UW West Campus Utility Plant

UWAC DESIGN DEVELOPMENT APPROVAL
30 March 2015

An Opportunity to Set a New Standard of Excellence
TODAY’S AGENDA

PROJECT OVERVIEW

PREVIOUS MEETING RECAP (2/17/15 UWAC MEETING ONLINE)

WHERE WE ARE NOW

1. SITE & LANDSCAPE DEVELOPMENT
2. ENGINEERING/SYSTEMS UPDATE
3. SCREEN/WRAPPER CHARACTER
4. BASE LEVEL MATERIALS & CHARACTER
5. INTERPRETIVE OPPORTUNITIES

NEXT STEPS

The team is scheduled to wrap up our Phase 1 Agreement on 5/8/15, and move forward with Final Design under the Phase 2 Design/Build Agreement

Construction scheduled to begin Fall 2015, with Substantial Completion in Fall 2016. Final Completion scheduled to coincide with February 2017 ARCF opening.
PROJECT OVERVIEW
PROJECT PARAMETERS

PROJECT PRIORITIES

2. CREATE ARCHITECTURAL VALUE: Campus Gateway & Fit with the West Campus Framework Plan
3. EXPRESS SUSTAINABILITY ETHIC: Opportunity to communicate UW’s Commitment to Sustainability

FUNDING

$ 30.5 M Initial Budget for Phase I West Campus Utility Plant
$  5.7 M Value-Added Enhancements
$ 36.2 M Total Project Budget

PROGRESSIVE DESIGN/BUILD DELIVERY METHOD


SCHEDULE

Design Build Contract in May 2015
Start Construction Fall 2015
Phase 1: Substantial Completion - February 2017
Phase 2: Additional Equipment Only - TBD
CURRENT AND FUTURE DEVELOPMENT

- 10,500 T Chiller Capacity (with additional 3,000 T provided by Future Thermal Energy Storage)
- Each 1,000 T serves approximately 350,000-600,000 SF of development
- 6,000 T planned to serve South Campus
- 7,500 T Future Capacity could serve roughly 4,500,000 SF of development on West Campus
PREVIOUS MEETING RECAP
SITE ANALYSIS

KEY CONSTRAINTS

- **WEST**: North leg of utility tunnel to Gould Hall; South leg to South Campus
- **NORTH**: Alley setback, building screening, truck turning radius
- **EAST**: Alley setback, truck turning radius
- **SOUTH**: UW ductbank + SCL 26kV Service to West Receiving Station
- **ONSITE**: Utility Tunnel to Central Plant; Power Poles adjacent to alley; truck turning radii
MAXIMIZING CAPACITY

At 74’ x 110’, the WCUP Plant is:

- As **SMALL** as it can possibly be while maximizing the capacity of chilled water and emergency power it provides to the South & West Campuses.

- As **BIG** as it can be working within the various site constraints and budget limitations.
**CHILLED WATER**

- Chillers to support 10,500T total future capacity
- Ability to add Thermal Energy Storage for additional 3,000 T

**POWER GENERATION**

- Future expansion to 12MW

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**FUTURE BUILD OUT**

- **PARTIAL BASEMENT PLAN**
- **MAIN FLOOR PLAN**
- **ROOF PLAN**
INITIAL INSTALL – DAY 1

CHILLED WATER
- Chillers to support 3,000T initial capacity

POWER GENERATION
- Generators to support 6MW initial capacity
CLEAR ORGANIZATION OF SYSTEMS
BUILDING/INTERPRETIVE CONCEPT

**MAGNET & PORTAL**

- Facility to Attract Interest & Provide Opportunity for Engagement
- Interpretive Content to be Curated by UW ES&S
- Integrate Building Facades with Interpretive/Display at Multiple Scales
- Connect/Engage with BGT & University Way
INTERPRETIVE/DISPLAY OPPORTUNITIES

AUGMENTED REALITY

3-D Virtual Objects are Integrated into a 3-D Real Environment in Real Time

Connections Can be Made to Other UW Campus-wide Information/Data/News:
• Sustainability Initiatives
• Campus Energy Usage
• UW Nobel Laureates

Working with UW ES&S who will be responsible for curating the information content accessed through the PORTAL
GREEN BUILDING RATING SYSTEM - ENVISION

RECENT PROJECT SUSTAINABILITY PROGRESS

- 11/14/14 Direction from UW to Proceed with ENVISION
- 1/26/15 Sustainability Workshop with UW Stakeholders and Project Team

CREDIT LIST

1 PURPOSE
- U1.1 Improve Community Quality of Life
- U1.2 Stimulate Sustainable Growth & Development
- U1.3 Develop Local Skills & Capabilities

2 WELLBEING
- W2.1 Enhance Public Health & Safety
- W2.2 Minimize Noise and Vibration
- W2.3 Minimize Light Pollution
- W2.4 Improve Community Mobility & Access
- W2.5 Encourage Alternative Modes of Transportation
- W2.6 Improve Accessibility, Safety, & Wayfinding

3 COMMUNITY
- C3.1 Preserve Historic & Cultural Resources
- C3.2 Preserve Views & Local Character
- C3.3 Enhance Public Space
- C3.4 Innovate or Exceed Credit Requirements

1 COLLABORATION
- L1.1 Provide Effective Leadership & Commitment
- L1.2 Establish a Sustainability Management System
- L1.3 Foster Collaboration & Teamwork
- L1.4 Provide for Stakeholder Involvement

2 MANAGEMENT
- M2.1 Pursue Integrated Design Strategies
- M2.2 Enhance Interconnection Integration

3 PLANNING
- P3.1 Plan for Long-Term Monitoring & Maintenance
- P3.2 Address Conflicting Regulations & Policies
- P3.3 Enhance Usability

1 MATERIALS
- M1.1 Reduce Non-Embodied Energy
- M1.2 Support Sustainable Procurement Practices
- M1.3 Use Recycled Materials
- M1.4 Use Regional Materials
- M1.5 Reduce Waste From Landfills
- M1.6 Reduce Excavated Materials Taken Off Site
- M1.7 Provide for Decommissioning & Recycling

2 ENERGY
- E2.1 Reduce Energy Consumption
- E2.2 Use Renewable Energy
- E2.3 Commission & Monitor Energy Systems

3 WATER
- W3.1 Protect Fresh Water Availability
- W3.2 Reduce Potable Water Consumption
- W3.3 Monitor Water Systems

1 SITING
- S1.1 Preserve Prime Habitat
- S1.2 Protect Wetlands & Surface Water
- S1.3 Preserve Prime Farmland
- S1.4 Avoid Adverse Geology
- S1.5 Preserve Floodplain Functions
- S1.6 Avoid Unsuitable Development on Steep Slopes
- S1.7 Preserve Greenfields

2 RESILIENCE
- R2.1 Manage Stormwater
- R2.2 Reduce Flood & Erosion Impacts
- R2.3 Prevent Surface & Groundwater Contamination

3 BIODIVERSITY
- B3.1 Preserve Species Biodiversity
- B3.2 Control Invasive Species
- B3.3 Enhance Biodiversity
- B3.4 Maintain Wetland & Surface Water Functions

4 ENVIRO
- E4.1 Innovate or Exceed Credit Requirements

ENVIRO

- Alternative Third-Party Rating System designed for Infrastructure Projects
- Opportunity for UW to continue to demonstrate Sustainable Leadership

ENVISION™
DESIGN PRINCIPLES

• Thoughtfully integrate UW WCUP into the larger campus context

• Highlight the distinctly different characters of the Burke Gilman Trail and University Way

• Focus on the southwest corner; it works at both the regional/campus scale and the human scale

• Engage the public through “Windows into the Process” and a positive pedestrian experience along University Way

• Convey through architecture/landscape/interpretive program the concept of “TRANSFER” or “EXCHANGE”. Relates to the plant’s function, it’s connection to other buildings on campus and the exchange of services/ideas/info that are the hallmark of a higher ed institution.
CAMPUS CONTEXT
MASSING CONCEPT

SCREEN
WRAPPER
SOLIDS
SLAB
## DESIGNING TO BUDGET

### SCREENWALL

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Structure</td>
<td>$260,000</td>
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<tr>
<td>Screen Panels</td>
<td>$575,000</td>
</tr>
<tr>
<td>Misc Finishes/Coping</td>
<td>$15,000</td>
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<tr>
<td>Enhancement Allowance</td>
<td>$200,000</td>
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<tr>
<td><strong>SUBTOTAL</strong></td>
<td><strong>$1,050,000</strong></td>
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<tr>
<td><strong>AREA</strong></td>
<td><strong>20,859 vsf</strong></td>
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<td><strong>$50.34 per vsf</strong></td>
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### LED Lighting / Dashboard

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<th>Item</th>
<th>Cost</th>
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<tr>
<td>IT Backbone</td>
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<td><strong>SUBTOTAL</strong></td>
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<tr>
<td><strong>AREA</strong></td>
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### INTERPRETIVE FEATURES

### STOREFRONT

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<td><strong>SUBTOTAL</strong></td>
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<tr>
<td><strong>AREA</strong></td>
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<tr>
<td></td>
<td><strong>$64.00 per vsf</strong></td>
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### PRECAST INSULATED CONCRETE PANELS

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<th>Item</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Precast Panels</td>
<td>$600,000</td>
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<tr>
<td>Misc Support Steel</td>
<td>$32,000</td>
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<tr>
<td>Paint at Interior</td>
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<td><strong>AREA</strong></td>
<td><strong>9,136 vsf</strong></td>
</tr>
<tr>
<td></td>
<td><strong>$69.94 per vsf</strong></td>
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PATTERNED

WILD TURKEY VISITOR CENTER - DE LEON & PRIMER
TRANSLUCENT

LABAN DANCE CENTRE - HERZOG & DE MEURON
CENTRE FOR SYNCHROTRON SCIENCE - BATES SMART
SOLID AND TRANSLUCENT

ZLTO– DE ARCHITECKTEN CIE
TATE MODERN ADDITION– HERZOG & DE MEURON
OSU EAST REGIONAL CHILLER PLANT - LEERS WEINZAPFEL
UW ALDER HALL - MAHLUM
DE YOUNG MUSEUM - HERZOG & DE MEURON
FOLDED

IPERA 25 – ALATAS ARCHITECTURE
PORTOBELLO ROAD CARPARK
LOUVERED

SWISS RAILWAY MAIN OFFICE - LUSSI + HALTER
MULTIFAMILY BUILDING - LOLA DOMENECH + ANTONIO MONTES
CASP 74 - BACH ARQUITECTES
SCREEN WALL STUDIES
SUMMARY OF YOUR COMMENTS

• A thoughtful and expected process leading to an “inevitable” package for the equipment.
• Project fits into campus context very well. The way the mass is articulated appears to be a good contributor to a larger collection of buildings.
• Slope of site has been used effectively to separate utility from pedestrian experience.
• The building can be simple and straightforward – it doesn’t need to be overdone or self-conscious. Embrace its bigness and give it texture.
• Appreciate the idea of using the screen wall as a MAGNET/PORTAL and the intent of working with UW ES&S on curating the interpretive content.
• Consider how the building will appear differently in the day (solid object) and at night (transparent & permeable).
• Encouraged team to consider a 3-D expression of the screen. A 2-D expression simply becomes a graphic exercise.
• Consider weathering in tougher mechanical microclimate and appearance of materials over time.

• Key architectural decisions to be made:
  • Material Selection & Articulation of Screen Wall
  • Material Selection & Articulation of Solid/Glazed Base
  • The rest is “irreducible”
WHERE WE ARE NOW
SITE PLAN

- Total Landscape Area: 8393 sf
- Quantity of New Trees: 17
WORKING LANDSCAPE

GREEN STORMWATER INFRASTRUCTURE REQUIREMENTS

AREA REQUIRING MITIGATION: 11,380 SF

MITIGATION MEASURES:
- Bioretention: 4,376 sf
- Trees: 430 sf
- Pervious Pavement: 820 sf
- Total Area Mitigated: 5626 sf
- % MITIGATION ACHIEVED: 50%
UNIVERSITY WAY CHARACTER

Street Trees:
- Green Ash
- or Pin Oak

Understory:
- Cotoneaster (Hot)
- or Vinca Minor (Cool)
BIORETENTION CHARACTER

Viburnum Trilobum:
- Spring
- Fall
- Winter

Cornus Sericea ‘Arctic Fire’:
- Spring
- Fall
- Winter
BURKE GILMAN TRAIL CHARACTER

Tree Canopy:
Big Leaf Maple, Douglas Fir, Vine Maple

Understory:
Swordfern, Salal, Kinnikinick, Oregon Grape, Snowberry, Beach Strawberry
**CHILLED WATER**
- Chillers to support 10,500 T total future capacity (far exceeding the 6,000 T requirement in the RFP)
- Ability to add Thermal Energy Storage for additional 3,000 T

**POWER GENERATION**
- Future expansion to 12 MW
INITIAL INSTALL – DAY 1

CHILLED WATER
• Chillers to support 3,000 T initial capacity
  (meeting the 3,000 T requirement in the RFP)

POWER GENERATION
• Generators to support 6 MW initial capacity
MASSING CONCEPT

SCREEN
WRAPPER
SOLIDS
SLAB
MATERIAL PALETTE

TEXTURED CONCRETE

POLYCARBONATE

CORRUGATED METAL

@ BASE

@ SCREEN WALL ABOVE
SCREEN WALL SYSTEM DESIGN DRIVERS

AESTHETIC/ARCHITECTURAL

• The screen wall contributes significantly to the architectural character of the building at this important gateway site
• Elegant simplicity rather than complex self-conscious expression is desired
• Surface modulation/articulation (3-D) may be more powerful than surface composition (2-D)
• Materials and detailing of screen must meet acoustic and cost requirements noted below

ACOUSTIC MITIGATION

• Project must meet Seattle Noise Ordinance (60dBA max. @ adjacent receiving property line)
• Acoustic mitigation required for (mostly) low frequency sound created by the Cooling Tower exhaust fans and intake louvers
• Emergency Generator noise is exempt from the Seattle Noise Ordinance
• Open screening or perforated panels on their own will not achieve the acoustic isolation required
• Acoustic performance requirements dictates solid panels with an average mass of 5psf

COST EFFECTIVE

• Budget allowance of $50/sf for screen wall system (structure, panels, interpretive, etc...)
• Budget for screen wall panels/skin is approximately ½ of the total screen wall system budget
• Look for efficiencies – every element addresses multiple requirements simultaneously
FACETED

TRESARCA RESIDENCE - ASSEMBLAGE STUDIO
DEAR GINZA BUILDING - AMANO DESIGN OFFICE
SCREEN WALL SYSTEM DESIGN DRIVERS

ARCHITECTURAL SCREEN
- Offers Maximum Flexibility In Panel Finish
- Outer Panel Can Be Perforated and/or Open
- Outer Skin Not Performing Acoustically

ACOUSTIC MITIGATION PANEL
- Acoustic Panel Not Visible From Exterior Of Building
- Acoustic Requirements Met Using Inexpensive Panel
- Sandwich Assembly Captures Screen Wall Frame

COST EFFECTIVENESS
- Requires Two Separate Installation/Labor Systems = More Costly
- Double Skin System Does Not Currently Fit Into The Established Cost Model

ARCHITECTURAL SCREEN INTEGRATED WITH ACOUSTIC MITIGATION PANEL
- Architectural Skin Does Double Duty
- Provides Exterior Expression And Acoustical Mitigation
- Panel Must Be Solid and +/- 5psf To Meet Acoustic Requirements
- Exposed Screen Wall Frame Requires Durable Finish and Bird Roosting Protection

COST EFFECTIVENESS
- Single Layer Requires Only One Installation/Labor System = More Cost Effective
- Single Layer Skin System Currently Fits Into The Established Cost Model
SHAPED FINS

AMET SCHOOL - LIVE ARCHITECTURE
HOLLAND PARK SCHOOL - AEDAS
SHAPED FINS
ZIG-ZAG PANELS

CHAPEL FOR THE DEACONESS OF ST. LOUP - LOCAL ARCHITECTURE
ARCTIA HEADQUARTERS - K2S ARCHITECTS
ZIG-ZAG PANELS
GLOWING BOX

LABAN DANCE CENTRE - HERZOG & DE MEURON
CENTRE FOR SYNCHROTRON SCIENCE - BATES SMART
GLOWING BOX – MODEL SHOT
WINDOWS INTO THE PROCESS
WINDOWS INTO THE PROCESS - DESIGN OPTIONS

PATTERN
- Frit Can Be Fixed To The Glass Surface
- Can Be Activated With Light
- Inexpensive Initial Cost
- More Fixed/Less Flexible

LIGHT
- LED Lighting Could Be Programmable To Offer Variety Over Time
- Could Benefit From - But Not Require - A Receiving Surface

PROJECTION
- Ease Of Programming/Flexibility
- Requires An Active Curator To Maintain Subject Matter Interest
- Requires A Receiving Surface At Or Behind The Glass Plane
- Potential Higher Initial And Operating Costs
WINDOWS INTO THE PROCESS - PATTERN
WINDOWS INTO THE PROCESS - PATTERN
WINDOWS INTO THE PROCESS - LIGHT
WINDOWS INTO THE PROCESS - LIGHT
WINDOWS INTO THE PROCESS - PROJECTION
WINDOWS INTO THE PROCESS - PROJECTION
CAMPUS GATEWAY
OPEN DISCUSSION

FEEDBACK & GUIDANCE