ST. HELENS PUBLIC SAFETY BUILDING

Image by Mackenzie Inc.

- Located in St. Helens, OR
- Police station and municipal building
- 2.3-acre lot
- Approximately 22,000 square feet
- Maintain public and private separation
- Consideration for the adjacent wetland and solar panels
- Implement value engineering

PROJECT GOALS

SAFETY | SUSTAINABILITY | COST

WATER RESOURCES

Design Storm	Total Runoff Volume (ft^3)
24-hr, 25-yr	27,359
24-hr, 100-yr	31,535

Stormwater Runoff Volume for Design Storms

- Santa Barbara Urban Hydrograph Method (SBUH) and Rational Method
- Reduce stormwater discharge to pre-development levels
- Remove excess sediment from runoff to improve water quality
- Aboveground Detention Pond

Stormwater Pond Example

GEOTECHNICAL

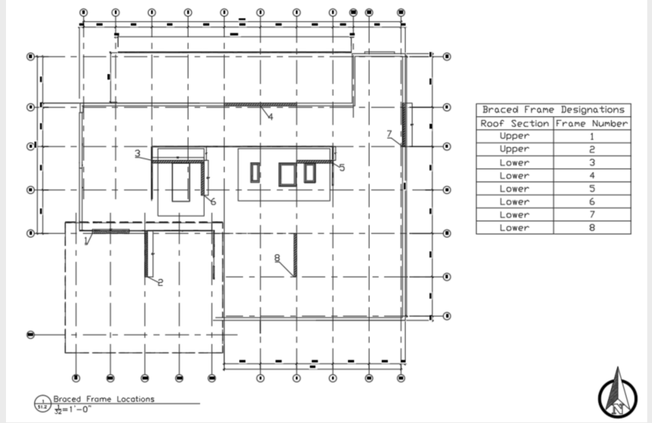
- Individual Pad Footings at each column
- Three footing sizes:
  3 ft x 3 ft, 5 ft x 5 ft, and 6 ft x 6 ft
- Reinforcement determined by ACI 318
- 18” thickness, rebar at 15” below top surface.

Typical Pad Footing

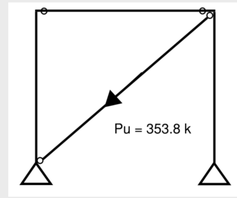
STRUCTURAL

LATERAL

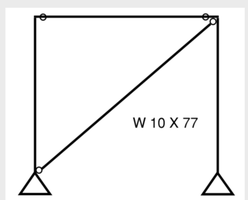
- Lateral force resisting system determined by equilibrium equations, axial load analysis, and AISC Steel Manual Table 4-1a
- Wind and seismic forces are acting on the lateral system and was found that the seismic loading controls
- Steel braced frame selected for both the lower and upper roof sections
- Wide-flange steel members



Lateral Frame Layout



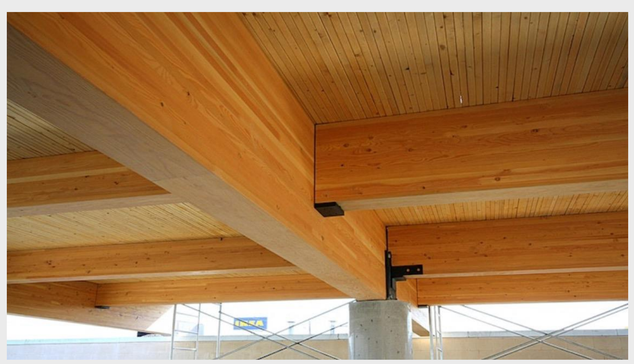
Frame Demand Example



Member Sizing Example

GRAVITY

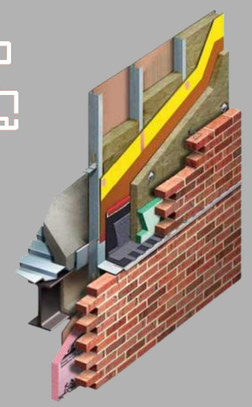
- High-roof: Structural steel members selected for columns, beams, and girders
- Low-roof: Glulam implemented for columns, beams, and girders
- Column sizes selected:
  - -GL 5½ x 6
  - -GL 6¾ x 9
  - -W 10 x 45
  - -W 10 x 33



Glulam Roof Example

BUILDING ENVELOPE

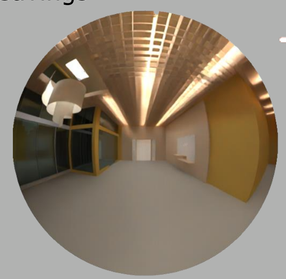
- 4” Brick Masonry Facade with Blue Skin Vapor Barrier on exterior face
- 3” Thermafiber RainBarrier Mineral Wool Insulation
- 6.25” Thermafiber Ultrabatt Mineral Wool Insulation between studs
- Sustainability standards increased by 250% from original design
- Thermal performance increased by 65%



Steel Stud Wall with Masonry Veneer

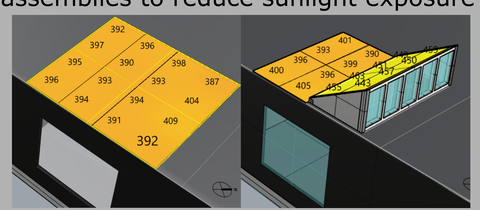
LIGHTING

- Combination of electric and daylighting
- Electric lighting design of the public spaces and exterior
- Daylight and other controls to increase energy savings



Lobby Rendering

- Addition of clerestory roof in the Break Room increases daylight autonomy by 30% and produces 6.8% more solar energy
- Photochromic film applied to glazing assemblies to reduce sunlight exposure



Solar Radiation Testing on Flat vs Clerestory Roof

Oregon State University