in multiple formats;
— collaboration tools will provide access to digital (via WIFI) and analog media;
— writable wall surfaces;
— projector screens will be configured to allow simultaneous access to white boards and the projection of subject matter content; and
— some faculty preferred a combination of personal white boards and writable surfaces on multiple walls to enable display of student produced materials in “gallery” format.

Multi-modal

PRACTICE



Recommended laboratory planning module is 10′-4 ″ to 10′-8″ wide by 30′-0″ deep.



Modular Planning of Laboratory Space

WSU Everett (courtesy SRG)

Labs provide hands-on, experiential learning enabling students to apply subject matter content learned in the classroom. They provide access to space, software, and/or equipment that is not available in general purpose classrooms.

— Labs will be scheduled for teaching and research.
— Some labs will be used by clubs to meet in non-lab times.
— Open labs will enable students to practice on their own schedules.
— Capstone labs provide dedicated space for senior projects.

Modular Planning and Flexibility

Laboratory space is organized based on modular planning principles that set a grid of dimensions by which structural columns, walls and partitions are located.

— They provide flexibility for future modifications that may be required by changes in laboratory designation, equipment or departmental organization.
— They may be combined to produce large, open laboratories or subdivided to produce small instrument or special-use laboratories without requiring reconstruction of structural or mechanical building elements.
— They create laboratory spaces that are not obstructed by columns.

Module dimensions result from analysis of the laboratory bench space, equipment and circulation space.

— They accommodate technical workstations, instruments, and procedures.
— The space between benches is designed to allow people to work back-to-back at adjacent benches, allowing accessibility for disabled persons and movement of people and laboratory carts in the aisle.
— The module provides adequate open space for floor standing equipment.

Transparency at Labs

CONNECT

— In
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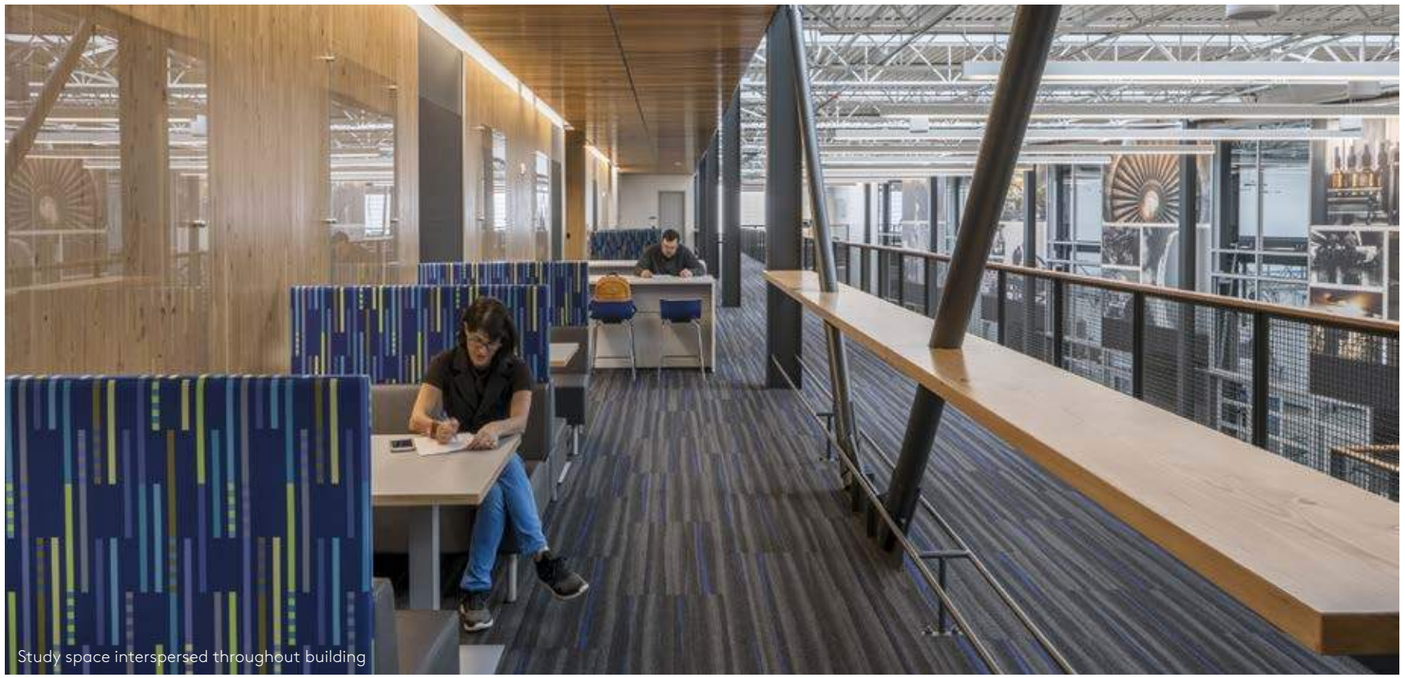
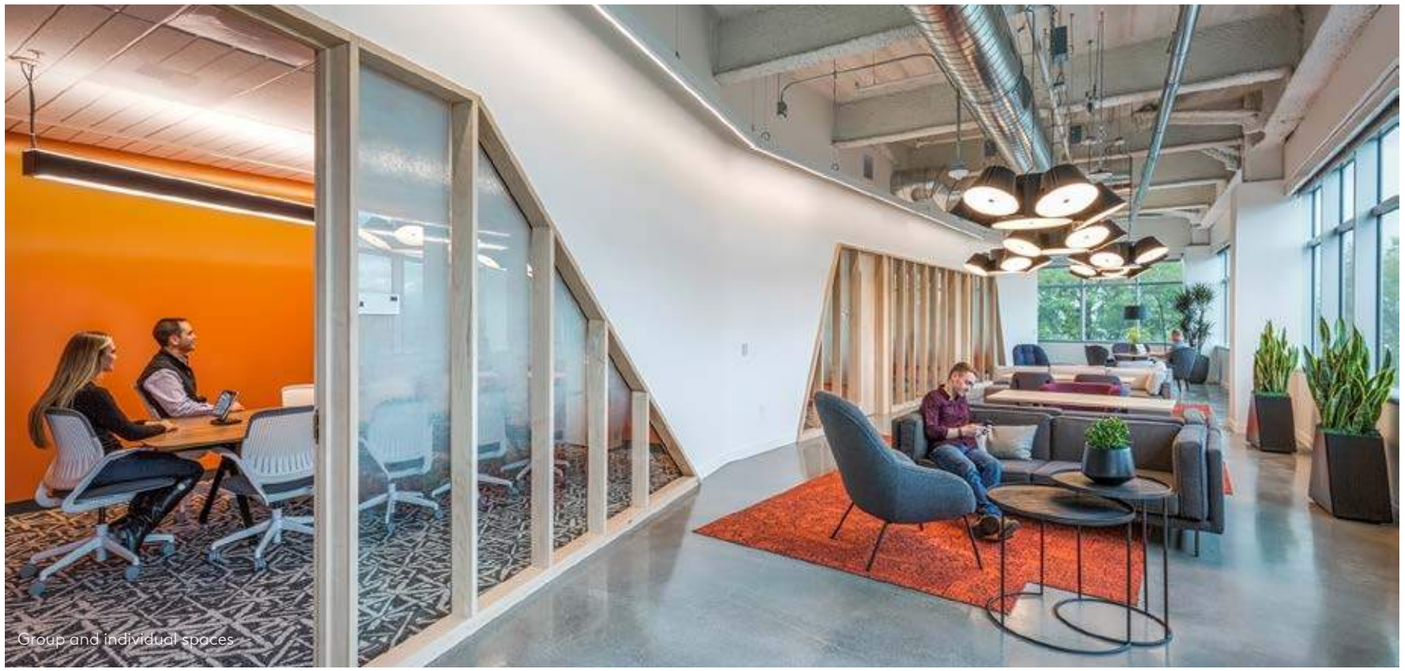
Shared informal spaces allow students to connect with their peers and faculty. They are the connective tissue between people and institutions.

Students should have the choice of informal spaces for individual study, group study, and for socializing.

— Individual student study enables students to get work done before class.
— Students may want to continue the discussion that started in class in group study.
— Students engage with their peers in social spaces.
— Social space allows students to connect with visiting industry partners.
— Shared break rooms that are connected to faculty suites serving both institutions enable faculty to collaborate regarding pedagogical successes and challenges.



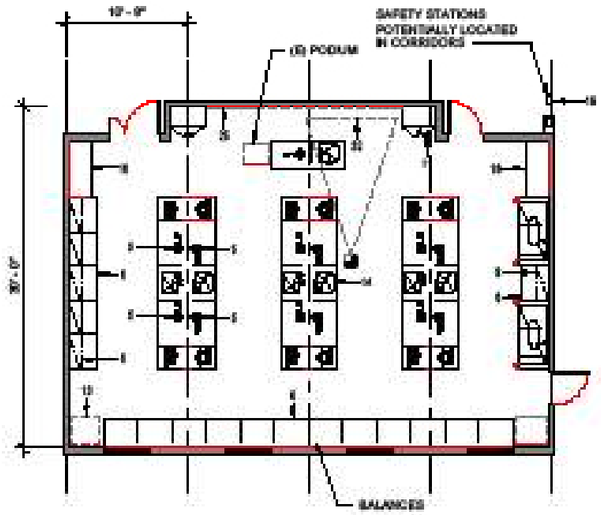
Study space interspersed throughout building

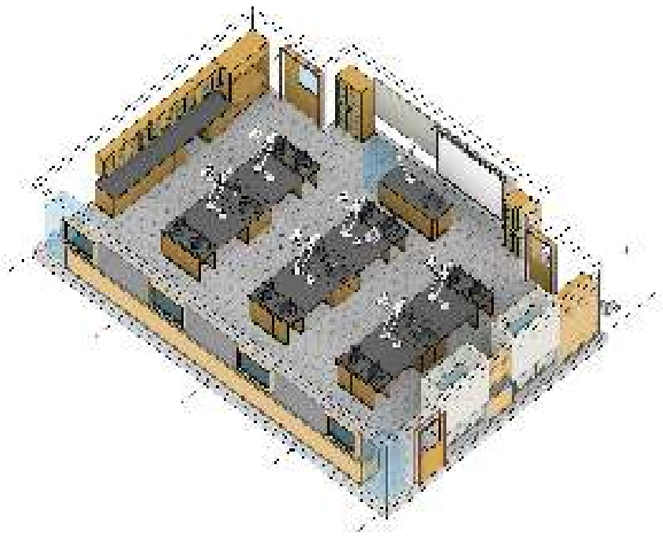


Group and individual spaces

ROOM DATA SHEETS & SPACE LAYOUTS

Detailed programmatic requirements have been outlined in Room Data Sheets and Space layouts. These are conceptual in nature and will be further refined with user input during the design phase. **See appendix for data sheets and layouts**.





DETAILED SPACE REQUIREMENTS — University of Washington Bothell / Cascadia College

STEM 4 BUILDING — Mithun + Research Facilities Design

DEPARTMENT: UWB MECHANICAL ENGINEERING — SPACE ID NO: 2.03

SPACE NAME: ME TEACHING LAB, THERMAL FLUIDS — OCCUPANTS: 24

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	

MECHANICAL	
Temperature	
68°-76° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
ASHRAE Class	2/4
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	Note 1

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	●
Heat Producing	●
Noise Producing	●

PLUMBING	
Laboratory Gas (LG)	●
Laboratory Vacuum (LV)	
Laboratory Air, 15-30 psi (LA)	●
Compressed Air, 100 psi (A)	●
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	●
Chilled Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide (CO_2)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	●
Flammable	
Toxic	
Floor Drain (FD)	●
Floor Sink (FS)	(1)
Safety Showes/Eyewash (SS)	●
Eyewash/Drench Hose (EW)	●

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (Off-Of)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	
70 fc at bench/desk	●
Safe light	
Special Lighting	
Dontenoble	Note 2
Zoned Lighting	●
Other	

CHEMICALS	
Bases	
Acids	
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	●
Other	
Base	
4" Topset Base	●
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	●
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	10'-0"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	●

EQUIPMENT / INSTRUMENTS	
Dynamometer	●
Other test apparatus	(2)

REMARKS:

1. Consideration for engine exhaust
2. Suitable for AV presentations

NON-ASSIGNABLE SPACE

Restrooms
Inclusive restroom facilities will be designed to accommodate all abilities, needs (ex. families) and genders.

Facilities will follow campus guidelines and will be organized into three spaces on each floor: a multi stall room for male and female genders and a third, single occupant, multi-use restroom.

Combining these into a single room with multiple private stalls will be further evaluated during design.

Showers
A locker room with showers will be provided to support active transportation on campus and help meet LEED credit requirements.

Wellness Suite
One wellness suite will be provided in the building to support the needs of new mothers as well as other building occupants needing respite.

Vending
Extensive dining facilities are centralized on campus. Tertiary vending facilities will be provided within the public space of STEM 4. Vending machines, microwaves and refuse facilities will be provided. A sink may also be considered.

Receiving Area
The Corp Yard serves as a centralized 'Loading Dock' for the campus. As such, STEM 4 will have a tertiary receiving area within the building adjoining the service yard that will be similar in nature to the facilities at Discovery Hall. An overhead door and storage space for building supplies will be provided. Dock levelers and similar equipment are not desired.

Hazardous Materials Handling
EH&S uses Discovery Hall as a centralized Hazardous Material Storage area and will serve STEM 4. Small volumes of hazardous materials will be provided in labs and prep spaces in the STEM 4 building. A separate hazardous materials storage room is not required.

MEP/IT Spaces
Refer to MEP/IT Target Value Assumptions for descriptions

03.4— ADDING VALUE

Program Space at Risk

— Interior fit-out of shelled areas

— Base target scope assumes 10,000 net square feet of interior space will be shelled. The value add goal for interior program is to finish this space through savings realized in design and construction phases.

— See Value Add Log in the appendix for a complete list.

04

BUILDING

04.1— VISION & GOALS

MEMORANDUM OF UNDERSTANDING

— *Create **learning environments** that support **collaboration, active learning, and faculty innovation** while **building community** across students and faculty.*

— ***Maximize space for instruction and research** in a manner consistent with program goals and institutional values.*

— *Display the campus' commitment to **environmental and economic sustainability,** including by seeking to **minimize life-cycle costs and carbon footprint.***

Peninsula College - Maier Hall

CAMPUS MASTER PLAN

— Modulate and articulate buildings to create human scale at the base and meet the sky at the roofline.
— Provide flat roofs for buildings perpendicular to topography.
— Complement materials and colors in adjacent campus buildings.
— Create safe, human scale spaces that provide calm, contemplative environments.
— Provide active facades, locate programs that connect to adjoining pathways.

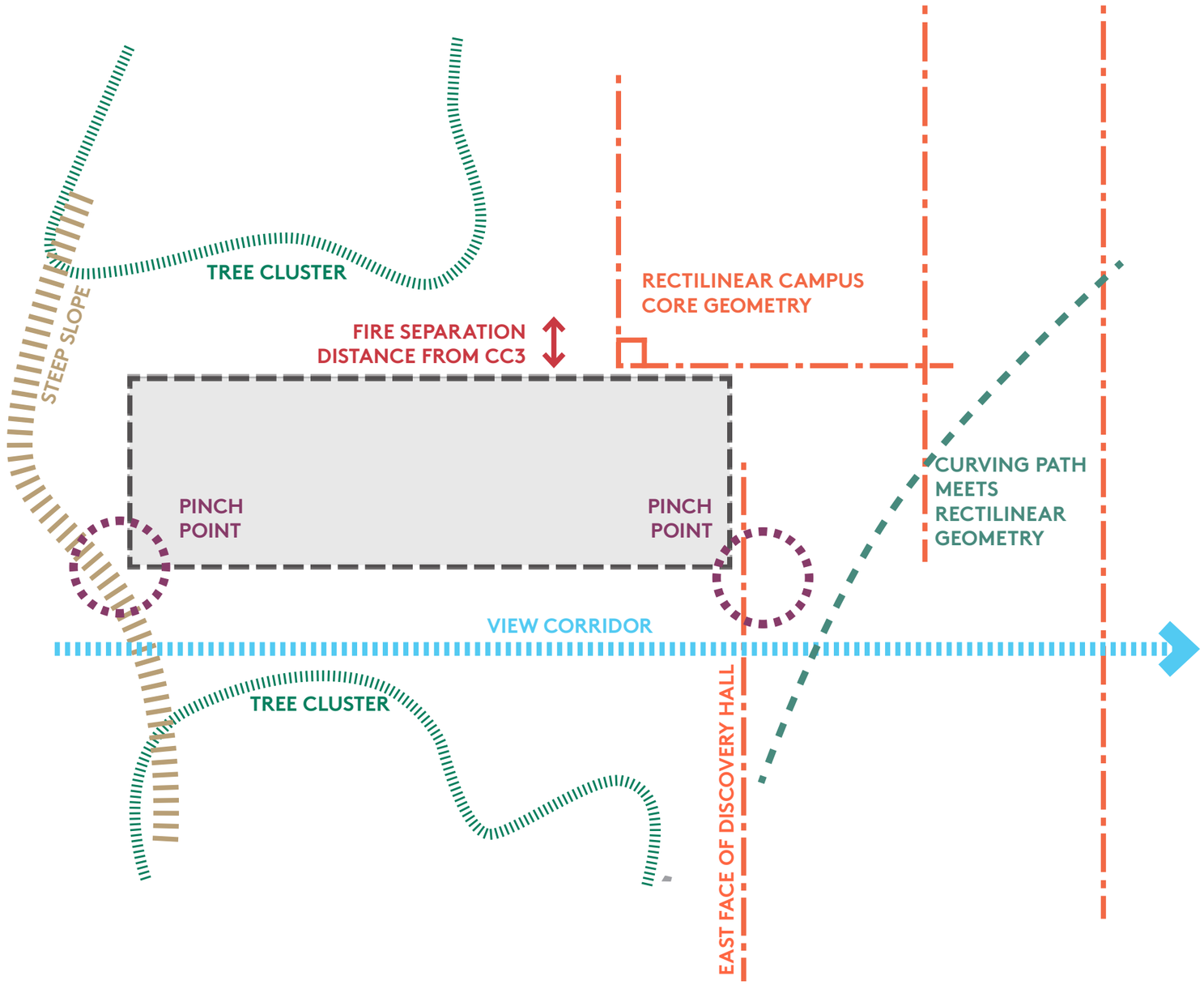
GOALS

— Knit the building into the landscape in terms of its plan, section and articulation.
— Employ transparency to provide program visibility and to foster awareness of career pathways.
— Provide local views of the forested hillside to the north and south. Take advantage of the regional views over the campus to the east.
— Facilitate intuitive wayfinding through clear organization of interior circulation.
— Create opportunities for engagement through design of public spaces, entrances, stairs, and circulation areas.
— Promote interaction between the college and the university through careful planning of adjacencies and strategic placement of shared spaces.
— Create a variety of type and scales of outdoor and indoor spaces to accomodate program uses.
— Maximize daylight.

04.2— ANALYSIS

LOCATING THE BUILDING

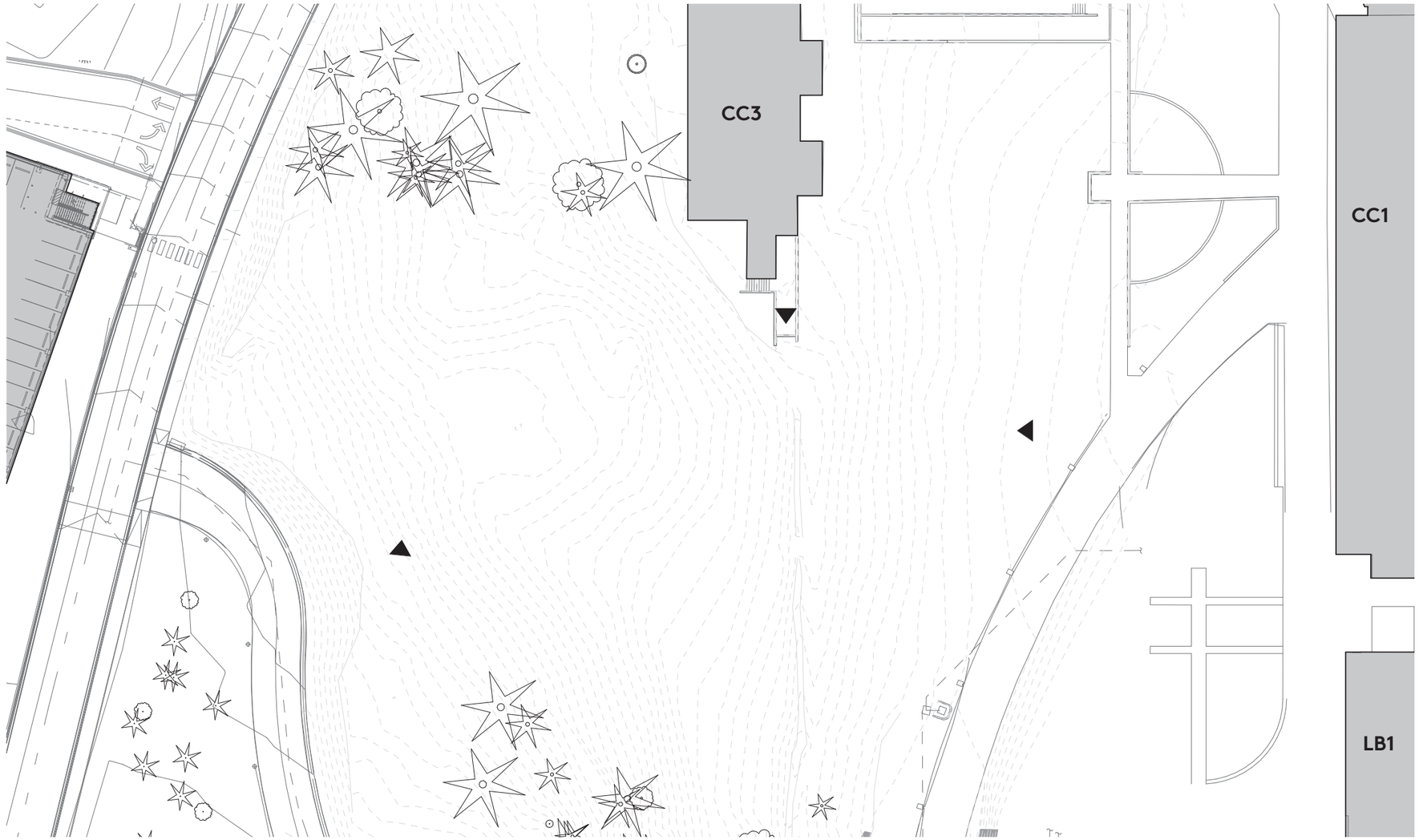
— Maximize efficiency of ADA access, services access and preservation of upland forest.
— Maintain minimum 20' from CC-3 to meet fire separation requirements and provide construction and maintenance access.
— Align with the east face of Discovery Hall to fit existing campus geometry and bracket the north campus quad.
— Take advantage of view corridor between CC-1 and Library Building.

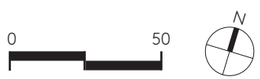


ENGAGING THE SITE

ACTIVE FACADES

— Promote transparency of primary facades, opening the building to campus and showcasing STEM.
— Select programmatic uses at grade to maximize visibility and connection to campus and to fulfill functional requirements.
— Maximize activation of façade near the primary pedestrian circulation
— Promote intuitive wayfinding of entrances.
— Take advandate of the views of the upland forest and wetlands.
— Create spaces for quiet study and recharging.





DAYLIGHT

Building Orientation / Layout

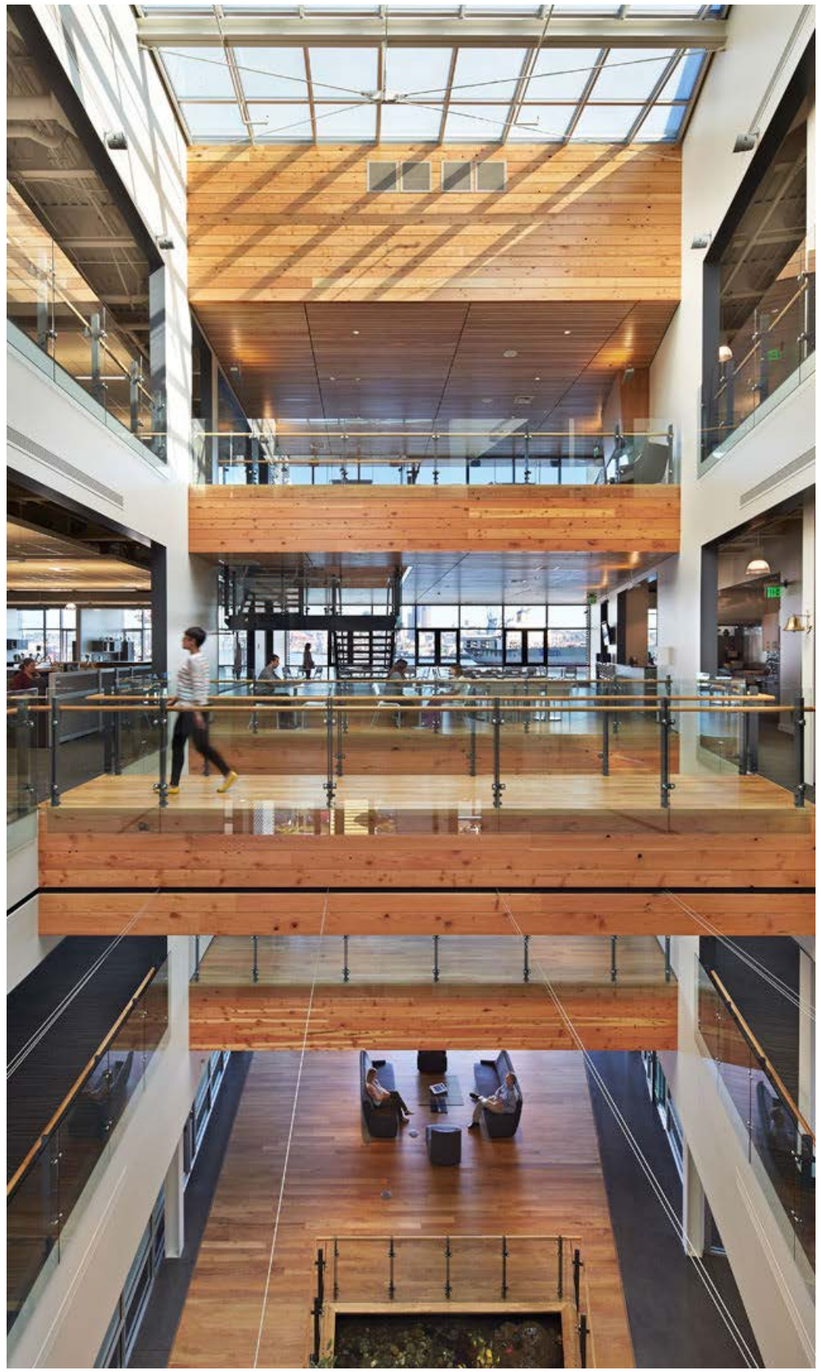
— Rectilinear building form maximizes north and south exposures.
— 31 foot deep program bays maximize daylight penetration.

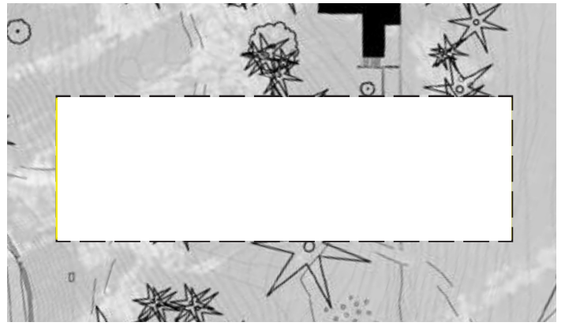
Exterior Walls

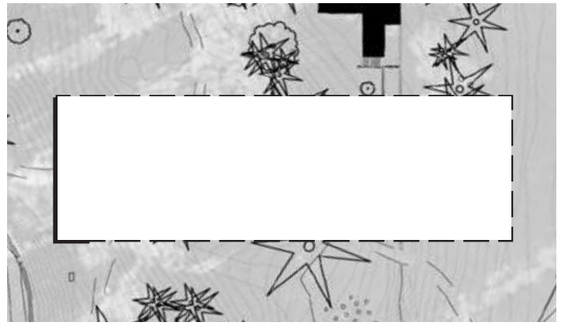
— Fenestration located to provide balanced daylighting within spaces.

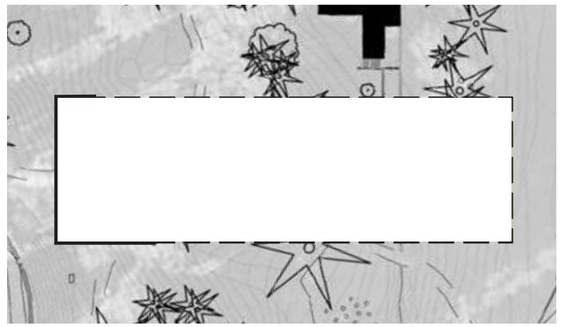
Lightwell

— An interior lightwell provides daylight access to the primary circulation and informal study areas as well as interior facing program elements
— Multistory opening between levels 2 - 4 to provide daylight access to interior circulation, informal learning areas and interior offices.
— Glazed enclosure around the lightwell is employed to avoid atrium code designation. Extent of enclosure will be studied during design phase.









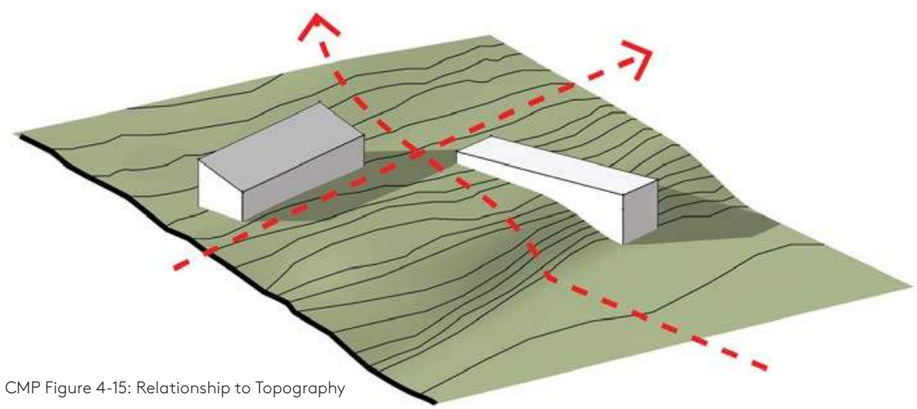
04.3— WORKING ASSUMPTIONS

Orientation & Roof Form

— Building oriented perpendicular to hillside.
— Provide flat roof per campus master plan, similar to Discovery Hall and CC-3.
— Locate mechanical equipment to maximize acoustical and air quality, setback from roof edges and screened from view.
— Organize rooftop equipment to maximize potential for photovoltaics.

Complementary Materials

— Brick and profile metal panels, concrete site walls, stairs, and sidewalks.



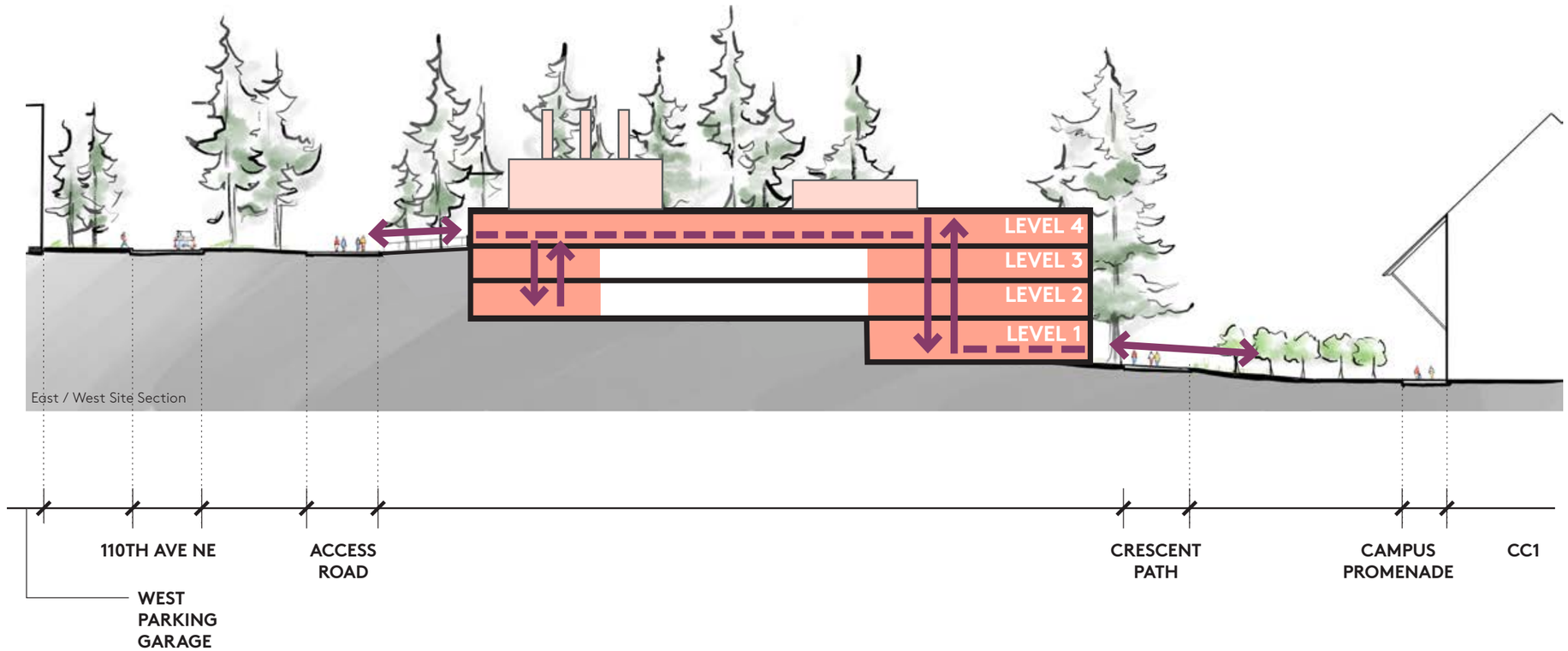
CMP Figure 4-15: Relationship to Topography


24


OLYMPIC COLLEGE

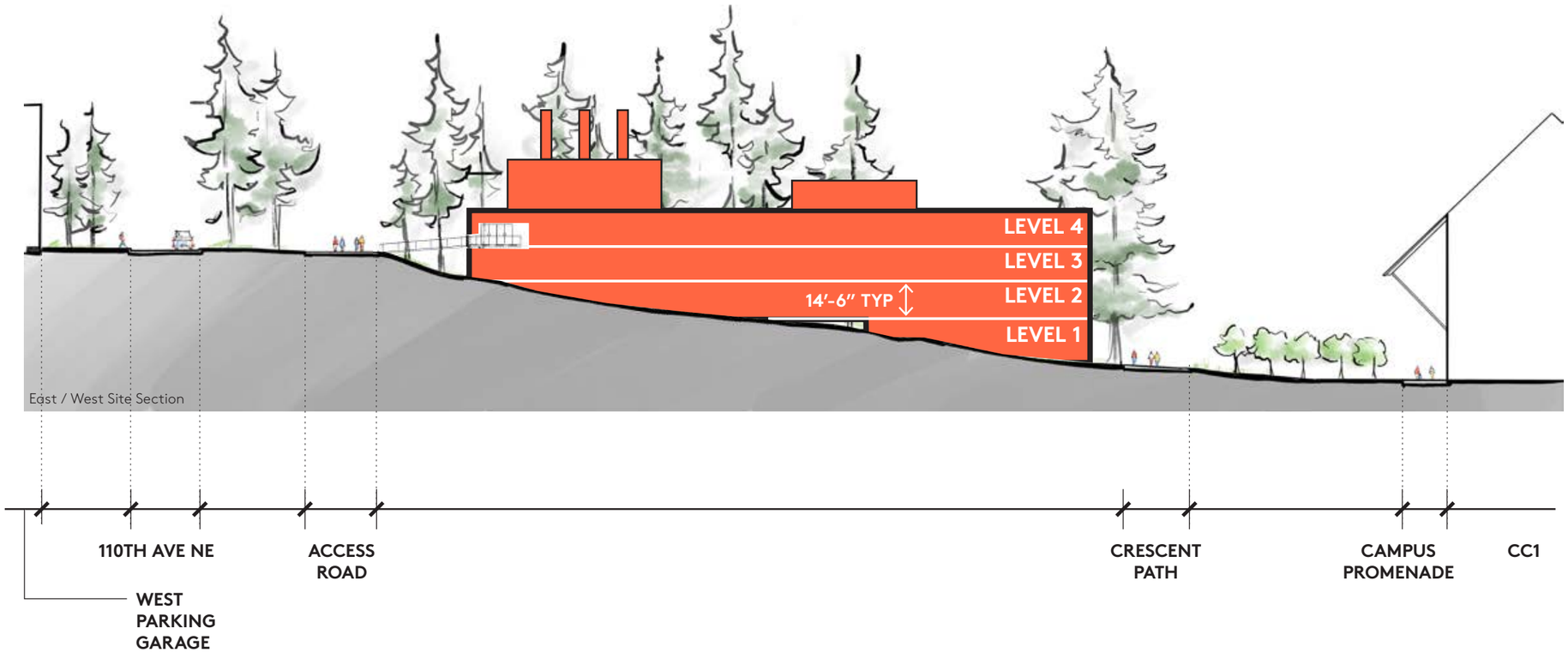
CIRCULATION

— Locate stairs to encourage movement near building entrances. Visual appeal of east stair will be amplified through transparency and choice of materials. The west stair will extend to the roof.
— Design hallways designed to foster engagement, group work and individual study spaces adjacent.
— Two elevators to provide redundancy that serve levels 1 - 4. The roof does not have elevator access in base scope.

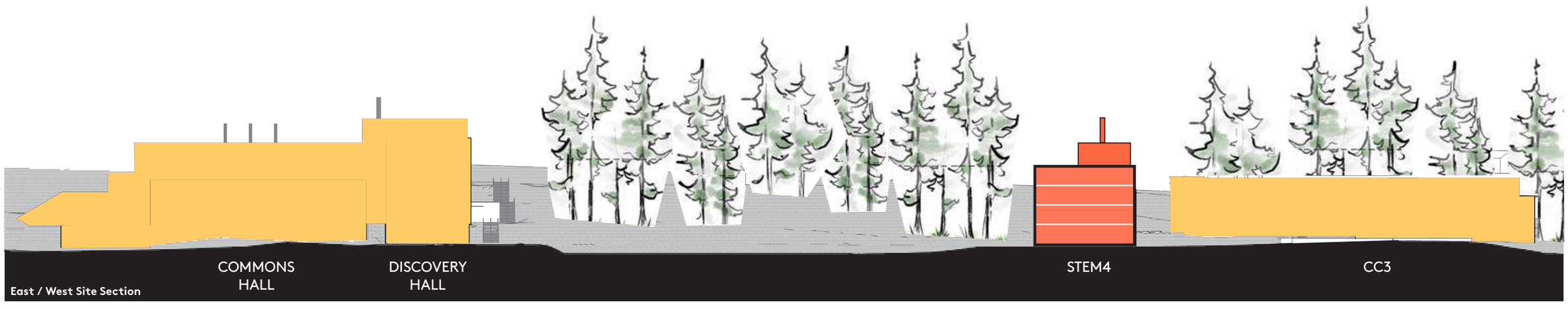


HEIGHT, BULK & SCALE

— A four-story building fits the scale of north quad and is more cost-effective than a 5-story structure of smaller footprint
— 14′-6″ average floor to floor height
  » Individual floor heights may be adjusted to accommodate specific programmatic needs
  » The finish floor elevations of Levels 1 and 4 align with on-grade building entries to provide universal access and bookend the building height.
— Building height is approximately 60′ at the East Plaza, well under the zoning height limit.
— Building width varies between 80′ and 115′
  » Width will modulate depending on plan geometry and size of lightwell
— Building Length is approximately 240′ - 280



East / West Site Section

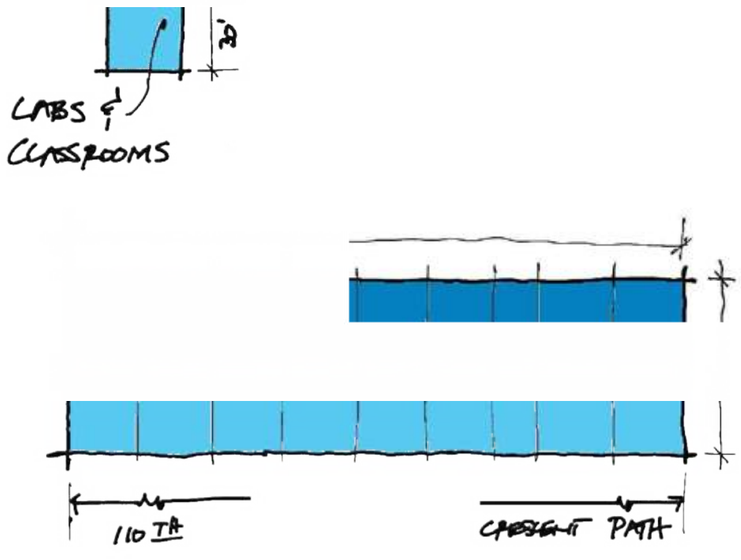


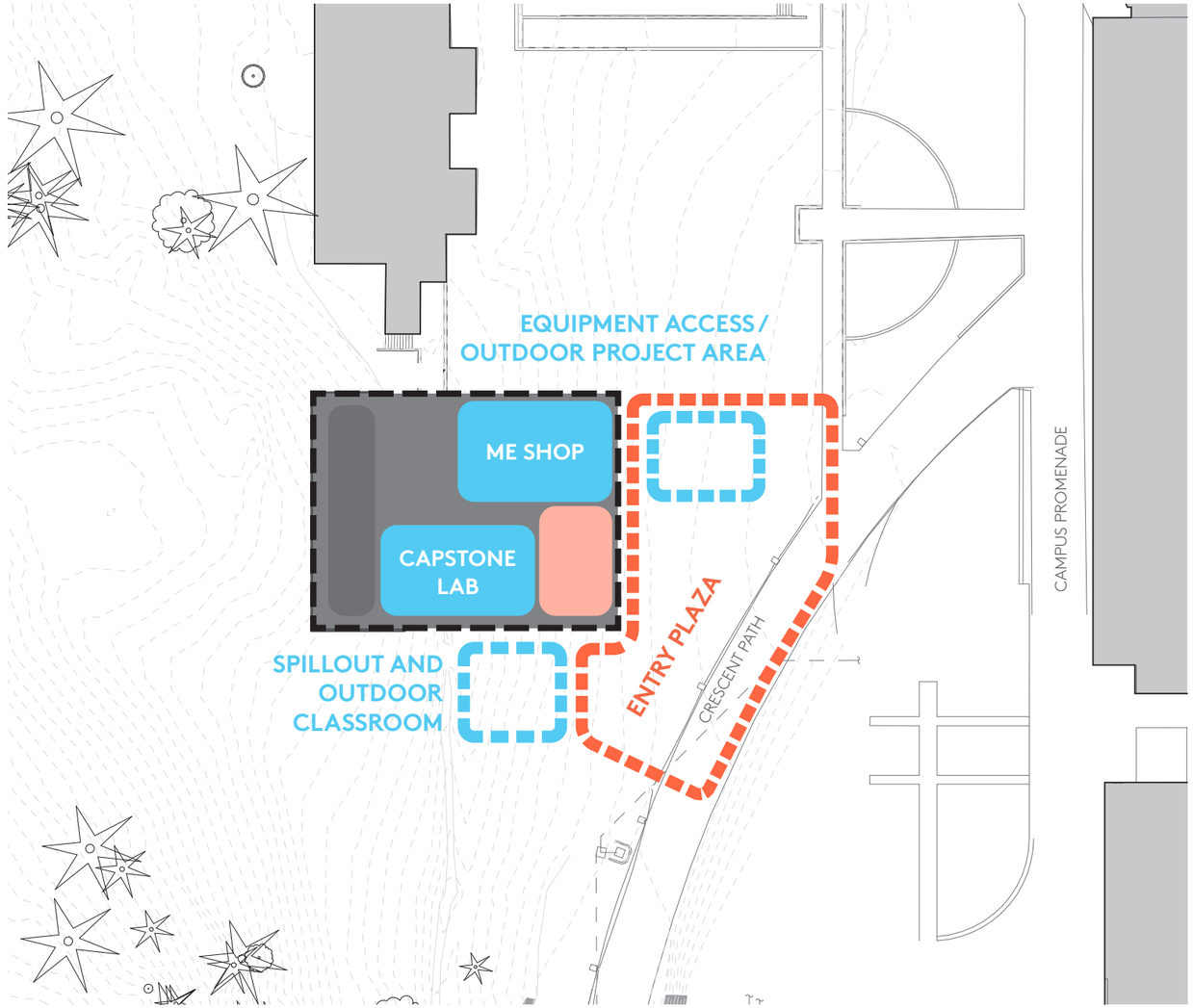
East / West Site Section

SITING THE PROGRAM

PLANNING MODULE

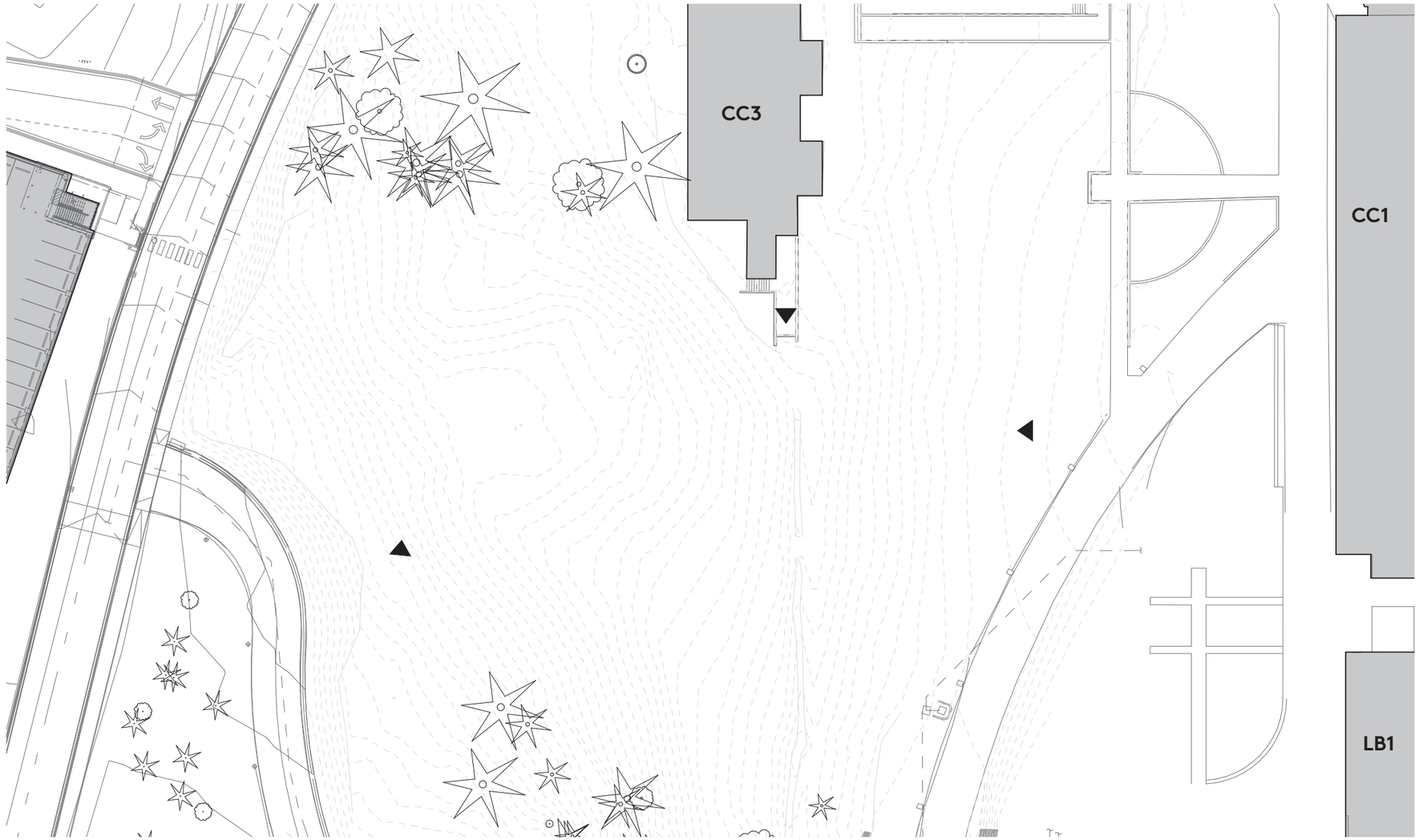
Programming defines the ideal laboratory planning module as 10′ -6″ parallel to a hallway or corridor and 30′ perpendicular to the circulation spine. This module corresponds to an efficient structural grid for post-tensioned concrete, mild steel-reinforced concrete or steel. It also aligns with a planniing module that works for classrooms and can be adapted to offices.





LEVEL 1

SITING THE PROGRAM



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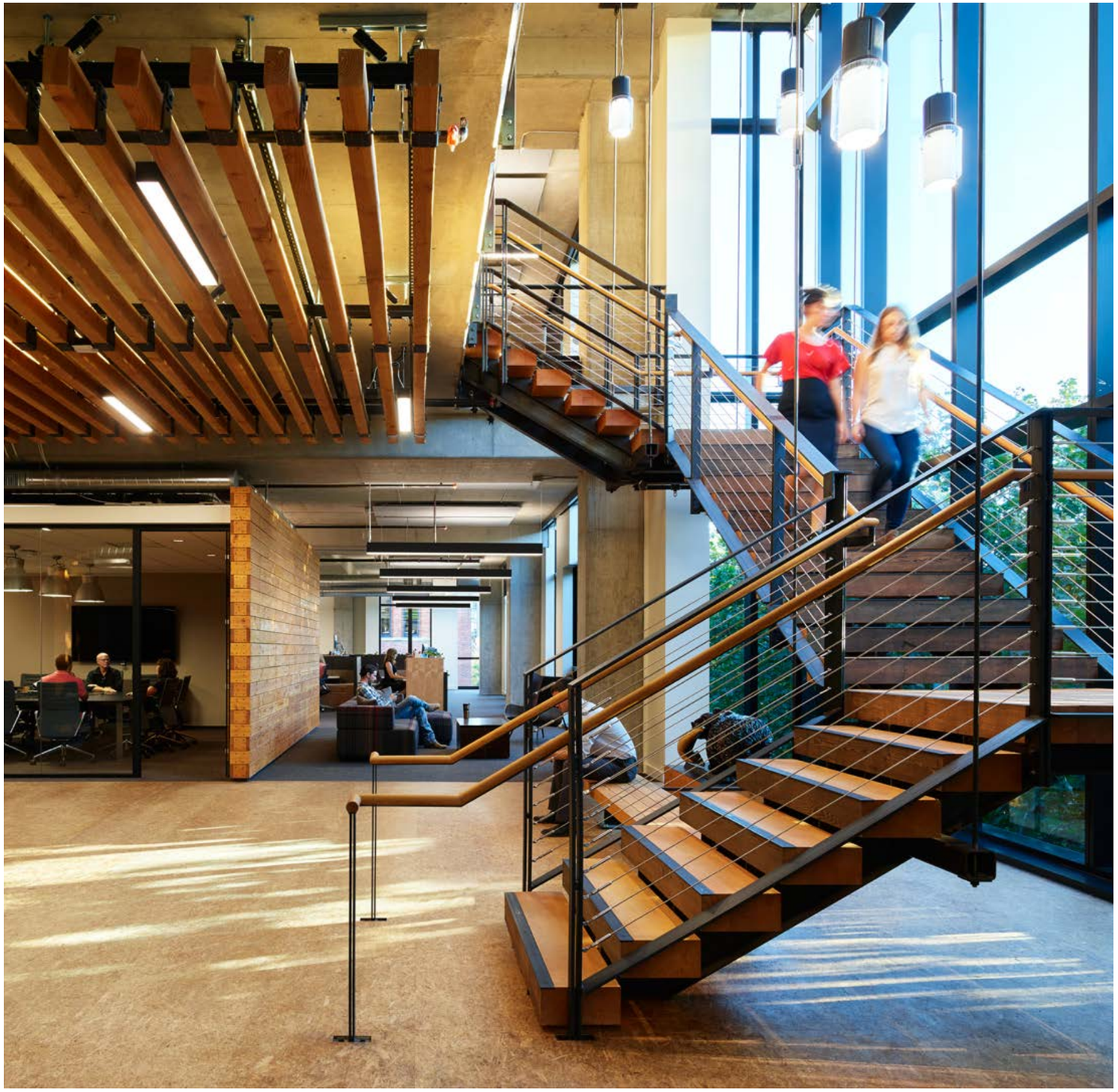
LEVELS 2 - 4 *(COMPOSITE)*

INTERIOR ENVIRONMENTS



04.5— ADDING VALUE

ENCLOSURE

— Greater proportion of curtainwall to enhance durability of glazing systems
— Solar shading to reduce heat gain and improve glare control*
— Increased thermal performance to enhance energy conservation and comfort*

Items marked with "*" contribute to UW GBS goal.

INTERIOR

— Wood ceilings and/or paneling in public space to introduce biophilic quality of natural materials. Salvaged wood can be incorporated in these interior elements.
— Enhanced design quality of both exit stairs will promote active lifestyle and improve wayfinding by treating required exit stairs as feature stairs.
— Increased area/quantity of relites will bring greater amount of daylight and transparency
— Additional casework to provide aesthetically pleasing solutions for storage in program spaces.
— Glass marker boards in lieu of porcelain to improve aesthetic appeal of marker boards.

05

PERFORMANCE REQUIREMENTS

05.1— VISION & GOALS

MEMORANDUM OF UNDERSTANDING

— *"Displaying the campus's commitment to environmental and economic sustainability, including by seeking to minimize building life-cycle costs and carbon footprint"*

Campus Master Plan

Stewardship is one of the six design principles embedded in the campus master plan. It requires stressing sustainable practices to the greatest degree practicable, including energy, resource efficiency, and healthy systems and environments.

Enhanced environmental and human health are identified as the related guiding principle.

Guiding Principles

— Consider economic and environmental sustainability in tandem
— Sustainable features must be visible and useful in the learning process
— Minimize embodied and operational carbon
— Provide durable, easy to maintain building systems to reduce life-cycle costs
— Contribute to Salmon Safe campus

05.2— ANALYSIS

A range of site strategies, building systems, and infrastructure options to support the project goal of economic and environmental sustainability were analyzed. The exploration included stormwater management options, rainwater reuse, structural and mechanical systems options, daylighting, and indoor environment. Each option was evaluated in terms of its contribution to resource conservation, carbon reduction, human health, durability, ease of maintenance, and first cost.

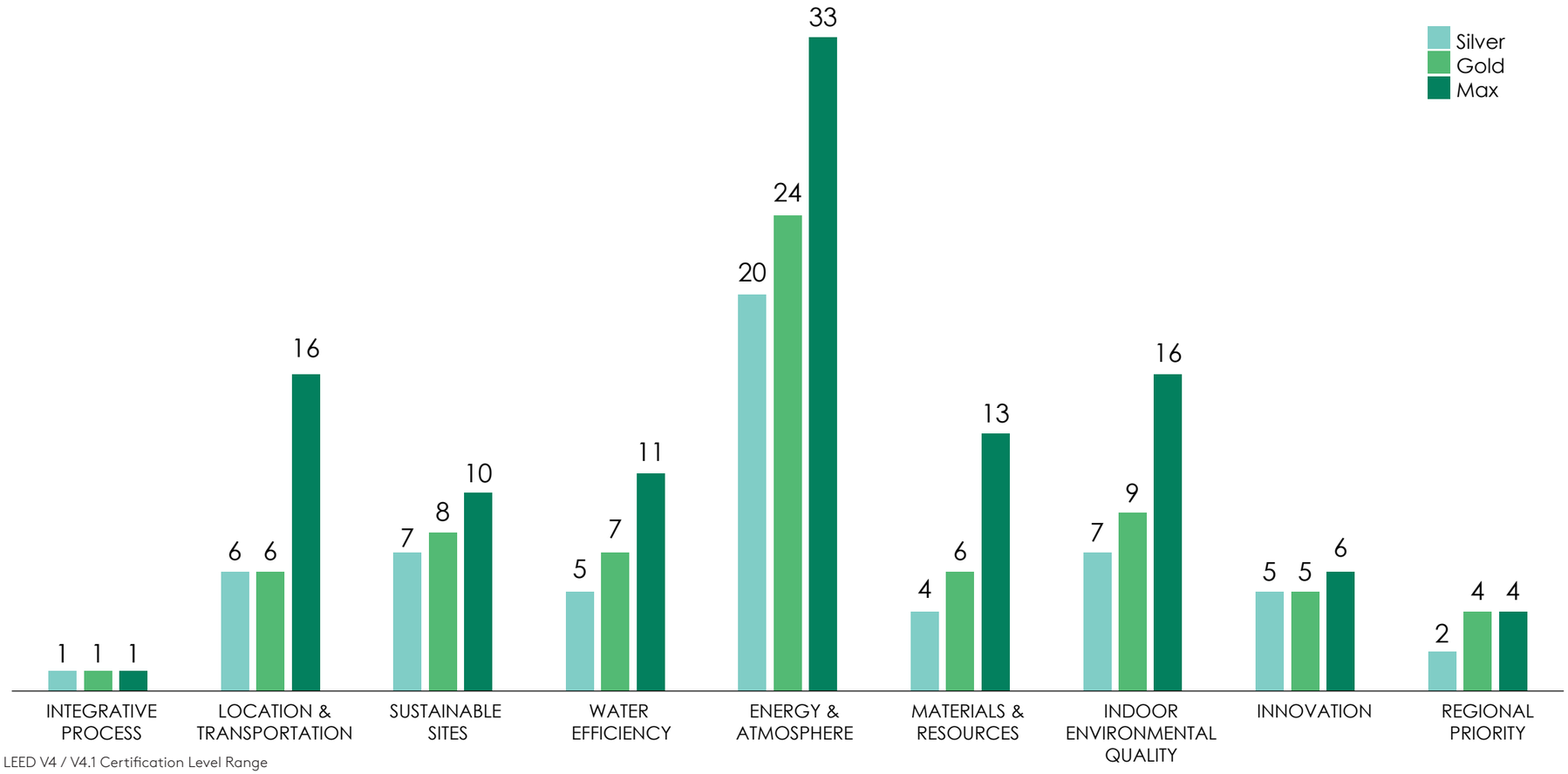
In addition to considering performance criteria, LEED and University of Washington Green Building Standards metrics, the team has obtained input from campus facilities and has led a sustainability workshop with a broad group of stakeholders.

This effort, combined with benchmarking and target scope analysis, has led to identifying sustainability scope targets and value adds described in the Target Scope & Budget Chapter.

To account for the varying stakeholder priorities, project goals, and budget, the team presented a range of sustainability targets to the Project Executive Committee for decisions at the end of the Project Definition phase. At the upper end of the range the project will feature systems necessary to meet UW Green Building Standards, which include LEED Gold certification, at least 15% energy use reduction relative to current code and at least 50% indoor and outdoor potable water use reduction. Achieving these standards requires a substantial initial investment. Maintaining a rainwater cistern for toilet flushing or for irrigation (the likely approach to reaching 50% combined potable water savings) increases long-term maintenance effort. Design options and life cycle costs for achieving UW Green Building Standards will be studied early in the design phase and will be presented for decision once sufficient information is available.

Benchmark projects that formed the basis for STEM 4 project budget achieved a mix of silver and gold ratings under LEED 2009. The STEM 4 project must follow current V4 version of LEED.

To account for the more stringent current requirements (LEED V4 Silver is roughly equivalent to LEED 2009 Gold), the team has considered both, Silver and Gold certification options and has developed pathways to achieving each level of certification. The potential pathways expressed in targeted number of points in each LEED category are illustrated in the graph.



LEED V4 / V4.1 Certification Level Range

PROCESS

Sustainability Workshop
The team led a sustainability workshop with Cascadia College and UW Bothell representatives on April 6th, 2020. The participants identified sustainable practices and priorities. Some align with UW Green Building Standards. Others are important to faculty, students, and staff. The workshop integrated six focus areas that contribute to a holistic approach to sustainability.

Project goals combine the Sustainability Workshop outcomes and related priorities identified during the Project Definition phase.

Common Thread
— Building and landscape should integrate learning opportunities and connections with curricula.

Ecosystem Goals
— Increase on-site biodiversity through landscape design and planting selections.
— Build on the 14-year-old practice of natural management of landscapes on campus. This goal relates directly to Salmon Safe certification.
— Promote living soils.
— Restore upland forest. This goal contributes to carbon sequestration.
— Maintain existing food forest and restore areas disrupted by new utilities.

Energy
— Reduce operational carbon footprint and meet 2030 challenge.
— Target EUI of 38 for non-lab spaces and EUI of 94 for lab spaces.
— Make energy metering data available to students and faculty for coursework.
— Pursue electrification of mechanical systems as much as feasible.
— Optimize daylighting of interior spaces and glare control.

Materials
— Prioritize safe and healthy materials.
— Advance material transparency through collection of EPDs.
— Salvage trees removed from the site for reuse and incorporate timber salvaged during construction of prior projects in STEM 4.

Resilience
— Use current and 2050 weather files to model mechanical system performance.
— Consider N+1 redundancy for lab exhaust and heating.
— Provide electrostatic filters for use during wildfire season.

Equity
— Engage the students, starting with student government and clubs, in the design process.
— Promote equity through prevailing wage practices and apprenticeship programs in construction.
— Advance equity through hiring practices and community involvement. Mithun is a JUST organization.
— Explore level of interest in gender-neutral restrooms.
— Provide lactation rooms.

Water
— Highlight water as a visible site element through the use of raingardens and open streams. Raingardens are preferred to concrete or other man-made channels.
— Prioritize on-site stormwater management over channeling stormwater to the wetland.
— If rainwater cistern is included, display it prominently.
— Consider safe access by students and faculty to stormwater vaults for learning purposes.

Wellness
— Incorporate an “irresistible stair” to promote use of stairs.
— Promote positive social interaction through design.
— Create an inclusive environment by providing a variety of non-structured indoor and outdoor spaces.
— Provide spaces for unstructured individual study.

Owner Project Requirements and Sustainability

The Owner's Project Requirements (OPR) define performance targets for facility operations and maintenance. They inform design decisions, systems selection, construction practices and are the foundation of building commissioning.

OPR and sustainability requirements are interrelated. For example, indoor temperature range impacts energy consumption, owner's requirements for interior finish materials influence indoor air quality.

Drafts of the OPR and Sustainability Requirements are included in the Appendix.

Intended Life of Building Systems

— Life of the structural system in the project area is defined by its performance in seismic events. Structural design will meet the new 2018 code, which includes more stringent seismic design requirements than 2015 code.
— Service life of major exterior envelope systems, elevators, mechanical, plumbing, electrical, and technology systems is determined by the standards contained in the UW Bothell |Cascadia College Design Reference and Operations Guide (DROG) and in the UW Facilities Standards and Design Guidelines (FSDG).

Emergency Planning

— The building will be evacuated in case of emergency.
— Life safety systems required for building evacuation will be supported by and emergency generator. Extent of laboratory exhaust systems and heating that must be connected to standby power or emergency generator will be defined in collaboration with Bothell Facilities Department and UW EH&S.

Transition to Occupancy (T2O) Action Plan

The T2O process starts in Project Definition and evolves as the project advances. The process assures that standard project documents are provided in the format required by the campus. Components of T2O include:

— Project Definition Final Target Program
— Life Cycle O&M
— Conditions of Owner Satisfaction
— LEED OPR
— Prevention by Design
— BIM Execution Plan
— Standards Variance Log
— Budget Options Log
— Submittal Review Process
— eO&M
— FM Data Transfer Plan
— MEP Commissioning Plan
— Enclosure Commissioning Plan
— IT Coordination Log
— Issues Tracking Plan
— Warranty Tracking
— Facility Management and Preventive Maintenance Plan

Building Occupant and O&M Personnel Requirements and Critical Design Criteria

These sections of OPR will be developed as part of the design phase of the project.

ENERGY LIFECYCLE COST ANALYSIS

All public projects in Washington are required to submit Energy Lifecycle Cost Analysis (ELCCA) studies to the Department of Enterprise Services. This study will be completed in the early Design Phase. The ELCCA combines 50-year costs for energy, maintenance and replacement to generate the anticipated total cost for the HVAC systems.

OPERATIONAL CARBON & ELECTRIFICATION

The key contributor to Climate Change is Greenhouse Gas (GHG) Emissions from burning fossil fuels, what we refer to as operational carbon. Traditionally the two main sources of operational carbon for buildings have been from electricity and natural gas heating. As electricity grids become cleaner by adding more renewables, the building industry is moving to electrify buildings as a means to eliminate GHG emissions. The path to decarbonization for STEM 4 is through electrification of the HVAC heating system.

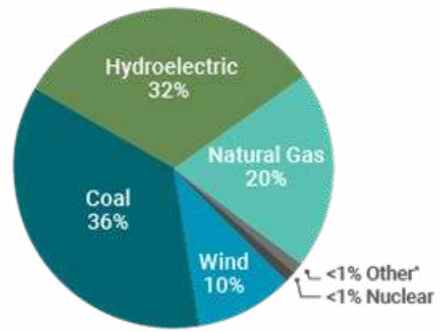


figure 1

Puget Sound Energy – Fuel Mix

Electricity is provided to the UWB/CC campus by Puget Sound Energy (PSE). PSE's energy mix is currently composed of the sources shown in Figure 1.

Per WA state law, PSE is required to phase out their coal, the highest GHG emitting power source, by 2025 and have zero emission power by 2045.

Puget Sound Energy – Green Direct

PSE also offers a unique option for large scale customers such as the UWB /CC campus called Green Direct. This program allows customers to opt-in to purchasing 100% renewable power for a specified length of time, usually 10-15 years. The existing campus buildings have opted into the Green Direct program already, meaning all their power is essentially coming from renewable sources. All new buildings, including STEM 4, need to opt-in individually to the current Green Direct offering. Currently PSE is in the planning stage for their next phase. Per discussions with PSE, enrollment for this phase may open in mid-2021, meaning STEM 4 would be eligible. This topic requires further coordination with the campus and PSE.

Decarbonization thru Electrification

As the PSE grid becomes cleaner, the emissions from electricity will reduce until 2045 when they are eliminated. In addition, opting into Green Direct will eliminate emissions as soon as the renewable system is on-line. This leaves the natural gas boilers as the only remaining source of GHG emissions in the Target Value Assumptions. If the natural gas boilers are included in the design, the building will always have GHG emissions. The solution to this is to electrify the heating system by replacing the natural gas boilers with electric heat pumps as shown in the system schematics in Figure 2 and Figure 3.

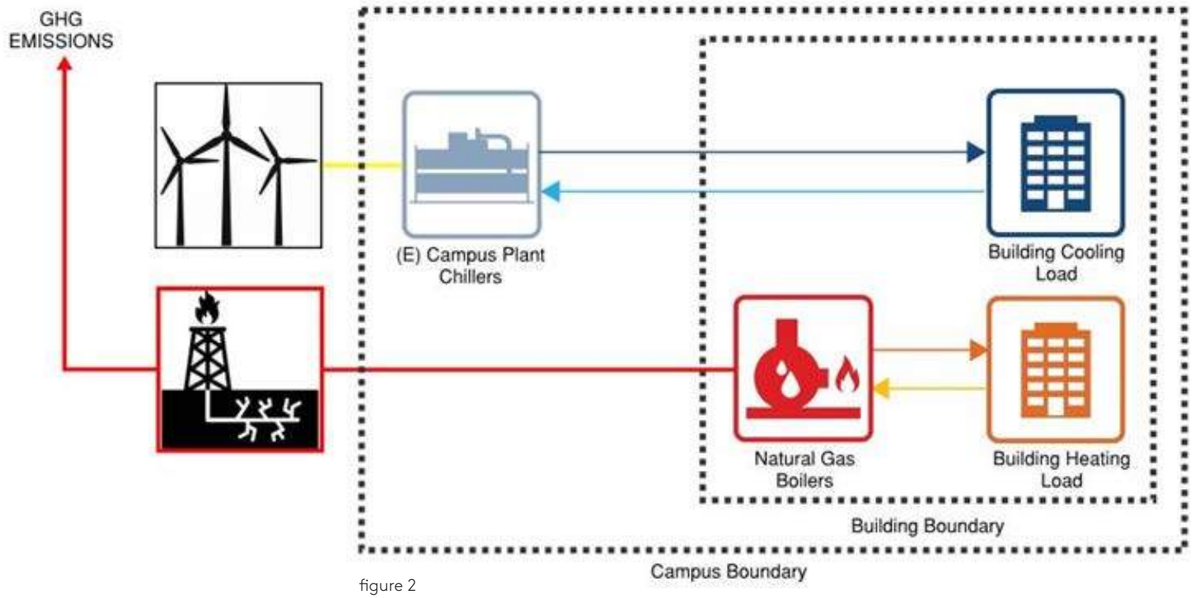


figure 2

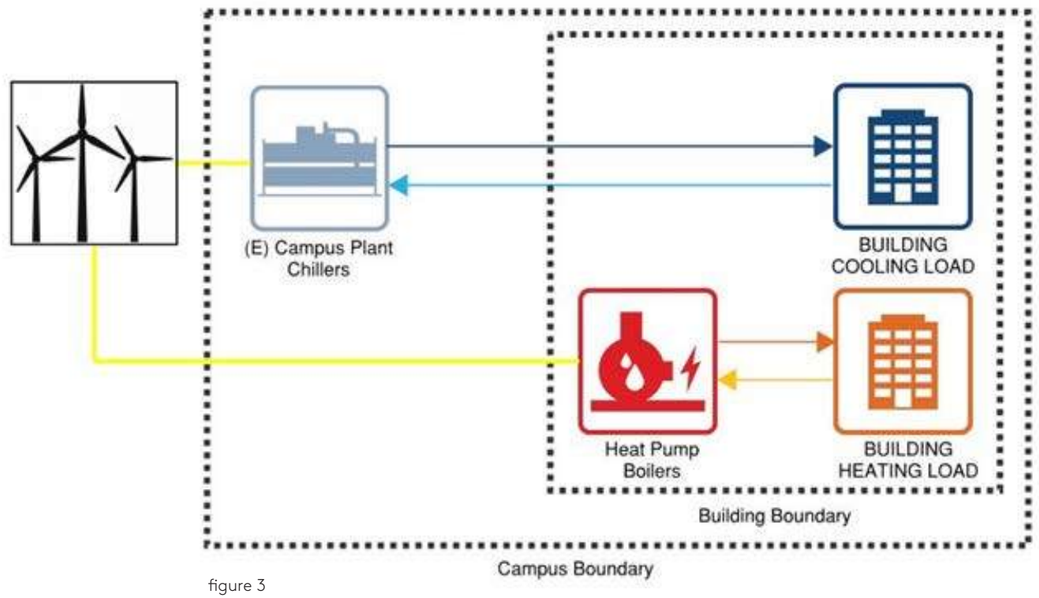


figure 3

05.3— BASE TARGET SCOPE

All systems are based on the 2018 International Building Code, other applicable codes and the Bothell Campus Design Reference and Operations Guide and UW Facilities Services Design Guidelines except where noted in the variance log.

General Indoor Environmental Criteria
— Cooling: 75 degrees +/- 2 degrees
— Heating: 70 degrees +/- 2 degrees

Energy Modeling
LEED certification model:
— ASHRAE 90.1 – 2010
— 20% annual energy cost savings

UW Green Building Standards
— 2018 Washington State energy code
— 15% annual energy use savings

STRUCTURAL

Criteria
— Live load criteria = 100 psf.
— No vibration criteria.
— Roof to accommodate photovoltaic array.

System
— Two-way post-tensioned concrete floor and roof, permanently mark tendons on underside of slab.
— Concrete shear walls for lateral resistance.
— Steel framing at mechanical enclosures/ screening, canopies, equipment support, cladding, finishes and the like.

MECHANICAL & PLUMBING

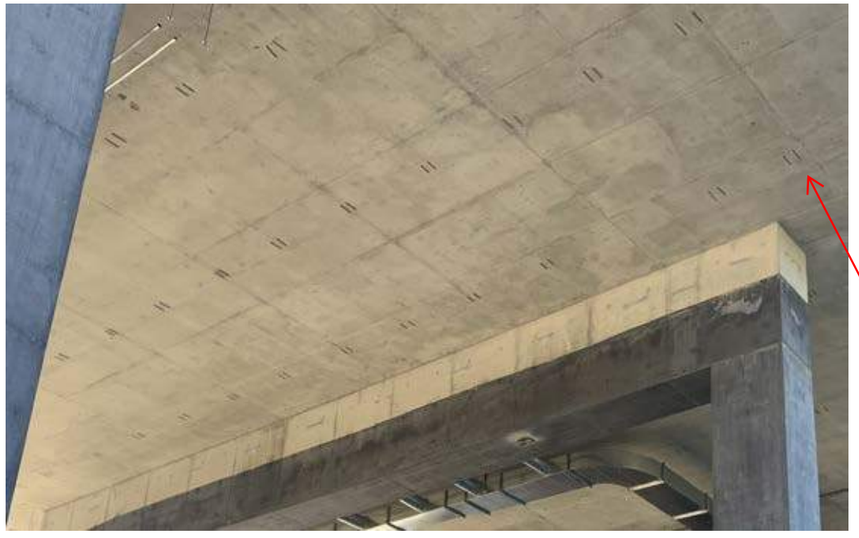
Source Energy
— Heating: natural gas.
— Cooling: campus chilled water loop, required system upgrades are included in a seperate project administered by Bothell campus facilities.

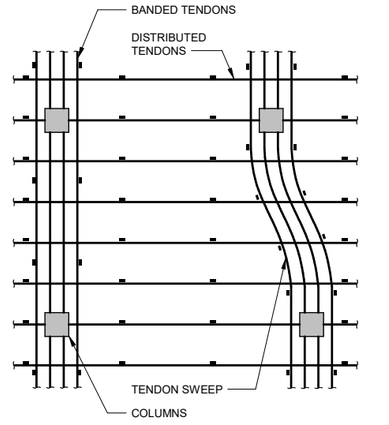
HVAC
— Four pipe fan coil systems, dedicated systems for lab and non-lab spaces.

Lab Ventilation / Exhaust
— Standard rootop air handling units supplying 100% outside air
— Rooftop exhaust fans located to minimize re-entrainment to CC-3 building intake.
— Venturi values at each fume hood.

Non-Lab Ventilation / Exhaust
— Dedicated outside air system (DOAS).
— Standard rooftop air handling units.

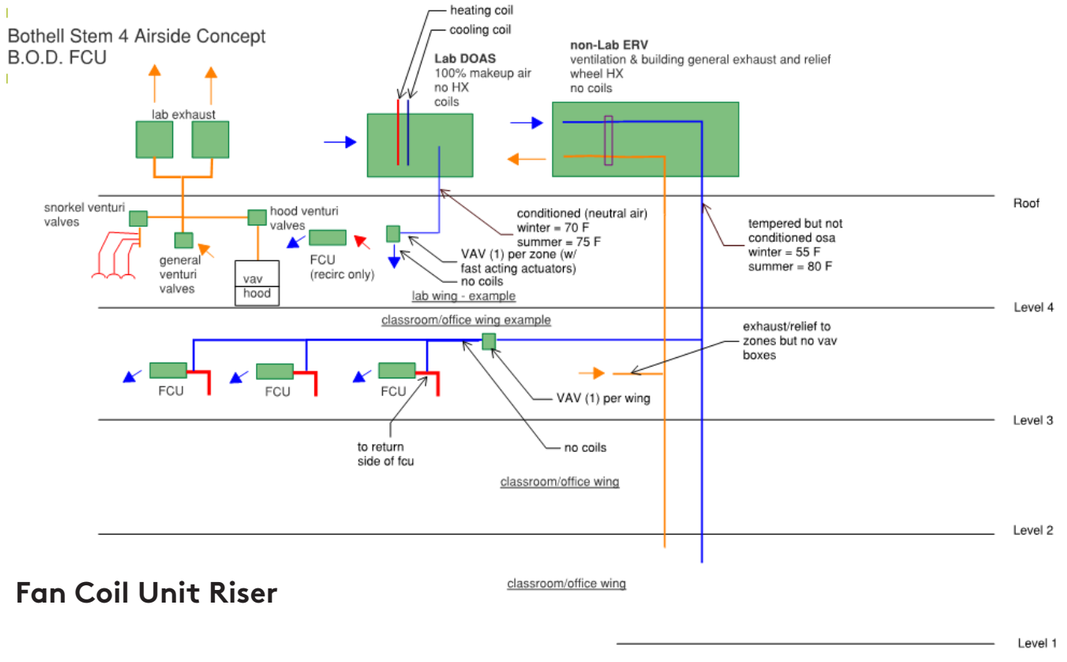
Plumbing and Piping
— Tepid water at emergency showers and eyewashes.
— Dedicated laboratory water loop with backflow preventers.
— Low flow plumbing fixtures.
— Provide compressed air, vacuum, manifolds and piping at cylinder gases in labs.





- 3/4"x6" CHAMFER STRIPS @ 10'-0" MAX
- DO NOT LOCATE WITHIN 3'-0" OF TENDON LOW POINTS
- MARK EACH SIDE OF BANDED TENDONS
- MARK EACH BUNDLE OF DISTRIBUTED TENDONS
- ADD MARKERS AT TENDON SWEEPS
- BANDED TENDON MARKERS NOT REQUIRED AT WIDE SHALLOWS

4 TYPICAL TENDON MARKERS
NO SCALE



Fan Coil Unit Riser

Sanitary System
— Floor drains with trap primers in toilet and equipment rooms.
— Condensate from HVAC coils routed to sanitary waste.
— Dedicated lab waste routed to pH monitoring station upstream of sanitary sewer connection.

ELECTRICAL
Power
— Transformer and diesel generator for permanent and standby power.
— Segregated transformers for clean and dirty power provided at each floor
— Circuits serving labs and other sensitive systems segregated from other loads.
— Standby power for elevators and critical lab equipment.
— PV ready facility.

Lighting
— Direct/indirect lighting at labs, classrooms and offices.
— Campus standard site lighting.
— All fixtures LED.
— Room controls with occupancy/vacancy sensors, daylighting and dimming for energy conservation.
— Integrate controls with AV in labs and classrooms
— Manual controls in all spaces.

Fire Alarm
— Fire alarm system upgrade of head-end equipment in other campus buildings as required.
— Building-wide and system-level metering provided.

LOW VOLTAGE & TELECOM
Data Networks
— Colocate UWB and CC service entries.
— Comm rooms at each level, align vertically.
— Cable tray in corridors, J-hooks to rooms.

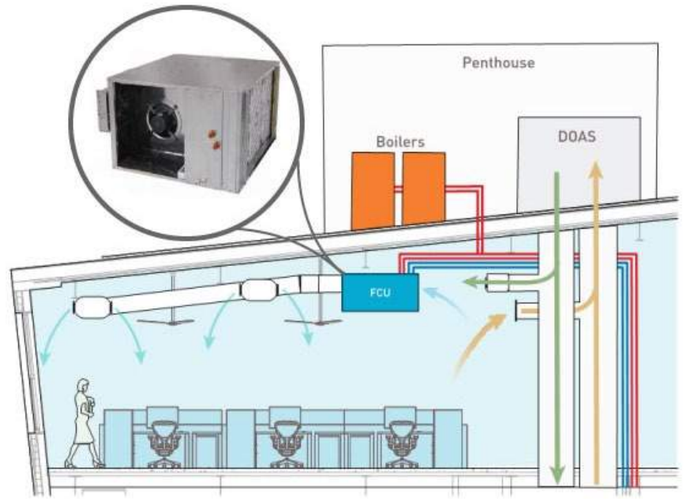
Wireless LAN (WiFi)
— Seperate networks for UWB and CC.
— Service to accomodate high usage at building and adjacent site.

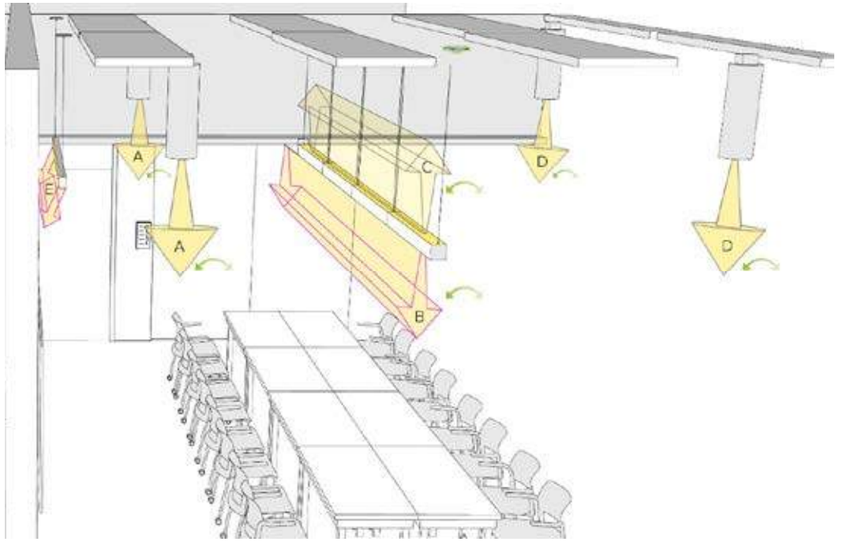
Security
— Operational card access system at building entries, rough-in for all lab, classroom and office suite entries.
— Rough-in for security cameras.

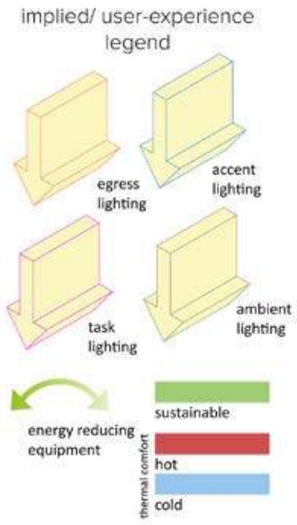
Ancillary Systems
— Distributed Antenna System (DAS) for emergency communication.
— Clock and paging systems.

AUDIO VISUAL
— Projectors and screens controlled from instructor podiums at labs and classrooms.

Fan Coil Unit Diagram







05.4— ADDING VALUE

Opportunities to add value to the project will be considered during the design and construction phases of the project. Items marked * increase level of compliance with UW Green Building Standards (UWGBS).

Value adds listed in this section focus on infrastructure. Chapters 2, 3 and 4 summarize value adds for the site, program, and building. See Value Add Log in the appendix for a complete list.

VERTICAL TRANSPORTATION

— Elevator stop at roof
  » IImprove maintenance access convenience

MECHANICAL

— VAV fan coil improvements
  » Increase number of control zones to enhance occupant comfort
  » Provide higher quality fan coil to improve durability, reduce mechanical noise and ceiling space requirements
— * Chilled beams in lieu of VAV fan coils to improve system quality and easeof maintenance, reduce mechanical noise
— * Heat pump boilers to reduce operational carbon
— * Lab exhaust heat recovery to gain significant energy savings
— N+1 redundancy for heating boilers and pumps to increase facility resiliency
— 30% extra capacity for lab exhaust system to provide greater adaptability to program change

PLUMBING

— Water conservation (may add to operational costs)
  » * Cistern and dual plumbing for indoor potable water savings
  » * Irrigation cistern for a dedicated planting area will enhance visibility of sustainable design features
— Heat pump water heaters to reduce operational carbon.

ELECTRICAL

— Access controls at classroom, lab, and office suite entries completed on Day 1 to improve safety and security; contribute to contact tracing in pandemics
— Enhanced lighting package for public areas to improve lighting quality and aesthetics
— * Reduced lighting power density and enhanced lighting controls to increase energy savings.
— Increase initial power density to provide higher flexibility for equipment choices and layout
— * Photovoltaic panels to increase energy savings and reduce operational carbon.

AUDIOVISUAL

— Enhanced AV package to facilitate lecture capture, hybrid classes or other technology enhancements.

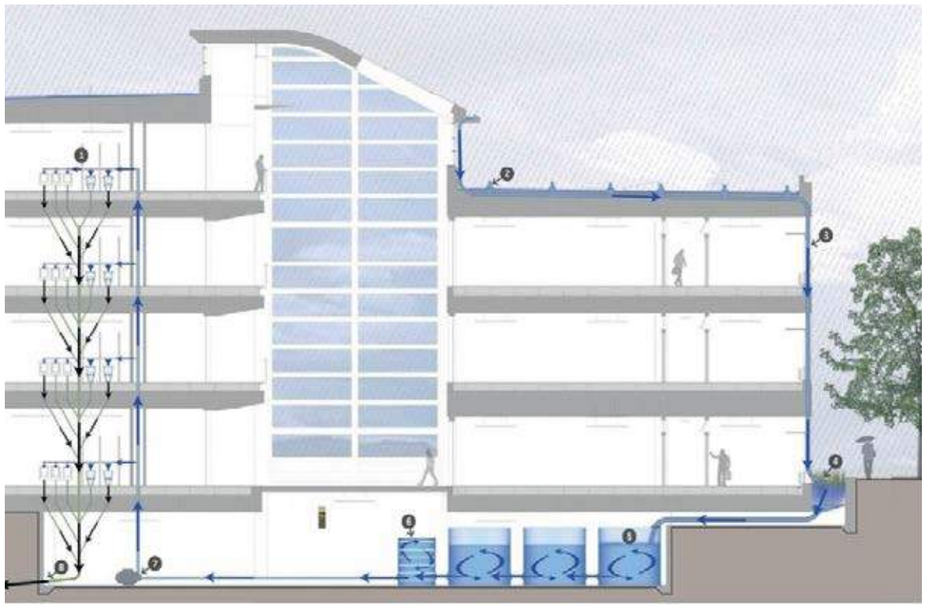


Figure 2. Rainwater Collection

06

TARGET SCOPE & BUDGET

06.1— PROCESS

BUDGET

The 2019 Washington State Capital Budget includes $79.438 million for design-build project delivery of Bothell STEM 4, which constitutes all of the funding for the project. The allocation was based on a joint capital request that anticipated a 100,000 gross square foot building and a $60 million design-build cost. The estimated scope and cost were informed by an evaluation of each institution's program needs and an analysis of three comparable, state funded higher education projects for science and engineering programs.

DESIGN-BUILD

Design-build project delivery takes advantage of the collective ability of the college, university and the design-builder to maximize the value of the budget. Initial alignment of scope and budget occurs in the Project Definition phase, creating an achievable base target with the common goal of increasing scope during the design and construction phases.

The base target responds to the institutions' baseline performance criteria for site development, program, building systems and sustainability. The team's expectation is that design innovation and management of risks and contingencies will allow the baseline to be exceeded. A preliminary list of elements that add value to the project provides a focus for the team moving forward. Key to the success of this approach is a focus on performance (rather prescriptive) criteria that in order to promote creativity and allow for competitive pricing.

PROCESS

Programming and Planning

— The scope of the project, from functional program to technical standards, is the result of a collaboration between the design-build team and the college and university's stakeholders through programming workshops, working group and big room meetings.

— It includes development of technical and sustainability requirements for site and facilities, which are the owner's Project Requirements (OPR). Three campus standards that impact scope and budget alignment have been considered:

» Bothell Campus Design Reference and Operations Guide
» UW Facilitates Facilities Services Design Guidelines, and
» UW Green Building Standards.

Benchmarks

Benchmarks are comparable projects that provide a frame of reference for understanding the relationship between scope and cost exercise in terms of performance criteria, program, site development and/or building systems.

Project Benchmarks

— Seven project benchmarks were evaluated for their comparable characteristics across all aspects of the proposed scope of STEM 4. Three are the projects that were used to establish the capital request for the project. Four new projects were analyzed as well.

System Benchmarks

— Detailed analysis of systems scope and cost, based on the Uniformat standard, helps to establish budgets for all of the project's components. Research includes the seven project benchmark projects and details from more than twenty other projects.

Test-to-fit Scenario

— Site plans, room data sheets, building planning diagrams and an outline specification provide a secondary means to evaluate the target scope of the project. They provide a means to test circumstances that are specific to STEM 4 in terms of its site, code requirements, LEED requirements and facility standards.

Alternatives Analysis

The programming, planning, benchmarking and test-to-fit evaluations identified a gap between project scope and budget. It also revealed differences about the hierarchy of project priorities amongst key stakeholders.

Three alternatives to the size of the building were developed to provide the institutions with a means to understand the options and to facilitate their decision-making process. The target scope of site development and building systems is constant for all three options.

A list of potential value added elements is also included along with a comparison of between the target scope for site and building systems and the campus standards. The intent is to allow the institutions' to consider ways maximize the size of the building while meeting other critical demands.

TARGET SCOPE AND BUDGET

Decisions about the final scope and budget are documented, providing the design-build team and the institution's stakeholders with a road map for design and construction process that maximizes value in alignment with agreed-upon priorities.

06.2— PROJECT BENCHMARKS

Detailed analysis of design and construction costs for recent university and community college projects provides a frame of reference for STEM 4. Eight projects of comparable program, size, complexity and geographic location were comprehensively evaluated.

Three were the basis of the 2019 capital budget request for STEM 4:
— WSU Everett
— Edmonds College, SET Building
— Grays Harbor College, STEM Building.

Four additional projects were evaluated:
— Everett Community College, Learning Resource Center
— Olympic College, College Instruction Center
— Shoreline Community College, HSAMCC
— UW Bothell, Discovery Hall.

STEM 4 cost per square foot is based on Option B described on page 85.

WSU
WSU EVERETT
$825/GSF *Project Cost*

EDMONDS CC
SET BUILDING
$889/GSF *Project Cost*

SHORELINE CC
HSAMCC
$963/GSF *Project Cost*

GRAYS HARBOR COLLEGE
STEM BUILDING
$1,106/GSF *Project Cost*

GSF $800/ GSF
GSF $900/ GSF
GSF $1,000/ GSF
GSF $1,100/ GSF
GSF $1,200/ GSF
GSF $1,300/ GSF

EVERETT CC
LEARNING RESOURCE CENTER
$861/GSF *Project Cost*

OLYMPIC COLLEGE
COLLEGE INSTRUCTION CENTER
$927/GSF *Project Cost*

STEM 4

CC / UWB
STEM 4
$1,044/GSF *Project Cost*
76,000 GSF

UW BOTHELL
DISCOVERY HALL
$1,303/GSF *Project Cost*

PROJECT BENCHMARK
BENCHMARK RANGE

Evaluation

Evaluation of the benchmark projects included:

— review of bid documents, cost estimates, pay applications, and change orders,
— interviews with project managers and facility managers,
— identification of regional and prevailing wage differences, and
— Identification of project delivery models.

Adjustments

In order to provide a balanced comparison, the costs were adjusted to current market conditions to account for increases due to:

— changes in the structural and energy codes,
— changes in LEED requirements, and
— escalation

These adjustments had a significant impact on the cost of the three benchmark projects that provided a basis for the 2019 capital request for STEM 4. A summary of the increased requirements follows.

ENERGY CODE

— Dedicated outside air systems
— Increased energy recovery requirements
— Condensing domestic water heaters
— Six additional energy conservation measures, minimum
— Increased envelope infiltration requirements
— Increased glazing and insulation requirements
— Additional commissioning
— Additional metering
— Controlled receptacles and lighting

STRUCTURAL CODE

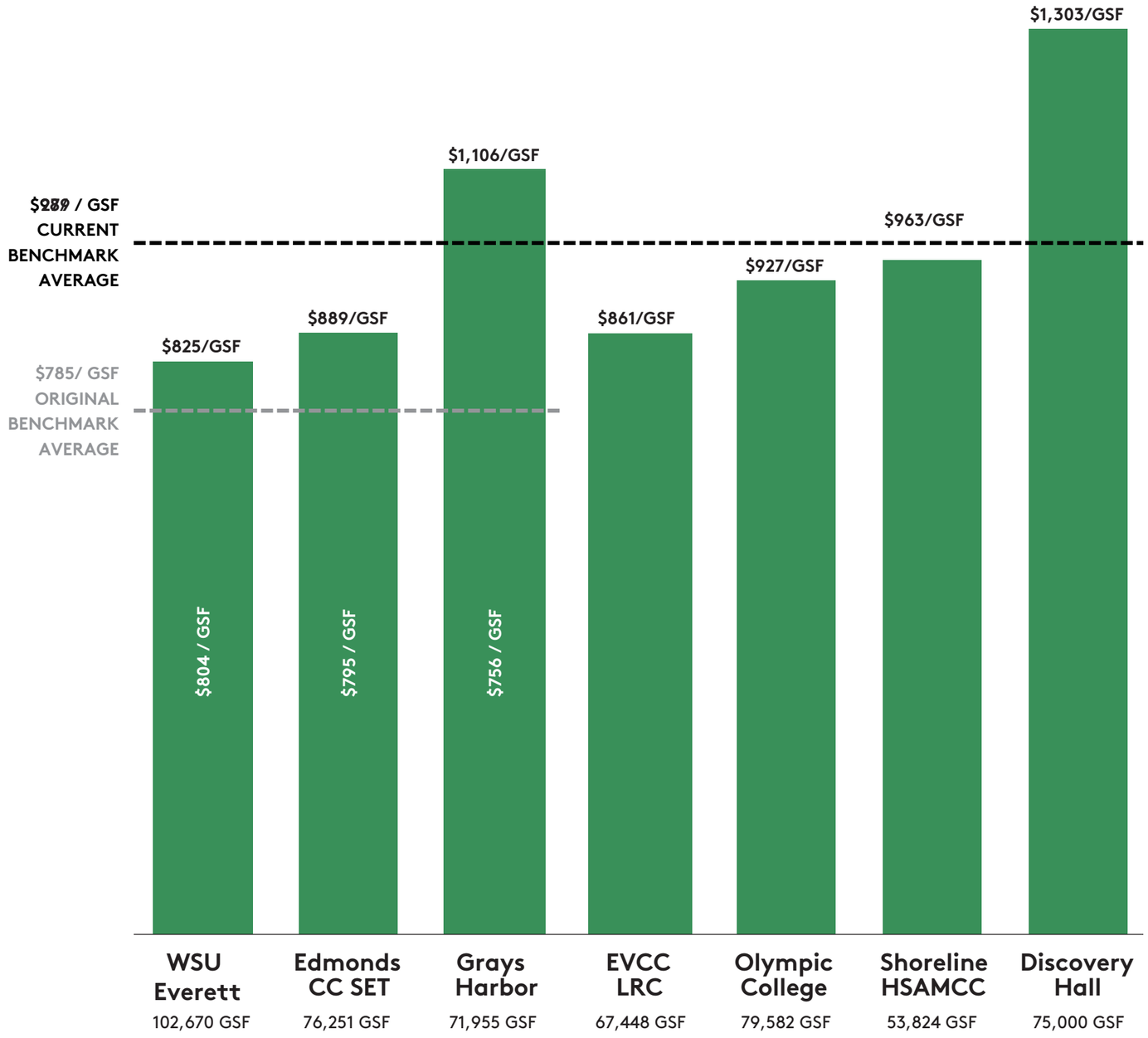
— Increased resistance to seismic forces

LEED

— LEED v4 replaces LEED 2009
— Increased construction and soft costs
— New and more challenging credits in all categories
— Energy systems performance must exceed code
— Energy performance and water conservation credits align with UW Green Building goals

ESCALATION

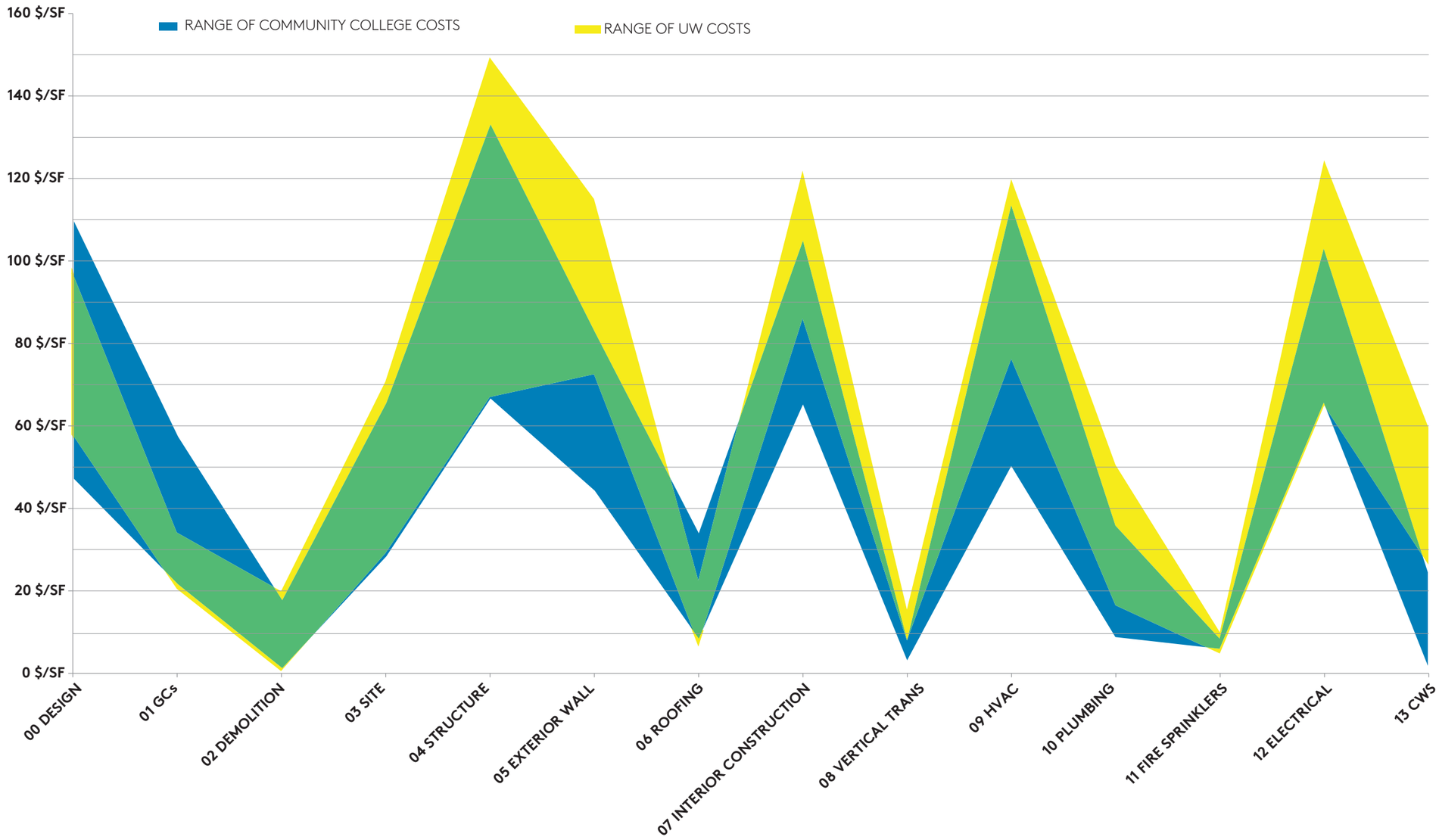
— All projects are escalated to June 2021



06.3— SYSTEM BENCHMARKS

Detailed system benchmarks, based on Uniformat categories, supplement the information provided by the project benchmarks. Additional projects were surveyed to support the analysis. They were chosen based on their comparability to STEM 4 site, program, building and performance requirements. A system by system survey showing the range of costs follows. The target budget for STEM 4 is indicated on each one.

The "mountain range" chart is an amalgamation of all the systems. It is color-coded to illustrate the range of costs for community college and university projects and indicates the area of overlap



SYSTEM BENCHMARKS-
00 DESIGN

WSU
WSU EVERETT
$53/BSF

UW
HSEB - 50% DESIGN BUDGET
$87/BSF

GRAYS HARBOR COLLEGE
STEM BUILDING
$94/BSF

WSU TRI-CITIES
ACADEMIC BUILDING
$103/BSF

$0 / BSF
$30 / BSF
$60 / BSF
$90 / BSF
$120 / BSF
$150 / BSF

UW
POPULATION HEALTH FACILITY
$62/BSF

STEM 4

CC /UWB
STEM 4
$92/BSF
76,000 GSF

UWB
DISCOVERY HALL
$97/BSF

SYSTEM BENCHMARK

BENCHMARK RANGE

SYSTEM BENCHMARKS-
03 SITE

OLYMPIC COLLEGE
CIC
$38/BSF

CC / UWB
STEM 4
$57/BSF
76,000 GSF

STEM 4

UWB
HSEB - 50% DESIGN BUDGET
$62/BSF

$0 / BSF
$30 / BSF
$60 / BSF
$90 / BSF
$120 / BSF
$150 / BSF

UW
POPULATION HEALTH FACILITY
$39/BSF

BAINBRIDGE ISLAND
BLAKELY ELEMENTARY
$60/BSF

UWB
DISCOVERY HALL
$139/BSF

SYSTEM BENCHMARK

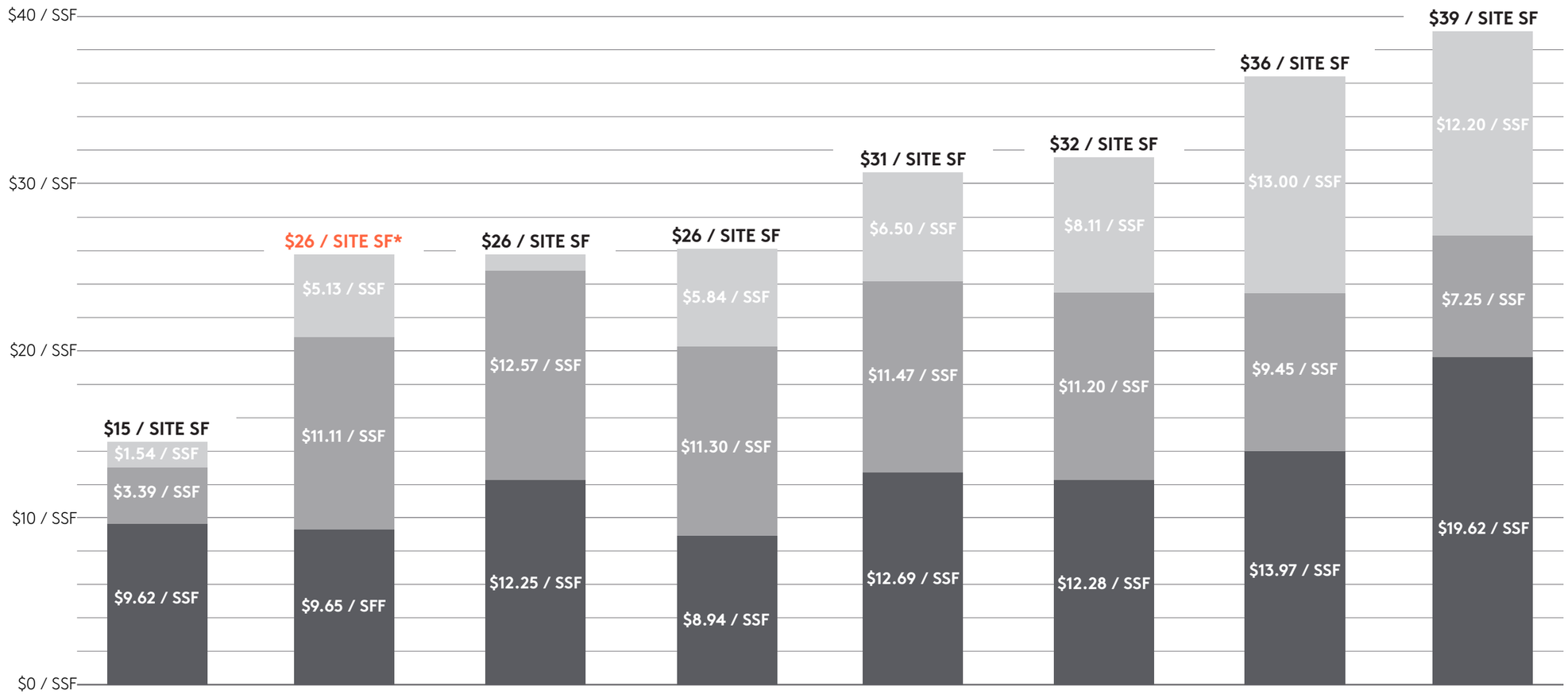
BENCHMARK RANGE

SYSTEM BENCHMARKS- LANDSCAPE COSTS

Additional projects were evaluated for specific site sub-system costs. Hardscape,softscape, and costs were compared to site areas for the following projects:

— UW Bothell, Discovery Hall
— Bainbridge Island, Blakely Elementary School
— UW, Population Health Facility
— Portland, Heartline Development
— UW, HSEB - 50% Design Budget
— St. Mary's on the Lake
— University Prep, ULAB

*The STEM 4 site area was based on the test to fit exercise. See section 6.4 for more detail.




UWB DISCOVERY HALL
286,132 SF SITE AREA

CC / UWB STEM 4
81,000 SF SITE AREA*


ST. MARYS ON THE LAKE
79,250 SF SITE AREA


BAINBRIDGE BLAKELY SCHOOL
111,577 SF SITE AREA


UW HSEB - 50% DESIGN
52,975 SF SITE AREA


PORTLAND HEARTLINE
16,180 SF SITE AREA


UW POP. HEALTH
136,299 SF SITE AREA


ULAB UPREP
51,108 SF SITE AREA

SITE FURNISHINGS COSTS / SITE SF
SOFTSCAPE COSTS / SITE SF
HARDSCAPE COSTS / SITE SF

SYSTEM BENCHMARKS-
04 STRUCTURAL

UW
POPULATION HEALTH FACILITY
$66/BSF

CC / UWB
STEM 4
$67/BSF
76,000 GSF

STEM 4

UW
3RD & BATTERY
$71/BSF

UW
LIFE SCIENCES
$85/BSF

$0 / BSF
$30 / BSF
$60 / BSF
$90 / BSF
$120 / BSF
$150 / BSF

SHORELINE
ICHS
$66/BSF

UW
HSEB - 50% DESIGN BUDGET
$70/BSF

UW
PACCAR HALL
$83/BSF

UW BOTHELL
DISCOVERY HALL
$143/BSF

SYSTEM BENCHMARK

BENCHMARK RANGE

SYSTEM BENCHMARKS-
05 EXTERIOR WALL

SHORELINE
ICHS
$49/BSF

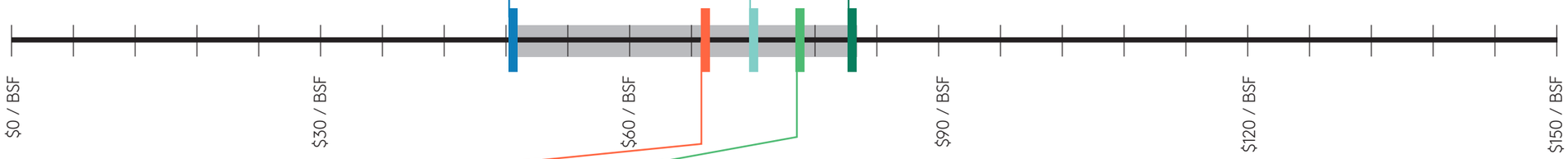
$101/WSF | 23,686 Total WSF

UW
HSEB - 50% DESIGN BUDGET
$72/BSF

$151/WSF | 46,811 Total WSF

UWB
DISCOVERY HALL
$82/BSF

$121/WSF | 50,626 Total WSF



STEM 4

UWB / CC
STEM 4
$68/BSF
76,000 GSF

$124/WSF* | 40,091 Total WSF *(test-to-fit)

OLYMPIC COLLEGE
CIC
$76/BSF

$137/WSF | 43,963 Total WSF

SYSTEM BENCHMARK

BENCHMARK RANGE

SYSTEM BENCHMARKS-
07 INTERIOR CONSTRUCTION

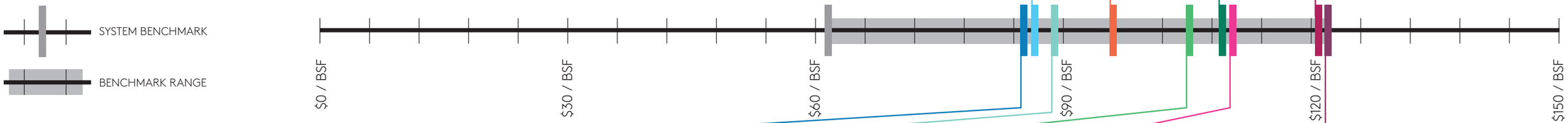
UW
HSEB - 70% DESIGN BUDGET
$86/BSF

CC / UWB
STEM 4
$96/BSF
76,000 GSF

STEM 4

UW
NANO ENGINEERING
$110/BSF

UW
CSE 2
$121/BSF



UW
POPULATION HEALTH FACILITY
$85/BSF

SHORELINE CC
HSAMCC
$89/BSF

UW
PACCAR HALL
$105/BSF

OLYMPIC COLLEGE
CIC
$110/BSF

UWB
DISCOVERY HALL
$121/BSF

SYSTEM BENCHMARKS-
09 HVAC

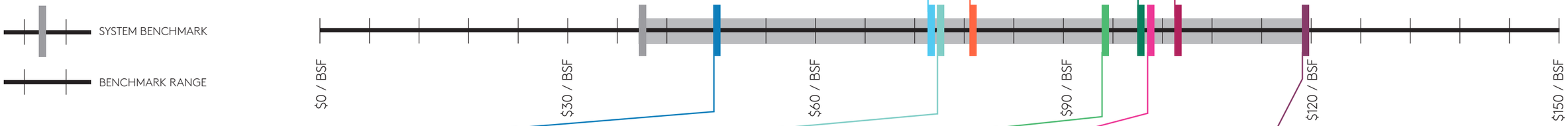
UW
POPULATION HEALTH
$76/BSF

CC / UWB
STEM 4
$79/BSF
76,000 GSF

STEM 4

UW
HSEB - 50% DESIGN BUDGET
$99/BSF

WSU
GAH PHASE 2
$104/BSF



OSU CASCADES
TYKESON HALL
$48/BSF

WSU
TRI-CITIES ACADEMIC BLDG
$76/BSF

WSU
REC 5 - PLANT SCIENCES BLDG
$95/BSF

WSU
TROY HALL
$100/BSF

UWB
DISCOVERY HALL
$119/BSF

SYSTEM BENCHMARKS-
10 PLUMBING

CBC
HEALTH & SCIENCES BLDG
$20/BSF

CC / UWB
STEM 4
$33/BSF
76,000 GSF

STEM 4

WSU
TRI-CITIES ACADEMIC BLDG
$41/BSF

WSU
TROY HALL
$46/BSF

$0 / BSF
$30 / BSF
$60 / BSF
$90 / BSF
$120 / BSF
$150 / BSF

SYSTEM BENCHMARK

BENCHMARK RANGE

OSU
CASCADES TYKESON HALL
$23/BSF

WSU
REC 5 - PLANT SCIENCES BLDG
$39/BSF

WSU
GAH PHASE 2
$44/BSF

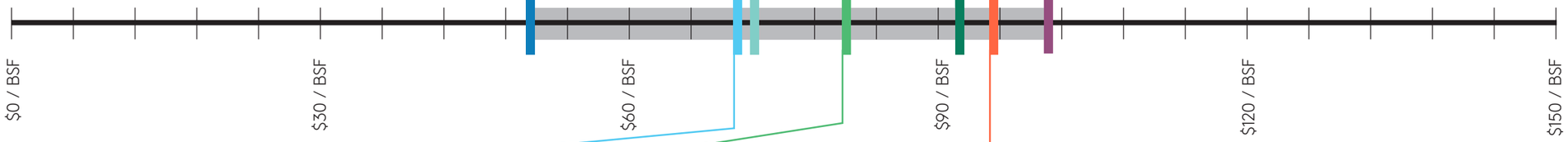
SYSTEM BENCHMARKS-
12 ELECTRICAL

SOUTH LAKE UNION MARRIOTT
$50/BSF

BELLEVUE COLLEGE STUDENT SUCCESS CENTER
$72/BSF

UW HSEB
$92/BSF

OVERLAKE MEDICAL CENTER EXPANSION
$100/BSF



AMAZON BLOCK 20
$70/BSF

UW NORTH CAMPUS
$81/BSF

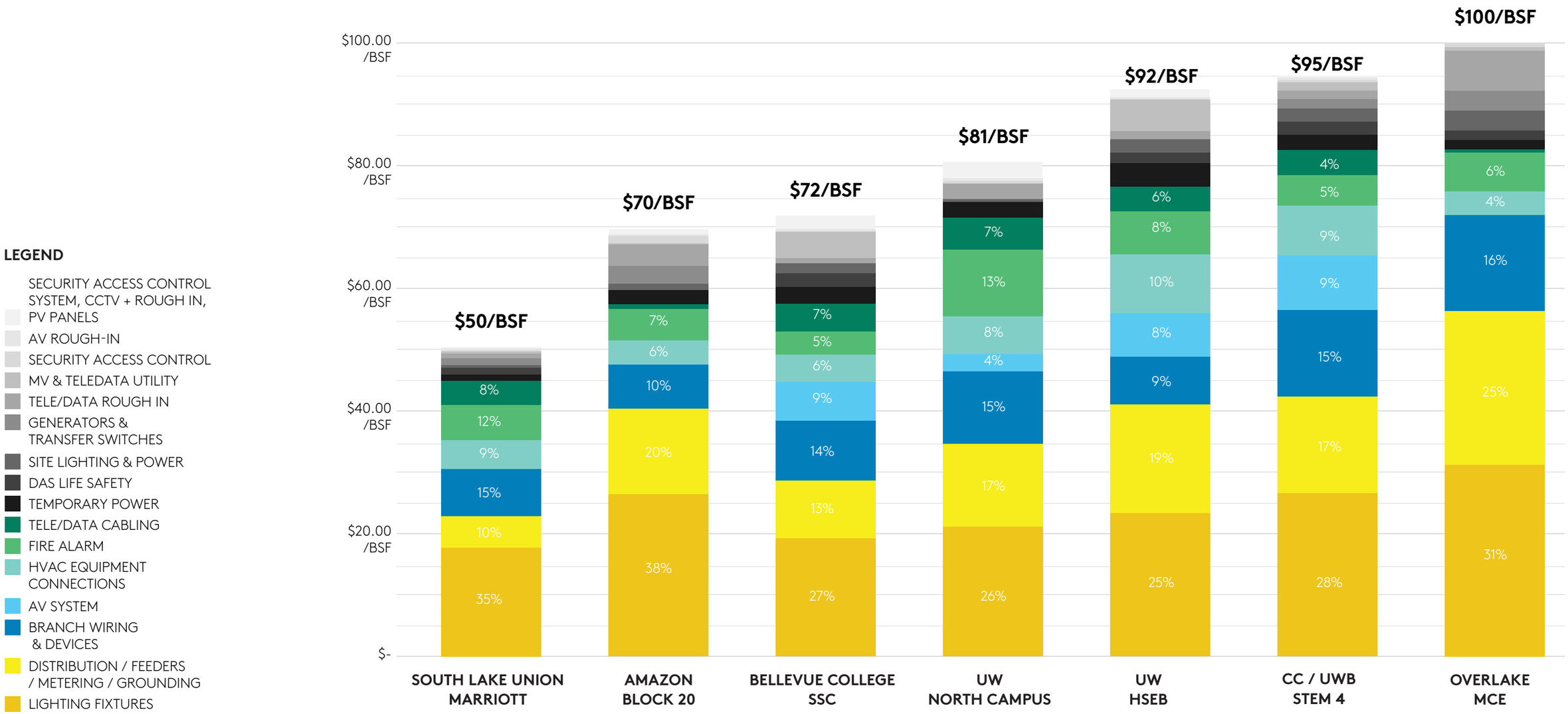
STEM 4

CC / UWB STEM 4
$95/BSF
76,000 GSF

SYSTEM BENCHMARK

BENCHMARK RANGE

ELECTRICAL SUB-SYSTEM BENCHMARK COSTS

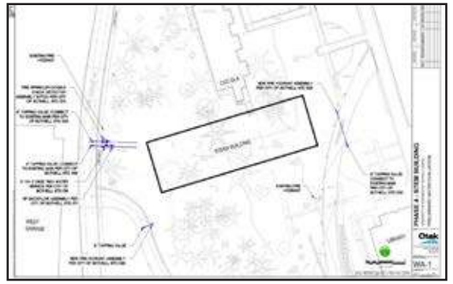


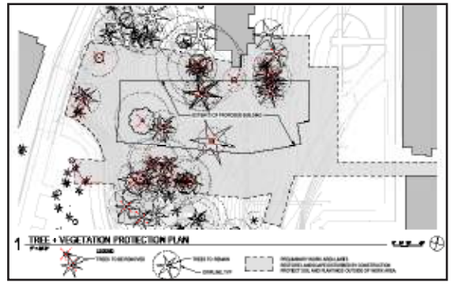
LEGEND

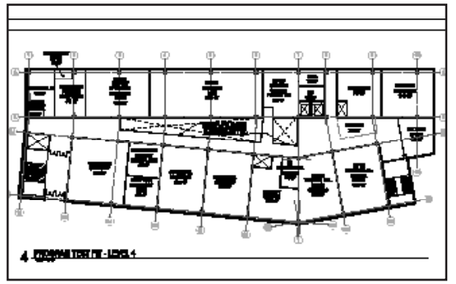
- SECURITY ACCESS CONTROL SYSTEM, CCTV + ROUGH IN, PV PANELS
- AV ROUGH-IN
- SECURITY ACCESS CONTROL
- MV & TELEDATA UTILITY
- TELE/DATA ROUGH IN
- GENERATORS & TRANSFER SWITCHES
- SITE LIGHTING & POWER
- DAS LIFE SAFETY
- TEMPORARY POWER
- TELE/DATA CABLING
- FIRE ALARM
- HVAC EQUIPMENT CONNECTIONS
- AV SYSTEM
- BRANCH WIRING & DEVICES
- DISTRIBUTION / FEEDERS / METERING / GROUNDING
- LIGHTING FIXTURES / BRANCH WIRING

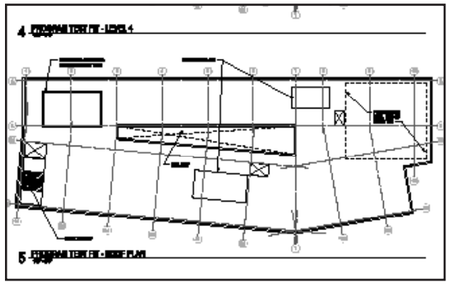
06.4— TEST-TO-FIT SCENARIO

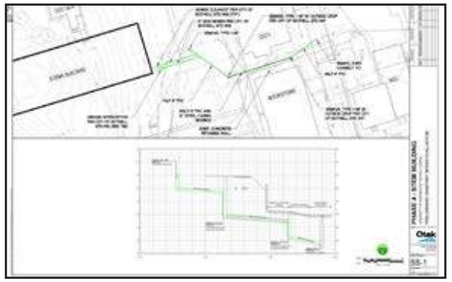
To confirm the target budgets identified by project and systems benchmarking the design-build team developed a cost estimate for a “test-to-fit “ scenario for an 86,000 GSF building that is based on project-specific circumstances. These include the initial site, program, building and performance requirements, and jurisdictional requirements. The test-to-fit scenario includes civil, architectural and structural drawings, and an outline specification. However, it is not meant to be the design concept for the project.

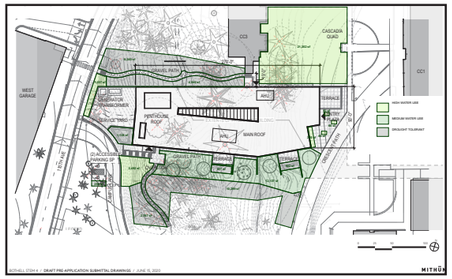


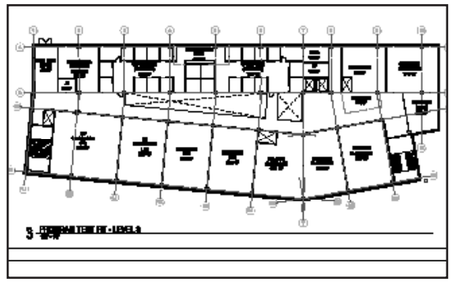


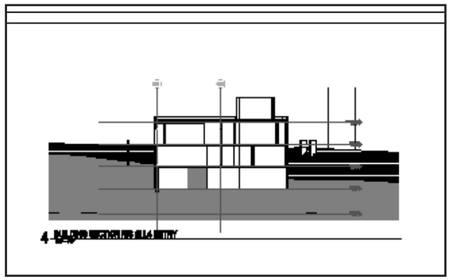


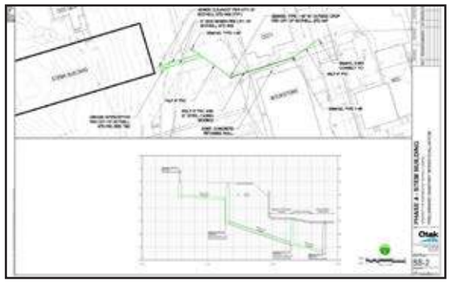


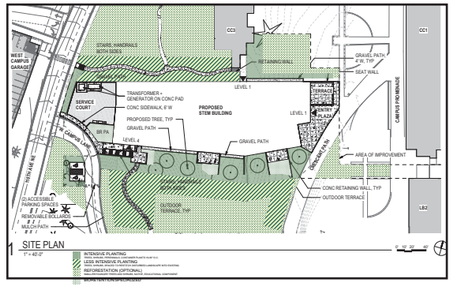


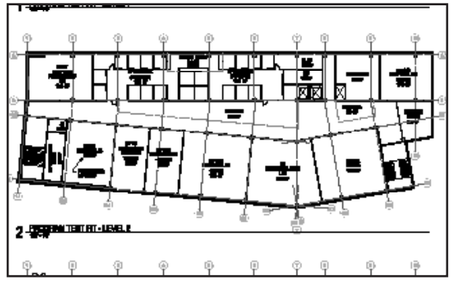


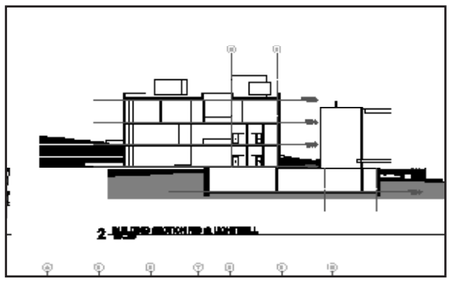


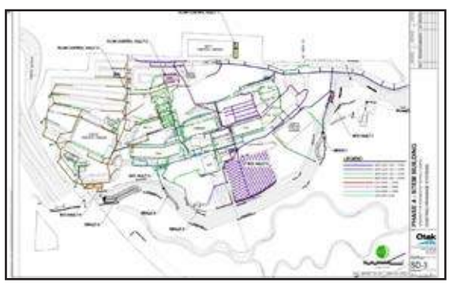


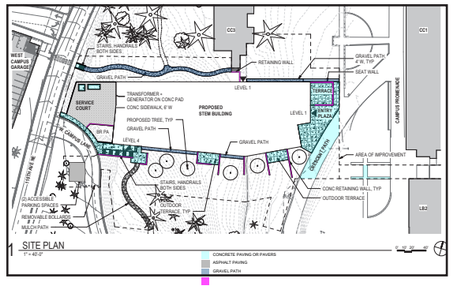


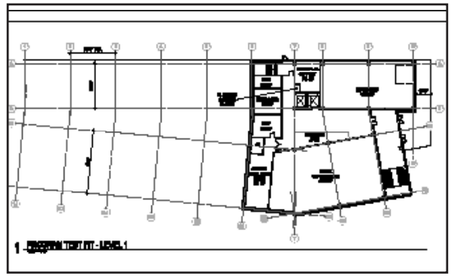


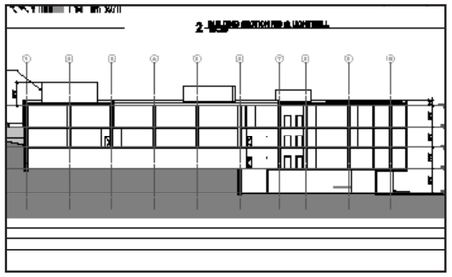












Civil Site Plans

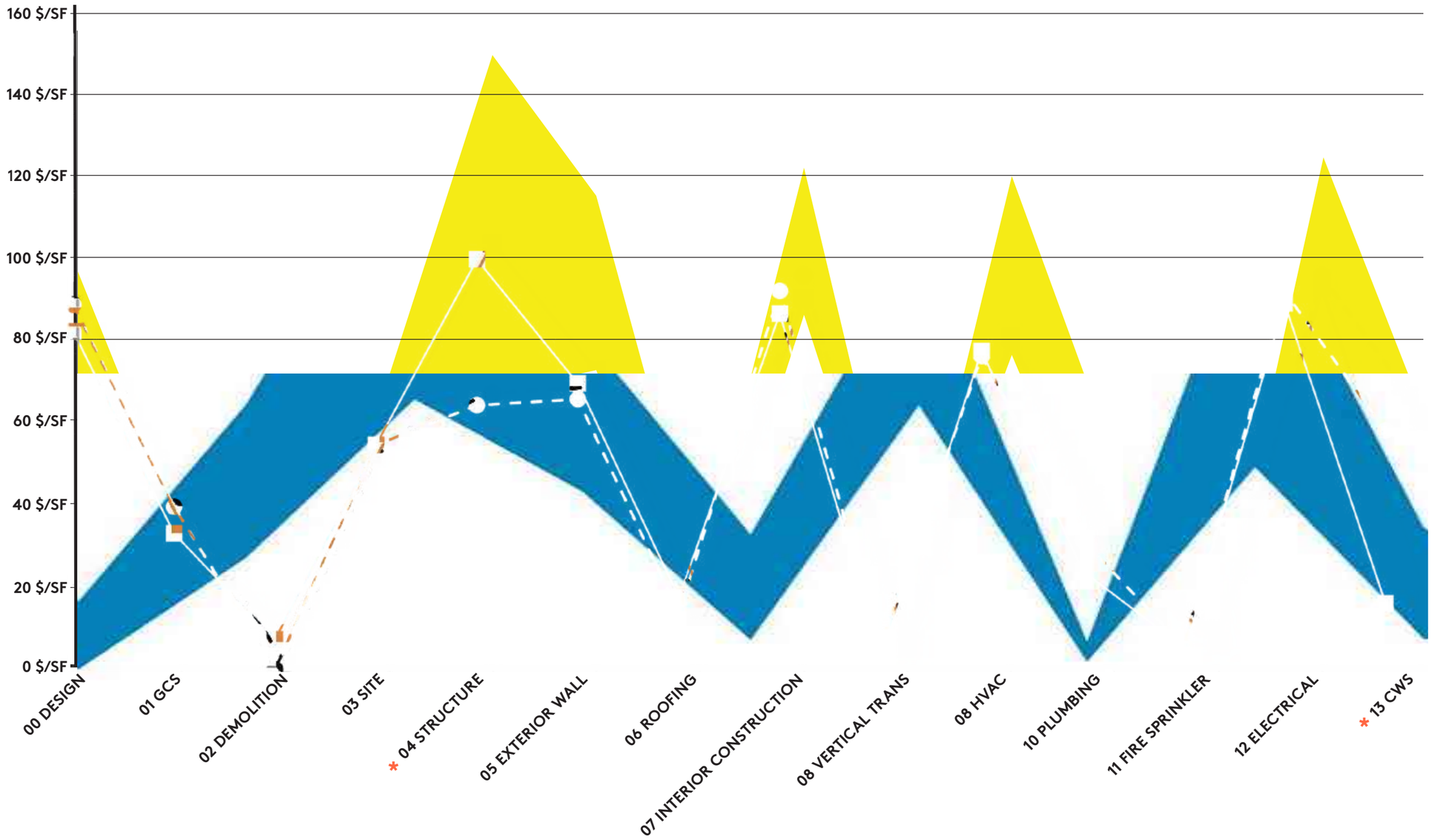
Landscape Site Plans

Building Plans & Sections

06.5— SYSTEM TARGETS

Target budgets for STEM 4 are based on the project benchmarks, the system benchmarks and the test-to-fit scenario. They provide a road map for the development of the project during the design and construction phases.

STEM 4 cost per square foot is based on Option B described on page 85.



* *Benchmark projects include the cost of Construction Work Support (CWS) in Structure costs*

06.6— ALTERNATIVES ANALYSIS

Design-build project delivery focuses on increasing value through design innovation and contingency management in the design and construction phases. This strategy allows the team to identify project scope elements that are "at risk", meaning that there is a reasonable chance they can be incorporated into the final project. The team outlined a range of scope-at-risk options to facilitate the college's and the university's prioritization and decision-making process. They are based on a $62 million budget for the design and construction.

Based on the analysis of the benchmarks and the test-to-fit scenario, the design-build team recommended an at-risk target of about 3% greater than the budget.

OPTION A - 71,000 GSF

Prioritize Site, Systems & Finishes

— Anticipated cost aligns with budget.
— Target savings on site development, finishes and building systems.

44,375	NSF finished
0	NSF at risk
0	NSF at unfinished
44,375	**NSF total**

OPTION B - 76,000 GSF

Prioritize Finished Program Space

— Anticipated cost 3% higher than budget.
— Target savings on finishing all program spaces.

37,200	NSF finished
10,300	NSF at risk
0	NSF at unfinished
47,500	**NSF Total**

OPTION C - 80,000 GSF

Prioritize Finished Program Space

— Increase budget by $1.2 million, finance FF&E through State Treasurer's Office
— Anticipated cost 4% higher than budget
— Target savings on finishing all program spaces

36,600	NSF finished
13,400	NSF at risk
0	NSF at unfinished
50,000	**NSF Total**

OPTION D - 86,000 GSF

Maximize Building Size

— Anticipated cost 3% higher than budget
— Target savings on finishing a portion of program spaces.
— Tenant improvements for unfinished area would be done as a separate project at additional cost.

28,200	NSF finished
10,300	NSF at risk
15,250	NSF at unfinished
53,750	**NSF total**

06.8— PREFERRED SOLUTION

In July 2020, the design-build team presented the Alternatives Analysis to the Project Executive Committee (PEC), which represents the college and the university. The PEC decided to maximize the size of the facility and to accept the risk of leaving a portion of the interior space unfinished. It chose to move forward with a hybrid of Options B and C. The PEC also decided to provide an additional $1.1 million in funding to meet programmatic goals.

The preferred alternative targets an approximately 77,500 gross square foot facility with design-build budget of $62.85 million. Base Target scope includes shelling approximately 10,000 net square feet or $1.8M for fit-out as a Value Add. During the design/preconstruction and construction phases, the project team will seek to mitigate this risk through innovation and budget management, aiming to achieve full build-out.

The design-build team worked with the PEC to identify and prioritize value-add options that may be considered if funds become available. The team also reviewed institutional standards and proposed certain variances that align with quality level of college and university benchmark projects. Key elements of base target scope, high priority value adds and key variances are summarized on the following page.

TARGET BUILDING SIZE: 77,500 GSF

Design Build Budget	$62,000,000
Additional Funding from UWB & CC	**$850,000
Subtotal	**$62,850,000**

**plus an additional $250,000 for soft costs

BASE TARGET SCOPE & BUDGET

Site
Restore site at perimeter of construction area
Provide access from Crescent Path & W. Campus Lane
Restore CC quad
Program
NSF split evenly between CC and UWB
Common space = student study areas
Building
4-stories
60-62.5% efficient
Lightwell
Performance Requirements
2018 Code
LEED Silver
Two-way post tensioned concrete structure
100 lbs/sf live load design criteria (code requires 60 lbs/sf)
No design criteria for vibration
10% additional MEP infrastructure capacity
4-pipe HVAC system with fan coils
Boiler/mechanical room
Standard rooftop airhandlers
Access controls at entries
Two elevators
Interior finishes comparable to original campus buildings
Limited relites
Increase quality of main stair

VALUE ADDED OPPORTUNITIES

Site	
Additional improvements to CC quad	
Forest restoration	
Program	
Complete tenant improvement in the shelled area	
All-gender restrooms	
Building	
Improve interior finishes	
Increase interior glazing	
Custom stairs	
Solar shading	
Performance Requirements	
Curtainwall in lieu of storefront	
Increase envelope thermal performance	
Expand AV scope for distance learning	$9,000/space
Additional AV in public spaces	$17,000/space
Extend one elevator to roof	$190,000
Chilled beams	$1,100,000
Increase number of control zones	$140,000
Heat pump boilers/water heaters	$650,000
Lab exhaust heat recovery	$425,000
Cistern/dual piping for toilet flushing	$325,000
Access control at all classrooms & labs	$250,000
Enhance lighting - public spaces	
Increase power density	$3.5/GSF or $266,000
Photovoltaic array (25kW)	$120,000
Advanced energy metering	
Higher quality fan coils	$136,000
Enhance outside air filtration	$35,000
30% additional MEP infrastructure capacity	$290,000
N+1 redundancy for boilers	$52,000

CAMPUS STANDARDS

Bothell Design Reference & Operations Guide	
Mechanical penthouse	*$760,000 or (1,700) GSF*
Custom DOAS air handlers	*$400,000 or (900) GSF*
UW Green Building Standards	
LEED Gold & 15% energy reduction better than code	$700,000 or (1,600) GSF
15% water reduction to achieve 50% better than code	$325,000 or (700) GSF
UW Facilities Services Guide	
Concrete or CMU back up wall for masonry	*$/(SF)*
Increase live load criteria to 150 lbs/sf	*$580,000 or (1,300) GSF*
Weather barrier types and roof drainage methods	$/(SF)
Mild concrete	*$500,000 or (1,100) GSF*
2000 mips vibration criteria	*$580,000 or (1,300) GSF*
30% additional MEP capacity	See value add list
No dollar limit warranties on roofing and waterproofing	$/(SF)

NOTES

— Campus standards listed in *gray text* represent variances approved by the PEC.

— Detailed information about valued added opportunities and variances to campus standards can be found in the project appendix.

— Value adds listed in bold represent initial priorities indentified by Facilities. These priorities will evolve depending on the level of achievement in energy and water conservation

— Funding ($500k) for chilled water plant expansion to support STEM 4 is provided by campus facilities and not included in the project budget.

— In-campus review / engineering services are provided by campus facilities

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PART 1: Project Vision

The parties envision a joint STEM building that provides a learning environment to inspire students and support faculty collaboration between UW Bothell and Cascadia and to create seamless academic pathways, research opportunities, and project learning experiences for students. The parties further envision managing the joint STEM building in an integrated, fluid, and sustainable manner such that it serves as a national model.

PART 2: Project Goals

- Program Growth - Maximize space for instruction and research in a manner consistent with program goals and institutional standards and values.
- Flexible Learning Environments - Create learning environments that support collaboration, active learning, and faculty innovation while building community across students and faculty.
- Foster Collaboration - Design a physical environment that promotes interactions between UWB and CC faculty, staff, and students.
- Sustainable Design - Display the campus' commitment to environmental and economic sustainability, including by seeking to minimizing building life-cycle costs and carbon footprint.
- STEM Presence - Redistribute STEM facilities across the campus as appropriate to improve operational efficacy, student access and relationships.

PART 3: Project Governance + Decision Making

All parties involved in this project will work towards making decisions using a consensus-based structure for the benefit of the project. The function of a good project governance structure is to make solid and timely decisions that allow the institutions to achieve their objectives while ensuring that the project takes full advantage of the resources

around it. Many decisions can and will be made at the Project Working Team (PWT) and Project Management Team (PMT) levels. Senior Management Team (SMT), consisting of principals from the construction and architecture firms and the project director representing the Owner, will supervise and guide the PMT. The Project Executive Committee (PEC) is comprised of a relatively small group with a variety of perspectives, including the primary proponents of the project, broader institutional perspectives, a "portfolio view" of a broad set of projects, and a longer-range view of the financial investments. This group will make all major decisions, will provide recommendations, and will determine trade-offs within the established parameters of the Project (site, budget, schedule and financing). The PMT will appraise the PEC of incremental decisions. The PEC may also engage in collaborative design sessions with the PMT and the PWTs. The Chancellor of UW Bothell and the President of Cascadia College will jointly serve as the Responsible Party who will approve any changes to the project outside of the established parameters of the Project. Project Organizational Chart included in the Appendix graphically illustrates governance structure.

PART 4: Team Behaviors and Tools

The Design-Build team will enable the behaviors and utilize the tools identified below to ensure that our outcome will be that the design and construction methods and final products are appropriate to the campus and in-keeping with project vision and goals.

1. Mutual Respect and Trust

We will foster an environment that promotes collaboration, and we will work as a team in the best interests of the project. Our successes and challenges are shared, and we are dedicated to the success of the entire project team rather than specific individual parties.

Behaviors:

- Commit to transparency in decision making
- Collaboratively harness the talents and insights of all participants
- Involve the right people at the right time
- Bring difficulties to attention of the group
- Ensure good communication through active listening and information sharing
- Provide a culture of psychological safety allowing for participants to ask tough questions, say difficult things, and suggest what might be a wild idea
- Approach situations with a solution-based attitude
- Minimize surprises. Over-communicate if necessary.
- Acknowledge project successes and challenges

Tools:

- Hold regular team meetings with the UWB, Cascadia College, Lease Crutcher Lewis, and Mithūn
- Allocate time in Big Room meetings to recognize hard work and cusses of the teammates.
- Allow for sharing the successes and challenges within the team in on-going meetings

2. Open Communication

We will communicate openly, honestly, and directly, with timely information that facilitates individuals' contributions. We will behave with a "no blame", inclusive culture and recognize disputes early and resolve them promptly.

Behaviors:

- Create clear decision-making moments and implications
- Work as a team to gather and respond to input
- Encourage questions

Tools:

- The entire team will use SmartSheet as the depository for meeting agendas, notes and collateral
- At all phases of the project, involve all parties impacted by outcomes in the decision-making process. Avoid surprises.

3. Reliable Promising

We will make and secure reliable promises as a basis for planning and executing the project, following "say what you do / do what you say" principle.

Behaviors:

- Facilitate complex and difficult conversations
- Admit when help is needed or when you are unable to deliver on a promise
- Share all successes and failures as a team

Tools:

- Accountability: regularly measure and make visible the reliability of team member promises through the use of workplans and action item tracking.

4. Collaborative Innovation and Decision Making

We will make major decisions using a consensus-based structure for the benefit of the project.

Behaviors:

- Commit to transparency in decision making and endeavor to involve the right people at the right time
- Discuss project challenges and issues in a way that promotes and encourages collaborative solutions
- Promote and encourage innovation to create value for the project
- Be open to change
- Maximize design integration across all disciplines to achieve unified design solutions.

Tools:

- Use decision-making process of Project Working Teams, Project Management Teams and Project Executive Committee to ensure clear feedback is received
- Representation of all major parties, UWB, Cascadia College, Lease Crutcher Lewis, and Mithūn, in key decisions
- Look for opportunities for prefabrication and design options that address multiple issues
- Involve team members from different disciplines in evaluating design options.

5. Organization and Leadership

We will operate as a joint organization. Leadership shall be taken by the team member most capable with regard to the specific task.

Behaviors:

- Commit to an outcome-based process, where our key team members are invested from the beginning and stay actively involved in all stages of the project
- Commit to operating in an environment of trust and mutual respect

Tools:

- Decide as a group which team member(s) should lead response to challenges as they arise
- Make connections with stakeholders to develop trust and establish guiding principles for the project

6. Ownership of Outcomes by Project Participants
We will hold regular meetings throughout project definition, preconstruction/ design, and construction/ occupancy with all key participants to leverage the collective potential of the combined knowledge and expertise of all parties.

Behaviors:

- Ensure we are creating a framework through which we can identify specific moments when we, together, discovered something about the project or made a decision

Tools:

- Coordinate early and timely involvement of key project participants
- Coordinate the campus process partners, design and trade partners, and manufacturer involvement to facilitate creative design decisions
- The D-B team will organize "Lessons Learned" sessions to discuss key issues on other projects, buildings, etc. that could inform or steer the design & construction efforts
- Invest in co-location and immersion within the team. Create opportunities for non-structured team time and make room for nurturing connections among the team members, particularly during on-going pandemic, while the team is working remotely.

7. Appropriate Technology
We will use the appropriate technology to enhance the collaborative process and improve the results. Design and construction coordination shall be digitally based, virtual, and shall use Building Information Modeling (BIM) technology.

Behaviors:

- Encourage group ownership of documentation and information
- Ensure project partners have access to the right documents and information

Tools:

- Create a BIM Execution Plan to orchestrate the use of BIM as a method of communication used to identify issues, concerns, discrepancies, and omissions, allowing the team to respond thoughtfully and not react in hurried environment
- Collaboratively and promptly resolve issues for the benefit of the project in the virtual environment and document them as a Collaborative Design Resolution
- Share schedule and cost management documents effectively and simply
- Use SmartSheet, Bluebeam Revu, Sharepoint, and BIM 360 to make coordinating and transferring information as simple as possible
- Establish protocols for version control.

8. Budget and Schedule Control
We will establish a Target Budget and Target Milestones (schedule) that include all major phases of the design and construction. The team will review budget and schedule updates on a regular basis and openly communicate any issues or concerns. All team members will share ownership of the project schedule, the project budget, and the project's quality.

Strategies:

- Balance budget "ups" and "downs" across the project to get value-driven decisions
- Facilitate "response" instead of "reaction"
- Encourage group ownership of budget, schedule, and quality

- Work with the institutions to establish clear priorities.
- Track and communicate risks

Tools:

- Measure decisions with project goals in mind
- Use frequent pull planning sessions to guide team on key milestones and decision-making deadlines
- Share schedule and cost management documents effectively and simply
- Schedule and participate in standing meetings to discuss issues
- Document decisions and share with the team.

9. Safety

Strategies:

- Every participant in the project is responsible and accountable for their own safety and the safety of others
- We will not walk by a hazard - When we see something, we say something
- Begin everything we do with a focus on safety
- Design a building that may be maintained safely throughout the life of the building

Tools:

- Relentlessly pre-plan our work to identify and address exposures
- Identify hazards during design in constructability reviews and adjust design to prevent injuries
- Collaborate with campus Facilities to ensure design addresses safe building maintenance
- Facilitate remote work and remote collaboration when necessary due to public health emergencies

10. Demonstrate a commitment to achieve or exceed UW equity businesses goals (as adopted by UWB/CC)

The team is committed to providing the maximum practicable opportunity for participation in contracting by sbe, dbe, MBE, WBE, and MWBE and to exceed the UW business equity goals.

Behaviors:

- Host outreach events
- Require all trade and consultant partners to include business equity outreach plans in their proposals

Tools:

- Break down work packages to allow for smaller firms to participate
- Encourage and support partnerships and mentorships between firms

11. Express institutional vision in design

We will ensure the facility goals are embedded in all design decisions, so the community understands why the facility is being built.

Behaviors:

- Engage faculty, staff, and students in the design process to extend collaboration and broaden understanding of the project's vision and goals within campus community.
- Employ best practices in sustainability to reduce energy and water use, lower life cycle costs, and improve occupant satisfaction and health
- Consider diverse cultural norms, needs and perspectives to create inclusive environments.
- Flexible Learning Environments: Create learning environments that support collaboration, active learning, and faculty innovation while building community across students and faculty.

- Foster Collaboration: Design a physical environment that promotes interactions between UWB and CC faculty, staff, and students.

Tools:

- Focus Groups
- Surveys
- Virtual or in-person Town Hall meetings
- Life cycle cost analysis

12. Campus Contribution

We will work to make a lasting contribution to the campus, be mindful of the desired future character of the site, and be responsive to design and development standards and guidance as described in the 2017 Campus Master Plan and other appropriate documents.

Behaviors:

- Encourage high quality design and construction
- Work to identify synergies between great design, sustainability, and cost
- Incorporate safely maintainable systems and design elements for the targeted lifespan of the building and its systems.

Tools:

- Practice Integrated Design to create indoor and outdoor spaces, building form, movement through the site and through building interior – all as an expression of a unified concept.
- Work with the institutional art committee to integrate indoor and outdoor art starting early in the design process.

13. High Performance Delivery

We will conduct an intensified early planning process, with the participation of key team members, to increase our efficiency during execution.

Behaviors:

- Contribute to best practices in project delivery
- Facilitate a seamless transition from design to construction to occupancy and beyond

Tools:

- Employ Lean methodology to maximize scope and value—and eliminate waste
- Craft incentives to share project savings
- Complete project on time, and strive to complete it early
- Complete the project on budget, and maximize the inclusion of added value incentives

14. High Performance Team

We will establish and continually evaluate project goals.

Behaviors:

- Create trust through transparency, accountability and candor
- Create fulfilling relationships between teammates that extend beyond the life of the project
- Have fun, take pride and celebrate achievements throughout the process
- Demonstrate value through our team's ability to be flexible and nimble in the project's changing circumstances

Tools:

- Report on the story of our team/s performance and how the campus benefited from the process
- Track key milestones of design and construction (buyout, successful deadlines, evolution of the budget)
- Select design and trade partners that share in the project mission, values, and team culture

PART 5: Measuring Success

It is important to the project team to develop a framework that includes clear and measurable indicators through which we can understand and reflect upon the success of our process and the proposed outcomes. We will agree upon the standards used to both establish and measure the outcomes such that the objectives are clear to all parties, and each member's respective role in that outcome is clear. We will track and monitor our team's performance by measuring whether certain activities took place, the quality of the activities conducted, and tools used, whether desired outcomes were reached, and whether desired impacts were attained. The scorecard included in the Appendix will be used as a tracking tool.

PART 6: Signatures

The intent of this Project Charter is to ensure the described goals, behaviors, and tools are embraced by every person and organization that is engaging in the Bothell STEM 4 project. We ask the members of the following teams to acknowledge this by reviewing and signing the document.

Project Executive Committee (PEC) **Senior Management Team (SMT)** **Project Management Team (PMT)**

APPENDIX I: Sample Scorecard

We will measure and regularly report on our performance to ensure objectives are clear to all parties and each member's respective role in achieving those objectives are understood. Outcomes will be further defined during the Project Definition Phase.

SUSTAINABILITY

GOAL	MEASURABLE OUTCOMES
Consider economic and environmental sustainability of the shared facility and campus in tandem	- Analyze life-cycle costs - Reduce energy consumption by X - Reduce potable water consumption by X
Make the sustainable elements of the project visible and useful in the learning process	- Include visible raingardens - If rainwater cistern is included - either locate it in a visible location outdoors or - provide a dashboard or means of monitoring stored rainwater volume for use in curriculum -Showcase salvaged timber - Incorporate signage describing sustainable elements of the project
Create indoor and outdoor spaces that support physical and psychological health of the students, faculty, and staff	- Conduct student surveys and workshops during design - Conduct student surveys after occupancy
Minimize embodied and operational carbon footprint	- Reduce embodied carbon by X - Reduce operational carbon by X
	-

BOTHELL CULTURE

GOAL	MEASURABLE OUTCOMES
Create opportunities for collaboration between CC and UWB faculty, staff, and students	- Joint participation of CC and UWB faculty representing similar programs in building planning - Increased amount of time and frequency of interaction between faculty, staff and students from both institutions
Accommodate all learning styles and needs	- Increased range of students using the building for informal study
Support interdisciplinary teaching initiatives and project-based learning	- New interdisciplinary courses taught in the building - Increased student participation in capstone and independent projects.

	- Enable external partners to not only present to students but to also engage with students in a manner similar to what they would encounter in the workplace.
Engage students in the design process	– Structure joint participation of UWB and CC students in the design process to provide student input and to set the foundation for shared use of informal student study and social spaces. – Schedule at least two sessions for joint CC and UWB student participation in the design process for furnishings selection to enable these spaces to support student learning outside the classroom.

CAMPUS CONTRIBUTION

GOAL	MEASURABLE OUTCOMES
Make STEM 4 project a magnet for learning and a recruitment tool	– High rate of space utilization - New building featured in the institutional recruitment materials
Stitch together STEM 4 and adjoining campus spaces	- *Improve North Quad* - *Enhance pedestrian experience along building frontage* - *Connect STEM4 outdoor program to existing hillside trails*
Improve and diversity hillside ecology	- Restore Upland Forest (value add) - Plant a diverse range of native and adapted plant species

HIGH PERFORMANCE DELIVERY

GOAL	MEASURABLE OUTCOME
Demonstrate the value of integrated design	1. Deliver the project with strategic early/ just-in-time work packages (TBD) 2. Reduce documentation/ paperwork (TBD) 3. Eliminate formal VE process through continual cost communication 4. Conduct multiple Pull-Planning Sessions 5. Achieve (TBD)% Planned Percent Complete rating
Meet schedule and budget goals	1. Complete Project Definition by end of September 2020 2. Submit SPR by end of October 2020 3. Obtain shoring/ utility/foundation permit by September 2021 4. Obtain building permit by November 2021 5. Obtain Substantial Completion by June 2023 6. Incorporation of added value incentive scope (range, TBD) 7. All punchlist items resolved within 60 days

HIGH PERFORMANCE TEAM

GOAL	MEASURABLE OUTCOME
Create an open environment for information sharing	1. Provide electronic O&M and BIM data 2. (Other) Transition-to-Occupancy goals 3. Reduce or Eliminate RFI's
Foster and maintain a positive and collaborative team culture	1. 95% of submittals "Reviewed" or "Reviewed as Noted" (not requiring resubmittal) 2. 3-4 team-building events (range) 3. Conduct regular surveys with team participants (Collaborators, PWTs, PMT, SMT and PEC) to solicit feedback for course correction.

APPENDIX II: Memorandum of Understanding

See attached.

APPENDIX III: Organization Chart

See attached.

APPENDIX II

UNIVERSITY of WASHINGTON BOTHELL

CASCADIA COLLEGE BOTHELL

MEMORANDUM OF UNDERSTANDING REGARDING A JOINT UW BOTHELL/CASCADIA COLLEGE STEM 4 BUILDING

This Memorandum of Understanding Regarding a Joint UW Bothell/Cascadia College STEM 4 Building (***MOU***) is entered into as of March 13, 2019, by and between the University of Washington Bothell (***UW Bothell***) and Cascadia College (***Cascadia***), both agencies of the State of Washington, which share a campus in Bothell, Washington.

Background

UW Bothell and Cascadia have both applied for and received funding from the Washington State Legislature for pre-design and design of science, technology, engineering, and mathematics (***STEM***) buildings to be constructed on their shared campus, and they anticipate receiving construction funding for their respective buildings in the future. The working title for UW Bothell's new building has been UW4, and the working title for Cascadia's new building has been CC4.

UW Bothell submitted a request to the Washington State Legislature to fund construction by combining UW4 and CC4 into a single STEM building with the goals of maximizing enrollment capacity and creating seamless academic pathways, research opportunities, and project learning experiences for students. UW Bothell and Cascadia are strongly committed to working as equal partners in the development and operation of the proposed joint STEM building, should its funding be approved by the Legislature.

Contingent Understandings

The understandings memorialized herein are contingent upon and assume a single appropriation by the Legislature to the University of Washington for a joint "STEM 4" building as described herein.

Understandings

Vision. The parties envision a joint STEM building that provides a learning environment to inspire students and support faculty collaboration between UW Bothell and Cascadia and to create seamless academic pathways, research opportunities, and project learning experiences for students. The parties further envision managing the joint STEM building in an integrated, fluid, and sustainable manner such that it serves as a national model.

Goals. The parties' goals for the joint STEM building are to:

1. Maximize space for instruction and research in a manner consistent with program goals and institutional standards and values;

2. Create learning environments that support collaboration, active learning, and faculty innovation while building community across students and faculty;

3. Design a physical environment that promotes interactions between UW Bothell and Cascadia faculty, staff, and students;

4. Display the shared campus's commitment to environmental and economic sustainability, including by seeking to minimize the joint STEM building's lifecycle costs and carbon footprint; and

5. Redistribute STEM facilities across their shared campus as appropriate to improve both operational efficacy and efficiency, and student access and relationships.

Building Name. The current working designation for the building is "STEM 4." The final designation and name of the building should be institutionally neutral and determined by mutual agreement.

Project Parameters. The STEM 4 building parameters are subject to change based on Legislative and donor funding. Absent such changes, the parties expect the project parameters to be as follows:

Budget. The total estimated design and construction project budget for 2019-2021 is $79.438 million. The parties anticipate that that budget will originate from a single Legislative appropriation to UW Bothell.

Schedule. The parties anticipate that the building will be substantially completed during 2022, with the sequence of major project milestones as follows (not necessarily all to occur by 2022):

- Legislative approval
- Design-build team selection
- Design commencement
- Construction commencement
- Substantial completion of construction
- Building occupancy

Site. The joint STEM building will be located on the parties' shared campus in Bothell, with the exact location on campus to be determined.

Scope. The parties expect that the joint STEM building will contain classrooms, science labs, faculty and staff offices, meeting rooms, storage rooms, and common areas. They further expect the building to be approximately 100,000 gross square feet with approximately 64,500 assignable square feet (***ASF***).

Space Assignment. The parties understand that realizing the project's vision and meeting its goals requires that the STEM 4 programming include a mix of spaces shared by both UW Bothell and Cascadia as well as spaces dedicated to each institution's separate use. Dedicated space is understood to be space designed for and exclusively used by a single institution. In contrast, shared space will be designed for use by both Cascadia and UW Bothell, with no delineation of institutionally-

dedicated areas within the space. The table below defines which types of spaces are expected to be institutionally dedicated and which would be shared in STEM 4. Institutionally dedicated spaces may be made available for use by the other institution by mutual agreement:

Assignable Space Type	Assignment
Classroom	Dedicated
Laboratory	Dedicated
Laboratory Preparation	Dedicated
Faculty and Staff Offices	Dedicated
Conference Rooms	Some Dedicated, Some Shared
Office Service - Printer/Copier Areas	May be Shared
Office Service - Supplies, Mail, Storage	Dedicated
Office Service - Break Rooms	Shared
Student Collaboration/Breakout	Shared
Tutoring Center	Dedicated (Cascadia)
Research Laboratories	Dedicated (UW Bothell)
Showers and Lockers	Shared
Restrooms	Shared
Data Center, if present	Shared (collocated, physically secured)
Data Closets	Shared
Janitorial Closets and Storage	Shared
Mechanical Rooms	Shared
Non-Assignable Space	Shared

Allocation of Institutionally Dedicated Space. Half of the dedicated space within STEM 4 shall be allocated to UW Bothell and half shall be allocated to Cascadia, assuming no donor funding for design and construction is received by either institution. If donor funding is received for the project, the receiving institution shall have the right to build additional dedicated space for its dedicated use, such space shall not be factored into the 50/50 allocation of dedicated space referenced in the preceding sentence of this section.

Donor Funding. In the event donor funding is received for the project by either institution, those funds would be used for the sole benefit of the institution receiving the funding, unless the use of such funds should materially increase other shared building expenses, such as infrastructure costs. If the use of donor funding results in an increase in other shared building expenses, the institution receiving the donor funding would use a portion of the donor funding to pay for the increase in shared building expenses.

Project Governance

CC and UWB shall share the authority in the following areas regarding the design and construction of STEM 4:

A. Establishing design standards and owner's performance requirements

B. Establishing criteria for the selection of project team members

C. Selecting consultants where directly hired by the owner

D. Approving design documents including those provided to contractors for the bidding of public works

E. Award of contracts for public works

Decisions shall be reached by mutual agreement using the following project governance structure, unless otherwise agreed to by UW Bothell and Cascadia

Project Governance Structure

Responsible Party. The Chancellor of UW Bothell and the President of Cascadia must jointly approve any changes to the project outside of the established parameters of the Project (site, budget, schedule, financing).

*Project Executive Committee (***PEC***)*. All major Project decisions, recommendations, and trade-offs within the established parameters of the Project (site, budget, schedule, financing) will be made by the PEC. The PEC may also engage in collaborative design sessions with the Project Management Team and Project Working Teams. The PEC will meet monthly and as required. The membership of the PEC consists of:

- UW Project Delivery Group Director (1)
- University Architect or University Landscape Architect (1)
- UW Bothell Representatives (2)
- Cascadia Representatives (2)
- UW Bothell Campus Facilities Representative (1)

*Senior Management Team (***SMT***)*. Decisions of the PMT will be overseen by the Senior Management Team, which shall also make human resources management decisions in the interests of the project. In the event the PMT cannot reach agreement on an issue, the SMT will collaborate with the PMT to resolve the issue by consensus, and the PMT will document that resolution of the issue. The membership of the SMT consists of:

- UW Project Delivery Group Director
- Design-Build Team Representatives (2), Design-Builder (1) and Architect (1)

*Project Management Team (***PMT***)*. Management level project oversight will be provided by the PMT, which shall make decisions by consensus. The PMT will work under the guidance and oversight of the SMT. The PMT reports progress and seeks approval of design, cost, and schedule changes from the PEC. The membership of the PMT consists of:

- UW Project Delivery Group Project Manager
- Cascadia Director of Facilities and Capital Projects

- Design-Build Team Representatives (2), Design-Builder (1) and Architect (1))

*Project Working Teams (**PWT's**).* PWT's are part of the collaborative process of developing the Target Program, Implementation Documents and other deliverables and may be formed temporarily or for the duration of the project. The PWT's are organized by the PMT and are interdisciplinary groups of Design-Build Team Members and representatives of the Owners. Each PWT shall have at least one representative from UW Bothell and one representative from Cascadia.

*Owner Architect Construction Team (**OAC**).* The OAC will be formed once the construction phase of the project begins and shall address issues that need to be resolved during the construction process. The OAC may request assistance from the PWT's and shall escalate material change issues through the governance structure. The membership of the OAC consists of:

- UW Project Manager
- Cascadia Director of Facilities and Capital Projects
- Design-Builder
- Architect

Owner's Representative. The owner's representative shall administer all contracts, subject to the agreements above, and after consultation with representatives of UW Bothell and Cascadia, and shall have the authority to make timely decisions in accordance with the approvals and agreements of the foregoing project governance structure. The UW Facilities Project Delivery Group shall be the Owner's Representative.

Building Maintenance and Custodial Services. Building maintenance and custodial services shall be provided by UW Bothell in accordance with the service levels specified in the Master Services Agreement between UW Bothell and Cascadia.

The entire cost of STEM 4 maintenance and custodial services shall be borne by UW Bothell. The institutional cost sharing formula in the Master Services Agreement between UW Bothell and Cascadia is not applicable to STEM 4 because the Legislature has appropriated all maintenance and operations (M&O) funding for STEM 4 to UW Bothell.

Furniture, Fixtures, & Equipment (***FF&E***). Each institution has an FF&E budget specified in its C-100 submission to Washington State's Office of Financial Management (OFM), and these budgets shall form the basis for allocating FF&E expenses. The cost of repairing and replacing furniture, fixtures and equipment for dedicated spaces shall be the responsibility of the institution occupying the dedicated space.

UW Bothell and Cascadia shall be jointly responsible for, and mutually agree upon the repair and replacement of furniture, fixtures and equipment for shared spaces. These costs shall be shared between UW Bothell and Cascadia on a 50/50 basis. Any remaining FF&E funds in the institution's FF&E budgets shall be applied to meeting that institution's dedicated FF&E needs.

APPENDIX II

Network Maintenance & Management. The design and management of network and wireless infrastructure would be determined during the design phase of the project through a collaborative process involving UW Bothell, Cascadia, and University of Washington Information Technology (***UW IT***) staff. The final design would allow both UW IT and Cascadia to immediately resolve any network issues without being encumbered by the need for another party to provide access to physical infrastructure. The final design would also allow guest access wireless that does not require login. Wireless services would be equivalent to that of each institution in its own managed space. Neither UW Bothell nor Cascadia faculty, staff, or students would need to follow procedures unique to the other institution in order to access the services of their institution.

Building Coordination. A building coordinator would be assigned to STEM 4, and the role would alternate annually between a UW Bothell employee and a Cascadia employee.

Room Scheduling Process. Dedicated space would be scheduled by the institution to which the space is dedicated. Shared spaces would be scheduled through a mutually agreed upon process/system that enables students, faculty and staff affiliated with either institution to directly schedule the use of shared space on a first come, first served basis.

University of Washington Bothell

Dr. Bjong (Wolf) Yeigh, Chancellor

Ruth A. Johnston, Vice Chancellor
Planning and Administration

Cascadia College

Dr. Eric W. Murray, President

Terence Hsiao, Vice President
Administrative Services

APPENDIX III

UWB|CC STEM 4 Project

Working & Focus Groups
Project #205294
Updated on 9/28/20

RESPONSIBLE PARTY

Eric Murray - CC President
Wolf Yeigh - UWB Chancellor

The Chancellor of UW Bothell and the President of Cascadia must approve any changes to the project outside of the established parameters of the Project (site, budget, schedule, financing). Their decisions shall be made by mutual agreement. As needed.

PEC (Project Executive Committee)

Meagan Walker - CC
Sharon Jones - UWB
Tony Guerrero - CC/UWB
Steve Tatge - UW
Kerry Levett - CC
Gowri Shankar - UWB
Leslie Cornick-UWB
Chris Byrne-CC
Kristine Kenney - UW

All major Project decisions, recommendations, and tradeoffs within the established parameters of the Project (site, budget, schedule, financing) will be made by the PEC. The PEC may also engage in collaborative design sessions with the Project Management Team and Project Working Teams. The PEC will meet monthly.

SMT (Senior Management Team)

Steve Tatge - UW
Brian Aske - Lease
Brendan Connolly - Mithun

Decisions of the PMT will be overseen by the SMT, which shall also make human resources management decisions in the interest of the project. In the event the PMT cannot reach agreement on an issue the SMT will collaborate with the PMT to resolve the issue by consensus. As needed.

PMT (Project Management Team)

Kim Clark - CC
Amy Van Dyke - UWB
Harry Fuller - UW
Scott Akre - Lewis
Lana Lisitsa - Mithun
John Egdorf - UWB|CC

Management level project oversight will be provided by the PMT, which shall make decisions by consensus. The PMT will work under the guidance and oversight of the SMT. The PMT reports progress and seeks approval of design, cost, and schedule changes from the PEC. The PMT will meet weekly.

Working Group 1
Campus Fit

Scope: Building Siting, Shell & Core, Landscaping, Enclosure, Lobby

Attendees:
PMT
Kristine Kenney, Mike McCormick

1 to 2 UWB: David Moehring, David Socha, Alexa Russo
1 to 2 CC: Midori Sakura, Stephan Classen; Bryan Fauth
Schedule: Meets every 2 weeks or monthly during design

Working Group 2
Interior Program

Scope: Classrooms, Labs, Offices, Shared Spaces, FF&E

Attendees:
PMT
1 to 2 UWB: Susan Smith, Leslie Cornick, Christy Cherrier

1 to 2 CC: Erik Tingelstad, Azizeh Farajallah, Chris Byrne, Peg Harbol, Desiree Engel

Schedule: Meets every 2 weeks or monthly during design

Working Group 3
MEP/Utilities

Scope: Mechanical, Electrical, Plumbing, Elevators, Site Utilities

Attendees:
PMT
1 to 2 UWB/CC: John Egdorf

Schedule: Meets every 2 weeks or monthly during design

Focus Groups	UWB	CC	Other
Facilities	Barney Harvey	Barney Harvey	
Landscape	Tyson Kemper Barney Harvey	Tyson Kemper Barney Harvey	UW - Kristine Kenney
Accessibility	Rosa Lundborg Ana Thompson	Bryan Fauth	UW - Julie Blakeslee UW - Bree Callahan
Sustainability	Alexa Russo CACES https://www.uwb.edu/sustainability/programs-initiatives/caces	John VanLeer	UW - Claudia Frere - Anderson

Focus Groups	UWB	CC	Other
Academic Programs	Leslie Cornick Alaron Lewis Bill Erdly Jennifer McCloud-Mann John Bridge Tad Ghirmai Christy Cherrier	Jeff Stephens (Chem) Mohan Raj (Eng/Phy)	Selected faculty after program decision made
Lab Design & Support	Christy Cherrier Rafael Silva Alaron Lewis Bill Erdly Jennifer McCloud-Mann John Bridge Tad Ghirmai Pen Moon	Bethany Tegi Ryan Higgins Maiko Luckow [HOLD Faculty]	UW - EH&S
IT Management	Christy Long Jim DeRoest	Brian Culver David Tucker	UW IT (Seattle)
Classroom Design & Support	Bryan White Charity Lovitt Pen Moon Julia Pefanis Ana Thompson David Moehring Susan Smith **UWB Students**	CC student (TBD) Brian B Mike Panitz Jeff Stephens	Other participants can be selected after program decision made
Office Space Design & Support	Christine Howard Susan Smith David Socha	Cindy Bea Nureni Adeyemo [HOLD AF]	Other participants can be selected after program decision made
Student Study & Support Space	Ana Thompson Cinnamon Hillyard Emily Christian **UWB students** Dave Snyder	Lindsay Burke. Maiko Luckow [Hold student]	Provide opportunities for open forums with students
Furniture	Susan Smith	Kim Clark	
Equity & Inclusion	**UWB students** Geetha Thamilarasu Miguel Macias Wayne Au	John Eklof [HOLD student]	
Art	Tyson Kemper Leslie Cornick Beth Beam Ted Hiebert **UWB student**	Chris Gildow Kathy Brown Kolya Rice	
Accessibility	Rosa Lundborg Ana Thompson	Bryan Fauth [student]	UW - Julie Blakeslee UW - Bree Callahan

Focus Groups	UWB	CC	Other
Facilities	Tony Guerrero Barney Harvey Nicole Sanderson Cham Kao	Tony Guerrero Barney Harvey Nicole Sanderson Cham Kao	
Lab Utilities & Management	Christy Cherrier Rafael Silva Adam Geoffrey	Chris Hurrell	UW - EH&S
IT Infrastructure	Christy Long Jim DeRoest	Brian Culver David Tucker	UW IT (Seattle)