This Addendum supersedes and supplements all portions of the Design Intent Documents dated December 21, 2022, with which it concerns. The Addendum becomes part of the Contract Documents upon issuance. Receipt of the addendum must be acknowledged on bid for bid to be considered valid.

This Addendum includes the following Sections and Attachments:

Section 1: Revisions to Bid Documents

SECTION 1: Bid Document Clarifications, Revisions, and Additions

1. Sheet G001  
   Revision: Drawing Index updated to include new drawings issued with this Addendum.

2. Sheet M100  
   Addition: New drawing sheet added.

3. Sheet M101  
   Addition: New drawing sheet added.

4. Sheet E001  
   Addition: New drawing sheet added.

5. Sheet E002  
   Addition: New drawing sheet added.

6. Sheet E100  
   Addition: New drawing sheet added.
7. Project Manual Mechanical Design Narrative
   Addition: New specification section added.

8. Project Manual Lighting Fixture Schedule
   Addition: New specification section added.

   Addition: New specification section added.

10. Project Manual 26 05 26
    Addition: New specification section added.

11. Project Manual 26 05 29
    Addition: New specification section added.

12. Project Manual 26 05 33
    Addition: New specification section added.

13. Project Manual 26 05 33.16
    Addition: New specification section added.

14. Project Manual 26 05 36
    Addition: New specification section added.

15. Project Manual 26 05 53
    Addition: New specification section added.

16. Project Manual 26 05 73
    Addition: New specification section added.

17. Project Manual 26 05 83
    Addition: New specification section added.

18. Project Manual 26 06 19
    Addition: New specification section added.

19. Project Manual 26 22 00
    Addition: New specification section added.
20. **Project Manual 26 24 16**  
   **Addition:** New specification section added.

21. **Project Manual 26 27 16**  
   **Addition:** New specification section added.

22. **Project Manual 26 27 26**  
   **Addition:** New specification section added.

23. **Project Manual 26 28 13**  
   **Addition:** New specification section added.

   **Addition:** New specification section added.

25. **Project Manual 26 28 16.16**  
   **Addition:** New specification section added.

26. **Project Manual 26 29 13**  
   **Addition:** New specification section added.

27. **Project Manual 26 29 23**  
   **Addition:** New specification section added.

28. **Project Manual 27 13 43**  
   **Addition:** New specification section added.

29. **Project Manual 28 46 00**  
   **Addition:** New specification section added.

**Summary of Enclosures:**
1. Drawing sheets as noted above
2. Specification sections as noted above

**END OF ADDENDUM NUMBER 1**
GENERAL NOTES:

1. MECHANICAL DRAWINGS ARE GENERALLY DIAGRAMMATIC. PREFABRICATED BUILDING MANUFACTURER TO FIELD LOCATE ALL PIPES, DUCTS, MECHANICAL EQUIPMENT AND ASSOCIATED APPURTENANCES TO AVOID CONFLICTS WITH OTHER EQUIPMENT, PIPING, LIGHTING, AND ELECTRICAL CLEARANCES.

2. MECHANICAL EQUIPMENT LOCATIONS ARE APPROXIMATE. PREFABRICATED BUILDING MANUFACTURER TO CONFIRM PLACEMENT OF EQUIPMENT PRIOR TO INSTALLATION.

3. BTU RATINGS OF EQUIPMENT SHOWN ARE APPROXIMATE AND ARE FOR THE COOLING RATING FOR THE EQUIPMENT. HEATING REQUIREMENTS FOR THE EQUIPMENT ARE NOT SHOWN.

4. MECHANICAL EQUIPMENT SHOWN WOULD BE SHIPPED LOOSE WITH MODULES. ON SITE, PREFABRICATED BUILDING MANUFACTURER WILL BE RESPONSIBLE FOR INSTALLING EQUIPMENT.

ABBREVIATIONS

VRF VARIABLE REFRIGERANT FLOW
DOAS DEDICATED OUTSIDE AIR SYSTEM
CFM CUBIC FEET PER MINUTE
BTU BRITISH THERMAL UNITS

SHEET NOTES:

1. CEILING-MOUNTED FOUR-WAY THROW CASSETTE; 2,300 BTU-12,500 BTU EACH (COOLING).

2. CEILING-MOUNTED ONE-WAY THROW CASSETTE; 2,500 BTU EACH (COOLING), MINIMUM.

3. WALL-MOUNTED INDOOR CONDITIONING UNIT; 12,000 BTU EACH (COOLING).

4. WALL-MOUNTED INDOOR CONDITIONING UNIT; 15,000 BTU EACH (COOLING), PLACEMENT OF UNIT WILL BE COORDINATED WITH WALL-MOUNTED RETURN AIR GRILLES.

5. WALL-MOUNTED INDOOR CONDITIONING UNIT; 24,000 BTU (COOLING ONLY).

6. CEILING-MOUNTED EXHAUST FAN; 10 CFM.

7. EXHAUST UP TO ROOF-MOUNTED EXHAUST FAN.

8. CEILING-MOUNTED EXHAUST FAN; 10 CFM.

9. ELECTRIC WATER HEATER, 3.5 KW INPUT, 20-GALLON CAPACITY.
1. MECHANICAL DRAWINGS ARE GENERALLY DIAGRAMMATIC. PRE-FABRICATED BUILDING MANUFACTURER TO FIELD LOCATE ALL PIPES, DUCTS, MECHANICAL EQUIPMENT AND ASSOCIATED APPURTENANCES TO AVOID CONFLICTS WITH OTHER EQUIPMENT, IRRIGATION, LIGHTING AND ELECTRICAL CLEARANCES.

2. MECHANICAL EQUIPMENT LOCATIONS ARE APPROXIMATE. PRE-FABRICATED BUILDING MANUFACTURER TO CONFIRM PLACEMENT OF EQUIPMENT PRIOR TO INSTALLATION.

3. BTU RATINGS OF EQUIPMENT SHOWN ARE APPROXIMATE AND ARE FOR THE COOLING RATING FOR THE EQUIPMENT. HEATING REQUIREMENTS FOR THE EQUIPMENT ARE NOT SHOWN.

4. MECHANICAL EQUIPMENT SHOWN WOULD BE SHIPPED LOOSE WITH MODULES. ON SITE, PRE-FABRICATED BUILDING MANUFACTURER WILL BE RESPONSIBLE FOR INSTALLING EQUIPMENT.

SHEET NOTES:
1. DEDICATED OUTDOOR AIR SYSTEM (DOAS) ROOF TOP UNIT, 2,300 CFM, DOWNFLOW UNIT. INSTALL UNIT A MINIMUM OF 10'-0" FROM ROOF EDGE.

2. VARIABLE REFREGERANT FLOW (VRF) OUTDOOR HEAT RECOVERY SYSTEM, TYPICAL OF TOTAL COMBINED CAPACITY OF 29 TONS.

3. DEDICATED CONDENSING UNIT FOR SERVER ROOM COOLING, 2 TONS.

4. EXHAUST FAN, SERVES RESTROOMS BELOW.

5. EXHAUST FAN, SERVES STAFF OFFICE BELOW.
INTENT: 
This scope of work will provide a narrative noting the minimum general requirements, required wiring devices, panelboards, light switches, and other items by room. It complements the specifications and drawings and is not intended to supersede any of those documents.

1. This scope of work is complimentary to A101, provide all receptacles, devices, outlets, jacks, and other items as shown in A101 in addition to this scope of work.

2. Each modular structure shall have racetrack and wiring installed in the fabrication shop prior to shipment from the end device to either a panel or power terminal block.

3. Sonitrol shall provide all end devices, head end devices, audio sensors, door sensors, card readers, keypads, and accessories. Sonitrol shall design, program, configure, and integrate the security systems.

4. Security systems devices: provide (2) audio sensors.

SCOPE OF WORK

STUDY ROOM 108:

1. Provide raceway and wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

2. Provide general purpose convenience receptacles: refer to A101.

3. Provide main distribution panel (MDP), sized to support the entire building.

4. Provide raceway for (1) 4" PVC conduit for mounted through the floor for telecom utility fiber.


6. Provide dedicated 20/1 breaker for each of the following:
   a. Door contact panel
   b. Security control panel

7. Locate the fire alarm control panel, the HVAC control panel, and the security control panel in this room. Provide each with a dedicated 20A single pole breaker and wiring.

8. Provide 12" wide 4" deep ladder tray around the perimeter of the room and across the center of the room, centered on network rack location, located at 6' AFF.

9. Provide modular fabricator to providing bonding means for each structural module to each adjacent structural module and the supporting means below the module. Use gfrp instead of gictubt of acceptability.

10. One panel receptacles shall be general purpose convenience receptacles.

STUDY ROOM 106:

1. Provide raceway and wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

2. Provide general purpose convenience receptacles: refer to A101.

3. Provide initial wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

4. Provide raceway and wiring for the following access control devices at the north-west exit door.
   a. Door contact

5. Provide subpanel in room 101 to serve all loads in rooms 100 and 101.

6. Locate (4) weatherproof and lockable in use GFCI receptacles located out-side. Locate one outside the main entry, one outside staff entry, one along the west wall, and one along the east wall. Wire to closest panel.

7. Provide subpanel in room 109 to serve all loads in rooms 108 and 110.

8. Security system devices: provide (2) audio sensors and (2) door sensor.

STAFF WORK ROOM 111:

1. Provide raceway and wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

2. Provide general purpose convenience receptacles: refer to A101.

3. Provide initial wiring for the following access control devices.
   a. Door contact
   b. Door contact
   c. Door contact

4. Provide raceway and wiring for the following access control devices at the north-west exit door.
   a. Door contact

5. Provide subpanel sized to provide power to rooms 102, 103, 104.


7. Security system devices: provide (2) audio sensors and (2) door sensor.

RECEIPTOIRE 112:

1. Provide raceway and wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

2. Provide general purpose convenience receptacles: refer to A101.

3. Provide initial wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

4. Provide raceway and wiring for the following access control devices at the north-west exit door.
   a. Door contact

5. Provide subpanel sized to provide power to rooms 105, 106, 107.


7. Security system devices: provide (2) audio sensors and (2) door sensor.

OFFICE ROOM 115:

1. Provide raceway and wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

2. Provide general purpose convenience receptacles: refer to A101.

3. Provide initial wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

4. Provide raceway and wiring for the following access control devices at the north-west exit door.
   a. Door contact


7. Security system devices: provide (2) audio sensors and (2) door sensor.

LIMITED POTTERY ROOM 117:

1. Provide raceway and wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

2. Provide general purpose convenience receptacles: refer to A101.

3. Provide initial wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

4. Provide raceway and wiring for the following access control devices at the north-west exit door.
   a. Door contact

5. Provide subpanel sized to provide power to rooms 105, 106, 107.


7. Security system devices: provide (2) audio sensors and (2) door sensor.

RECEPTIONS 118:

1. Provide raceway and wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

2. Provide general purpose convenience receptacles: refer to A101.

3. Provide initial wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

4. Provide raceway and wiring for the following access control devices at the north-west exit door.
   a. Door contact

5. Provide subpanel sized to provide power to rooms 105, 106, 107.


7. Security system devices: provide (2) audio sensors and (2) door sensor.

RESTROOM ROOM 118:

1. Provide raceway and wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

2. Provide general purpose convenience receptacles: refer to A101.

3. Provide initial wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

4. Provide raceway and wiring for the following access control devices at the north-west exit door.
   a. Door contact

5. Provide subpanel sized to provide power to rooms 105, 106, 107.


7. Security system devices: provide (2) audio sensors and (2) door sensor.

DATA ROOM 114:

1. Provide raceway and wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

2. Provide general purpose convenience receptacles: refer to A101.

3. Provide initial wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

4. Provide raceway and wiring for the following access control devices at the north-west exit door.
   a. Door contact

5. Provide subpanel sized to provide power to rooms 105, 106, 107.


7. Security system devices: provide (2) audio sensors and (2) door sensor.

LIBRARY:

1. Provide raceway and wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

2. Provide general purpose convenience receptacles: refer to A101.

3. Provide initial wiring for the following access control devices:
   a. Door contact
   b. Door contact
   c. Door contact

4. Provide raceway and wiring for the following access control devices at the north-west exit door.
   a. Door contact

5. Provide subpanel sized to provide power to rooms 105, 106, 107.


7. Security system devices: provide (2) audio sensors and (2) door sensor.
UTILITY TRANSFORMER
XXX kVA
CT-MAIN
M
MDP
(ROOM 120)
PANEL "A"
MCB
PANEL "B"
PANEL "C"
PANEL "D"

1 ONE-LINE
SCALE 1/16" 1/16" 1/16"

GROUND NOTES AND REQUIREMENTS:
1. ALL POWER CONDUITS SHALL HAVE AN EQUIPMENT GROUNDING CONDUCTOR. USE OF RACEWAY AS AN EQUIPMENT GROUNDING CONDUCTOR IS NOT ALLOWED.
2. GROUNDING DIAGRAM AND GROUND SIZES TO BE PROVIDED BY MODULAR FABRICATOR.
3. GROUND SHALL CONSIST OF AT LEAST TWO 3/4" DIAMETER, 10' LONG GROUND RODS.
4. ENGINEERING OF THE GROUND REQUIREMENTS IS MODULAR FABRICATOR SCOPE. INSTALLATION AND PROVISION OF GROUND IS NOT MODULAR FABRICATOR SCOPE.
5. ALL MODULAR SECTIONS SHALL HAVE GROUND TABS, LOCATED ADJACENT TO GROUND TABS LOCATED ON ADJACENT MODULAR SECTIONS. ALL MODULAR SECTIONS STRUCTURAL STEEL SHALL BE CONNECTED VIA LISTED GROUNDING MEANS TO ADJACENT STRUCTURAL STEEL MODULES.

LOAD SCHEDULE AND DEMAND CALCULATION

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| MODULAR FABRICATOR TO ENGINEER UTILITY TRANSFORMER SIZE AND SECONDARY VOLTAGE NOT IN FABRICATOR SCOPE TO PROVIDE.

GENERAL NOTES:
1. REFER TO ELECTRICAL AND COMMUNICATIONS SCOPE OF WORK.
2. ONE-LINE AND LOAD SCHEDULE SHOWN HERE IS PRELIMINARY DESIGN. MODULAR FABRICATOR TO VALIDATE ALL INFORMATION AND PROVIDE STAMPED DRAWINGS MEETING NEC, STATE, AND LOCAL REQUIREMENTS.
3. SECONDARY VOLTAGE TO BE DETERMINED BY BUILDING FABRICATOR. TYPICAL FOR ALL ONE-LINE EQUIPMENT AND WIRING.
4. SERVES ROOMS 100 AND 101.
5. SERVES ROOMS 102, 102.1 AND 103.
7. SERVES ROOM 120.

REVISION SCHEDULE

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MECHANICAL DESIGN NARRATIVE

The mechanical design scope shall include plumbing, heating, ventilation, and HVAC controls. Fire protection systems will be provided by the Prefabricated Building Manufacturer. The mechanical design will be a Delegated Design Item. Calculations will be completed by a Washington licensed engineer.

Design Parameters
The building mechanical design will conform to the latest adopted edition of the following building codes, including local amendments:

- Seattle Mechanical Code (2018)
- Seattle Fire Code (2018)
- Seattle Plumbing Code (2018)
- ASHRAE 15
- ASHRAE 62.1
- NFPA 13
- SMACNA – Sheet metal design standards

Design Conditions
Design conditions for determining building loads and equipment sizing will be in accordance with climatic conditions as outlined by ASHRAE and per requirements from the Seattle Energy Code. Specific conditions to be used are:

- Winter Design, Outside: +24°F
- Winter Design, Inside: +68°F
- Summer Design, Outside: +86°F DB +67°F WB
- Summer Design, Inside: +72°F DB

Heating and Cooling System
Heating and cooling for the building will be provided by a Variable Refrigerant Flow (VRF) system, capable of providing heating and cooling simultaneously. Two rooftop heat recovery units, with a combined capacity of 29 tons (cooling) and 443 MBH (heating), will be required. The rooftop VRF units will be piped using a two-pipe system, with branch circuit controllers provided for different zones within the building including the office spaces, the Reading Room, and the Meeting Rooms. Preliminary zoning is shown on the included mechanical drawings, sheet M100. Final zoning of spaces will be coordinated with the Owner prior to final design.

Refrigerants are subject to compliance with manufacturer offering products. Refrigerant to be R-410A or as compliant with manufactured designed system. Refrigerant piping for the VRF systems suction, hot gas, and liquid lines straight lengths is anticipated to be copper, ACR, Type L with mechanically attached joints. For copper piping with an outer diameter smaller than 5/8”, Type ACR, 060 soft annealed-temper
tubing with mechanical attached joints will be provided. Fittings and piping to be suitable for use with the refrigerants within the design pressure rating for the final system design. All refrigerant piping shall be installed in accordance with ASHRAE 15.

Terminal conditioning equipment for the spaces to be as follows:

- Four-way throw ceiling mounted cassettes (Capacity Range 2,500-15,000 BTUs): Staff Offices, Wellness, Break Room, and Mechanical Room.
- One-way throw ceiling mounted cassettes (Minimum capacity 2,000 BTUs): Study Rooms
- Wall mounted units (Capacity range 12,000 -15,000 BTUs): Open Reading Room and Meeting Rooms.
- Unoccupied spaces such as restrooms will be conditioned with transfer air from the adjoining spaces.

Final locations of the terminal conditioning equipment are subject to approval by the Architect and the Owner.

Refrigerant piping will be routed above the ceiling panels above the Offices and Study Rooms. Within the Open Reading Room and the Meeting Rooms, refrigerant piping will be routed in the crawlspace areas when possible. If required, refrigerant piping may be routed high along the walls or exposed ceiling space, provided that the piping is painted to blend in with the background. Terminal conditioning equipment will be provided with integral condensate lift mechanisms to dispose of the condensate in an approved plumbing location. Plumbing locations will be coordinated during the final design and approved by the Architect and Owner.

The Data Room will be provided with a cooling-only, dedicated split-system air conditioner comprised of a wall-mounted indoor unit and a dedicated 2-ton condensing unit on the roof. Energy efficiency ratings shall not be less than the prescribed values in ASHRAE 90.1.

Mechanical humidification systems are not planned for this facility.

Interior mechanical equipment will be shipped loose for installation on-site by the Module Manufacturer. Where feasible, refrigerant piping and condensate piping will be pre-installed within each module for final connection on site. Pipe ends will be capped and protected prior to shipping. Isolation valves will be provided on the refrigerant lines prior to connection to adjacent modules. Once on site, flexible connections will be provided between the modules. The Prefabricated Building Manufacturer will make all penetrations for refrigerant piping and protect penetrations for shipping. Exterior mechanical equipment will be installed on-site by the Prefabricated Building Manufacturer.

Insulate refrigerant piping as required by equipment manufacturer, local codes, and in accordance with the IECC minimum efficiency per ASHRAE 90.1.

**Ventilation**

The office areas, Reading Room, and the Meeting Rooms are required to be ventilated and cooled in accordance with ASHRAE Standard 62.1 and ASHRAE Standard 15.

A roof mounted; 2300 CFM Dedicated Outdoor Air System (DOAS) unit will be installed to provide 100-
percent outside air to the building. The DOAS unit will be provided with an electric heating coil and a
direct expansion (DX) cooling coil. All outside air will be conditioned prior to delivery to the spaces.
Ventilation ductwork will be routed above the ceiling panels over the office areas and will be delivered
to the rooms via ceiling-mounted diffusers. For all other areas of the building, ventilation air will be
supplied to the spaces through floor-mounted grilles, with the ductwork routed within the crawlspace.
Return air to the DOAS unit will be accomplished using a plenum return over the office space area.
Return grilles in the Reading Room will be mounted high along west wall of the room. Return air from
the Meeting Rooms will be transferred to the Reading Room via acoustically insulated return air boots,
installed over the Storage Room. Exposed ductwork within the Reading Room and the Meeting Rooms is
not allowable per the Owner.

The restrooms in the facility will be served by a dedicated roof mounted exhaust fan. The exhaust fan
will be interlocked with the building automation schedule and will remain on during occupied hours.
Dedicated exhaust fans for the Break Room, Mechanical Room, and Staff Office will be provided. The
Staff Office is assumed to have a printer/copier area, requiring a dedicated exhaust fan per ASHRAE
62.1. Actual CFM exhaust rates will be determined during design for the Staff Office. The exhaust fans
will be ceiling mounted and will be operate according to the building’s operational schedule. The
exhaust ductwork from the fans will terminate at the exterior of the building. Exhaust rates for all fans
will comply with ASHRAE 62.1.

The Prefabricated Building Manufacturer will fabricate ducts and ductwork penetrations. Ductwork,
fans, and associated equipment will be shipped uninstalled with penetrations covered and protected.
The Prefabricated Building Manufacturer will install and insulate ductwork, fans, and equipment on site.
Roof-mounted equipment will be installed by the Prefabricated Building Manufacturer. Flexible duct
connections will be provided between module connections.

All duct systems will be insulated in accordance with IECC.

**Plumbing**

Plumbing systems required for the facility include domestic cold and hot water, waste, vent, and
condensate waste systems at a minimum. Facility design will include four unisex restrooms, a Break
Room kitchenette sink, a water fountain with bottle filler, a frost-proof exterior hose bibb connection,
and a mop sink.

The water service for the facility will be supplied from the onsite municipal water connection. The size
of the domestic water service will be determined during design. The domestic water service will enter
the building at the mechanical room and distribute water service to the building from this location. Final
requirements for the sizing of the service, tie-in location of the fire water service line, and routing of the
piping to the building will be determined by a Washington licensed fire protection engineer and will be
under the responsibility of the Prefabricated Building Manufacturer.

Domestic hot water and cold-water piping will be Type ‘L’ copper with lead free solder fittings or
approved compression press fittings. PEX tubing and joint systems will be allowable with approval from
the Owner. Piping will be specified to be insulated with preformed fiberglass semi-rigid insulation in
accordance with IECC. Piping will be installed within the modules offsite, with final piping connections
to be completed once installed onsite by the Prefabricated Building Manufacturer. Isolation valves will
be installed on domestic water piping between module connections. Prefabricated Building
Manufacturer will make penetrations for piping, cover, and protect penetrations for shipping.

Waste and vent piping is cast iron, no-hub above grade, PVC, or ABS. Below grade waste will be provided by others. The plumbing fixtures and specialties in the facility will gravity drain to the pre-installed plumbing stub-ins within the crawlspace (provided by others). Final connections to the stub-ins will be provided by the Prefabricated Building Manufacturer and will be routed on site.

The roof for the building will be a shallow slope to capture runoff, which will then convey through an external thru-wall scupper, conductor head, and rainwater leader type system. The system will discharge to a low area on site for final disposal. The storm drain system shall be combined storm drain system sized in accordance with the latest adopted edition of the Uniform Plumbing code, including local amendments.

Natural gas piping is not anticipated for this facility.

Other plumbing considerations include:

- Plumbing fixtures will be of commercial quality. Vitreous china products will be used for the water closets and lavatories. Stainless steel will be used for the kitchenette single-compartment sink.
- Water closets will be wall mounted, flush tank type with back outlet connections, with the exception of ADA accessible restrooms where floor-mounted fixtures will be provided.
- Lavatories will be wall mounted with touchless, battery-operated, vandal resistant, faucets. Provide tempering valves at public fixtures conforming to ASSE 1070 per code.
- A wall-mounted ADA water fountain with bottle filler will be provided.
- A mop sink with wall guards, bumper guards, mop hanger, service hose, hose holder, and service mop faucet within the Mechanical room will be provided.
- Floor drains with trap primer connections to be provided as listed below, by code, and as required by local amendments, including but not limited to:
  - Mechanical Room: Provide one floor drain for the water heater pressure relieve valve and backflow preventer drainage
  - Restrooms: Provide a floor drain for each individual restroom
- Trap primers, when installed in public areas, are to be concealed in walls with access doors. Provide with lockable access doors for maintenance.

Prefabricated Building Manufacturer will make all penetrations for vent and waste piping. Prefabricated Building Manufacturer will also cover and protect penetrations for shipping. Flexible connections between modules will be installed on site by the Prefabricated Building Manufacturer. Plumbing fixtures will be shipped loose and installed on site by the Prefabricated Building Manufacturer.

**Domestic Hot Water**
A high-efficiency electric water heater is to be selected. Water will be stored at a minimum of 140°F. Hot water will be designed to be distributed through a temperature actuated mixing valve conforming to ASSE 1017 to circulate at 110°F.
It is not anticipated that a separate hot water circulation pump will be required for this facility due to the proximity of the hot water fixtures to the water heater.

**Fire Protection**
A wet pipe automatic fire sprinkler system will be required to protect the building. Design of the fire protection system will be the responsibility of the Prefabricated Building Manufacturer. Design of the fire suppression system will meet the requirements of the International Building Code, International Fire Code, and the City of Lakewood Fire Code Amendments. The fire suppression design will be provided in a Delegated Design Submittal, with calculations provided by a Washington licensed fire protection engineer.

**Controls**
Electric controls will be utilized to control the equipment in the facility. The facility is required to connect to the Owner’s offsite Direct Digital Controls BACnet centralized system. Controls will be installed by the Owner’s control vendor.

Provide electric control systems consisting of thermostats, control valves, dampers, and actuators, indicating devices, interface equipment and other apparatus and accessories required to operate mechanical systems, and to perform functions specified.

Testing, TAB, and pipe supports will be required during design and will be the responsibility of the Prefabricated Building Manufacturer.
Lighting fixtures will take between 6-8 weeks to arrive on site after the manufacturer receives the purchase order documentation. 6-8 weeks are standard lead times for most off-the-shelf lighting fixtures. Longer times will apply if customization, changes, or special requests are needed. Coordination for fixtures on this project has been done between lighting designer and local sales reps. Contractor and distributor to allow for Seattle Sales Reps to prepare and submit submittal packages for Blanca review, when applicable.

Lighting designer does not specify voltage and emergency lighting requirements, Electrical Engineer and/or Electrical Contractor to define, specify and document. Lighting designer does not design or specify any seismic bracing required for fixtures.

For lighting fixture mounting details refer to details in architectural documentation.
Dimming protocol is 0-10V to 1%, unless otherwise noted (U.O.N.).
All standard finishes, U.O.N.  All 90 CRI minimum.
Refer to Project Manual for specification sections defining Interior and Exterior Lighting System Components.
Refer to issued lighting fixture cuts for manufacturer's catalog pages. Lighting Manufacturer updates their catalog pages often. Contractor to verify that the most updated fixture cut is used in the submittal process. Please submit shop drawings as requested within fixture descriptions for approval as part of submittal process.
For all installation related information refer to manufacturer's published instructions.
Some fixtures will require aiming and high-end trimming after install at the direction of the lighting designer. The aiming and dimming settings of lighting fixtures shall occur after dark when daylight prevents accurate evaluation of lighting system performance. The Contractor shall provide all necessary personnel and equipment for aiming and adjusting of light fixtures, and programming of lighting control systems.

All LED luminaires are integrated LED Fixtures with a dedicated LED light source, U.O.N.
"L"=LED fixture, "XL"= Exterior LED
<table>
<thead>
<tr>
<th>Type Rev.</th>
<th>Description</th>
<th>Mfr.</th>
<th>Catalog</th>
<th>Source</th>
<th>Fixtures Watts</th>
<th>Dim.</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>Direct/indirect linear pendant. Fixture to be constructed out of extruded</td>
<td>Fluxwerx</td>
<td>VIEW VU1-B-B-D-93-A-</td>
<td>7042lm</td>
<td>76</td>
<td>0-10V to 1%</td>
<td>Reading Room</td>
</tr>
<tr>
<td></td>
<td>clear anodized aluminum, with transparent acrylic optic and a clear anodized</td>
<td></td>
<td>08-S-E1-M-06</td>
<td>3000K</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>finish. Fixture to measure 4.5&quot; tall x 1.5&quot; wide x various lengths comprised</td>
<td></td>
<td>90CRI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>of 8' long segments. Fixture to be provided with a .04&quot; stainless steel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>aircraft cable. Provide structure mounted remote driver.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>Pendant downlight. Fixture to be constructed out of architectural grade</td>
<td>Fluxwerx</td>
<td>Portal TC1-P-05-S-</td>
<td>2239lm</td>
<td>16</td>
<td>0-10V to 1%</td>
<td>Reading Room</td>
</tr>
<tr>
<td></td>
<td>aluminum and steel, with an acrylic lens and a metallic silver powdercoat</td>
<td></td>
<td>06-S-S-W-2-9-30-C-</td>
<td>3000K</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>finish. Fixture canopy to be structure with a metallic silver finish.</td>
<td></td>
<td>E1-P</td>
<td>90CRI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fixture to measure 5.66&quot; diameter x 3.19&quot; height. Fixture to have a wide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>beam spread distribution. Fixture to be provided with a suspension cable.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L3</td>
<td>Decorative pendant downlight. Fixture to be constructed out of aluminum body</td>
<td>Modern</td>
<td>Zanya PD-74223-3000K-</td>
<td>600Lm</td>
<td>20.3</td>
<td>0-10V to 1%</td>
<td>Reading Room</td>
</tr>
<tr>
<td></td>
<td>with etched acrylic diffuser and a gold finish. Fixture to measure 23&quot;</td>
<td>Froms</td>
<td>GO</td>
<td>3000K</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>diameter x 11&quot; tall.</td>
<td></td>
<td></td>
<td>90CRI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type Rev.</td>
<td>Description</td>
<td>Mfr.</td>
<td>Catalog</td>
<td>Source</td>
<td>Fixture Watts</td>
<td>Dim.</td>
<td>Location</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
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<td>--------------------------------</td>
<td>-----------------</td>
<td>---------------</td>
<td>-----------</td>
<td>----------------------</td>
</tr>
<tr>
<td>L4</td>
<td>Surface mounted downlight. Fixture to be constructed out of extruded aluminum, rolled and welded with a acrylic diffuser and a sky matte color finish. Fixture to measure 24&quot; diameter x 2 1/2&quot; tall.</td>
<td>Prudential</td>
<td>GazeRDS-LED3-MO-CCYSKM-D1-SC-UNV-SURF-DM01</td>
<td>3125Lm 3000K 90CRI</td>
<td>27</td>
<td>0-10V to 1%</td>
<td>Entrance and offices</td>
</tr>
<tr>
<td>L5</td>
<td>Back of house suspended linear downlight. Fixture to be constructed out of extruded aluminum with a TBD powder coat finish. Fixture to measure 4' long x 3.16&quot; tall x 1.15&quot; wide.</td>
<td>Prudential</td>
<td>Snapro S1-PRO-30LED-MO4-SAL-TMW-UNV-SUR-X3-DM01</td>
<td>2960Lm 3000K 90CRI</td>
<td>26</td>
<td>0-10V to 1%</td>
<td>Storage</td>
</tr>
<tr>
<td>L6</td>
<td>Recessed downlight. Fixture to be constructed out of cold rolled steel with an acrylic lens with a matte chrome trim finish. Fixture housing to measure 4 3/4&quot; diameter x 3 1/2&quot; tall.</td>
<td>Alphabet</td>
<td>NU4 LOPRO NU4-RDLP-SW-10LM-30K-90HE60-NL-MC-MC</td>
<td>800Lm 3000K 90CRI</td>
<td>9</td>
<td>0-10V to 1%</td>
<td>Restrooms</td>
</tr>
<tr>
<td>L7</td>
<td>Bathroom vanity. Fixture to be constructed out of aluminum hardware with an ultra thin light guide acrylic diffuser and a TBD finish. Fixture to measure 24&quot; long x 3.25&quot; tall x 3.5&quot; wide.</td>
<td>Brownlee</td>
<td>Flow-RD 5160-24-BNH13EC1-30K</td>
<td>1660Lm 3000K 90CRI</td>
<td>13</td>
<td>0-10V to 1%</td>
<td>Restrooms</td>
</tr>
<tr>
<td>L8</td>
<td>Grid mounted 2x2 panel. Fixture to be constructed out of extruded aluminum with a mate frame, and an acrylic frosted lens. Fixture to measure 2' long x 2' wide x 2.5&quot; tall.</td>
<td>Columbia Lighting</td>
<td>Scaler 2x2 SRP22-BLANK-30-MWHE-G-ED1-U</td>
<td>2100Lm 3000K 80CRI</td>
<td>18</td>
<td>0-10V to 1%</td>
<td>Multiple Locations</td>
</tr>
<tr>
<td>Type Rev.</td>
<td>Description</td>
<td>Mfr.</td>
<td>Catalog</td>
<td>Source</td>
<td>Fixture Watts</td>
<td>Dim.</td>
<td>Location</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------</td>
<td>-----------------------</td>
<td>--------------</td>
<td>---------------</td>
<td>-----------</td>
<td>------------------</td>
</tr>
<tr>
<td>L9</td>
<td>Decorative pendant downlight. Fixture to be constructed out of die cast aluminum body with pc diffuser and an aged brass finish. Fixture to measure 56&quot; long x 24&quot; tall. Canopy to measure 15&quot; long x1&quot; tall.</td>
<td>Modern Forms</td>
<td>Sydney PD-64256-3000K-AB</td>
<td>2568Lm 3000K 90CRI</td>
<td>41.4</td>
<td>0-10V to 1%</td>
<td>Circulation table</td>
</tr>
<tr>
<td>L10</td>
<td>Decorative pendant. Fixture to be constructed out of aluminum hardware with handcrafted interlocked acrylic petal shade and a brushed nickel finish. Fixture to measure 22&quot; diameter x 6&quot; tall. Canopy to measure 9&quot; diameter x 1&quot; tall.</td>
<td>Modern Forms</td>
<td>Fluffy PD-59922-3000K-BN</td>
<td>2333Lm 3000K 90CRI</td>
<td>31.5</td>
<td>0-10V to 1%</td>
<td>Multiple Locations</td>
</tr>
<tr>
<td>Type Rev.</td>
<td>Description</td>
<td>Mfr.</td>
<td>Catalog</td>
<td>Source</td>
<td>Fixture Watts</td>
<td>Dim.</td>
<td>Location</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------</td>
<td>--------------------------</td>
<td>--------------</td>
<td>---------------</td>
<td>------</td>
<td>------------------</td>
</tr>
<tr>
<td>XL1</td>
<td>Recessed downlight. Fixture to be constructed out of cold rolled steel with an acrylic lens with a TBD trim finish. Fixture housing to measure 4 3/4&quot; wide x 15&quot; long x 3 1/2&quot; tall.</td>
<td>Alphabet</td>
<td>NU4 LOPRO NU4-RDLP-SW-10LM-30K-90-HE60-NL-MC-MC</td>
<td>800lm 3000K 90CRI</td>
<td>9</td>
<td>0-10V to %</td>
<td>back entrance door</td>
</tr>
</tbody>
</table>
**LIGHTING FIXTURE CUTS**

<table>
<thead>
<tr>
<th>Lakewood Library</th>
<th>Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lakewood, WA</td>
<td>Lighting Design Intent</td>
</tr>
<tr>
<td>BuildingWork</td>
<td>12/8/22</td>
</tr>
</tbody>
</table>

Lighting fixtures will take between 6-8 weeks to arrive on site after the manufacturer receives the purchase order documentation. 6-8 weeks are standard lead times for most off-the-shelf lighting fixtures. Longer times will apply if customized, changes, or special requests are needed.

Lighting designer does not specify voltage and emergency lighting requirements, Electrical Engineer and/or Electrical Contractor to define, specify and document.

For multifamily projects, fixture efficacy required by local energy code is XXXX.

For lighting fixture mounting details refer to details in architectural documentation.

Dimming protocol is 0-10V TO 1%, unless otherwise noted (U.O.N.).

All standard finishes, U.O.N.

All sources to be LED and 90 CRI minimum.

Refer to Project Manual for specification sections defining Interior and Exterior Lighting System Components.

Refer to issued lighting fixture cuts for manufacturer’s catalog pages. Lighting Manufacturer updates their catalog pages often. Contractor to verify that the most updated fixture cut is used in the submittal process.

For all installation related information refer to manufacturer’s published instructions.
**Lighting Design Intent**

---

**L1**

---

**Catalog #**

**Project**

**Notes**

---

**Specification Data**

**Performance Focus**

80 CRI 4000 K (VU1xBx40)

<table>
<thead>
<tr>
<th>Energy (W/4ft)</th>
<th>Light (lm/4ft)</th>
<th>Efficacy (lm/W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 19 W</td>
<td>1900</td>
<td>103</td>
</tr>
<tr>
<td>B 23 W</td>
<td>2300</td>
<td>101</td>
</tr>
<tr>
<td>C 29 W</td>
<td>2850</td>
<td>99</td>
</tr>
<tr>
<td>D 38 W</td>
<td>3600</td>
<td>95</td>
</tr>
</tbody>
</table>

- Color Matching (SDCM)
- Lumen Maintenance (hr)
  - L90 per TM21
  - L70 Estimate
  - < 2 > 60,000 > 200,000

Nominal values, refer to back pages for full performance data.

---

**Features**

- Transparent optics appear like floating fenestration.
- Precision machined and extruded clear anodized aluminum construction.
- 3 endcap options – Beam, Radius or Square – preinstalled for perfect fit and finish.
- Up to 15 ft on center spacing, delivering 35 fc at 0.4 W/ft².
- No electrical connections required at fixture joints for virtually seamless continuous runs that are simple and fast to install.
**LIGHTING FIXTURE CUTS**

**Lakewood Library**
Lakewood, WA

**BuildingWork**

---

**Type: L1**

**Lighting Design Intent**
12/8/22

lblanco@blancalighting.com
206 799 4749

---

**ORDER GUIDE**

<table>
<thead>
<tr>
<th>OPTIONS</th>
<th>CONTROLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>VU1</td>
<td>B</td>
</tr>
</tbody>
</table>

---

**SPECIFICATION DATA**

**ORDER GUIDE**

<table>
<thead>
<tr>
<th>FAMILY</th>
<th>ENDCAP</th>
<th>OPTICAL DISTRIBUTION</th>
<th>ENERGY</th>
<th>CRI-CCT</th>
<th>FINISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>VU1</td>
<td>View</td>
<td>A 70 Up</td>
<td>30 Dn</td>
<td>B 20 Up</td>
<td>80 Dn</td>
</tr>
</tbody>
</table>

---

**ORDER GUIDE**

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>CEILING TYPE</th>
<th>DRIVER</th>
<th>VOLTAGE</th>
<th>SUSPENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>04</td>
<td>4 ft</td>
<td>F1</td>
<td>120–277 V</td>
<td>03 ≤ 3 ft</td>
</tr>
<tr>
<td>06</td>
<td>6 ft</td>
<td>F1</td>
<td>347 V</td>
<td>06 ≤ 6 ft</td>
</tr>
<tr>
<td>08</td>
<td>8 ft</td>
<td>F1</td>
<td>6 ft</td>
<td>12 ≤ 12 ft</td>
</tr>
<tr>
<td>XX</td>
<td>x ft ²</td>
<td>F1</td>
<td>25 ≤ 25 ft</td>
<td></td>
</tr>
</tbody>
</table>

---

**OPTIONS**

**WIRING & EMERGENCY**

<table>
<thead>
<tr>
<th>A#</th>
<th>Alternate Wiring Module Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>B#</td>
<td>Battery Pack Qty</td>
</tr>
<tr>
<td>H#</td>
<td>Emergency Switch Qty (270° or Controlled)</td>
</tr>
</tbody>
</table>

**ROW LAYOUT**

| C | Chicago Plenum |
| F | 4 ft End Module |
| G | 6 ft Modules |
| N | Non-Power End |

**SENSORS & CONTROLLERS**

| SE1 | Canopy Integrated Enlighted Smart Sensor |
| RE1 | Remote Enlighted Smart Sensor |
| VN1 | Acuity nLight Converter |

---

1 Specify run length in 2' nominal increments. Important: Run lengths cannot be modified on site (factory installed endcaps & joiners).

2 Integrated driver with mounting, power feed, suspension & canopy, except for remote.

3 Normal input power 4/4 ft. For 247 V with E1/E1 add 4 W to above.

4 For 247 V with E1/E1, luminaire includes transformer, A1 not available in Drywall ceiling.

5 For 247 V with E1/E1, luminaire includes transformer, 120–277 V and Remote (R) ceiling only.

6 For 120–277 V in grid (G), structure (S) and remote (R) ceilings, contact Fluxwerx.

---

**Due to continuous product improvements, specifications and dimensions are subject to change without notice. Certain options have limited compatibility with some other product selections.**

---

**PAGE 3 of 59**
### LIGHTING FIXTURE CUTS

**Type: L1**

**Lakewood Library**  
Lakewood, WA  
BuildingWork  
12/8/22

<table>
<thead>
<tr>
<th>Type</th>
<th>LIGHTING FIXTURE CUTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inventory</strong></td>
<td><strong>Lighting Design Intent</strong></td>
</tr>
</tbody>
</table>

#### SPECIFICATION DATA

**INTEGRATED DRIVER, MOUNTING, POWER FEEDS + SUSPENSION**

Refer to separate product specification datasheets for detailed dimensions of mounting hardware components, driver enclosures, canopies and wiring.

#### DRIVER, MOUNTING, POWER FEEDS + SUSPENSION

**INTEGRATED DRIVER**

- For Enlighted Sensors in drywall ceilings, use **INTEGRATED DRIVER** mounting enclosure options.

**NEW OR RETROFIT**

- **(D) DRYWALL**
  - Integrated driver, power feed and mounting suspension points suitable for CARB or plaster thicknesses of <0.875" (22 mm).

- **(G) GRID**
  - Integrated clip, driver, power feed and mounting suspension points suitable for accessible ceiling grid heights of <1.75" (44 mm).

- **(R) REMOTE**
  - External remote mounted driver. Power feeds and suspension points suitable for exposed conduit or recessed junction boxes. See Notes for wire gauge guide.

**NEW OR OFF GRID**

- **(S) STRUCTURE**
  - Exposed Ceilings
  - Integrated driver with mounting, power feed, and canopy suitable for exposed surface conduit or recessed junction boxes.

**NEW OR OFF GRID**

- **(D) DRYWALL**
  - For Enlighted Sensors in drywall ceilings, use **REMOTE (R) mounting enclosure options**.

**NEW OR OFF GRID**

- **(S) STRUCTURE**
  - Exposed Ceilings
  - Integrated driver with mounting, power feed, and canopy suitable for exposed surface conduit or recessed junction boxes.
LIGHTING FIXTURE CUTS

Lakewood Library
Lakewood, WA
Building Work
12/8/22
lblanco@blancalighting.com
206 799 4749
LIGHTING FIXTURE CUTS

NOTES

CONSTRUCTION
• Anodized, extruded + machined architectural grade aluminum
• Precision machined aluminum joints and endcaps are factory preinstalled for seamless fit
• Stainless steel fasteners
• 0.04" (1.0 mm) stainless steel aircraft cable suspensions
• Clean anodized surface finish or powdercoated in white, metallic silver or black, canopies in white as standard

OPTICAL
• Anodic optical structures with linear light extraction elements
• Precision molded high transmittance clear acrylic lenses
• Long life mid-flux LED system designed for typical TM21 lumen maintenance ≥ L90 @ 60,000 h
• Available in 3000K, 3500K, 4000K with CRI ≥ 80 and R9 ≥ 0, all with color accurate binning ± 2 SDCM

ELECTRICAL
• No electrical connections are required at fixture level for installation: low voltage power cords factory preinstalled
• High efficiency multivolt drivers, integrated with suspension and mounting components, for 50–60 Hz 125–277 V or 347 V
• Power Factor > 0.90
• Total Harmonic Distortion < 20%
• Dim level: Standard 3%, optional 1% or 0.1%
• Optional Battery Pack delivers 16 W Class 2 rated output for 90 min. Use 12 W input energy to estimate emergency flux, typically T850 (850 lm @ 100–150 lm/W)
• Optional G2D (Generator Transfer Switch): 120–277 V, disables 0–10 V control during emergency for full light output
• Surge Protection: Meets ANSI C84.1 spec and ANSI/IEEE C62.41
• Inrush Current: Meets NEMA 4x0

WIRE GAUGE
• Recommended low voltage wire gauge (AWG) for minimal losses over distance when REMOTE mounting:
  - 30 ft: 18 ga
  - 50 ft: 14 ga
  - 80 ft: 12 ga

ENVIRONMENTAL & CARE
• Designed for use in dry or damp indoor locations with ambient temperatures of 0–30°C (32–86°F)
• Not suitable for natatorium environments, e.g. swimming pools, hot tubs and saunas.
  The luminaire may be damaged by chemicals such as chlorine, solvents, ammonia, alcohol or sulfur in the area of operation or in cleaning products. Damage from contaminants is not covered under warranty.
• Clean only by wiping with a slightly water-damp, soft, clean cloth.

ELECTRICAL
• No electrical connections are required at fixture level for installation; low voltage power cords factory preinstalled
• High efficiency multivolt drivers, integrated with suspension and mounting components, for 50–60 Hz 125–277 V or 347 V
• Power Factor > 0.90
• Total Harmonic Distortion < 20%
• Dim level: Standard 3%, optional 1% or 0.1%
• Optional Battery Pack delivers 16 W Class 2 rated output for 90 min. Use 12 W input energy to estimate emergency flux, typically T850 (850 lm @ 100–150 lm/W)
• Optional G2D (Generator Transfer Switch): 120–277 V, disables 0–10 V control during emergency for full light output
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  The luminaire may be damaged by chemicals such as chlorine, solvents, ammonia, alcohol or sulfur in the area of operation or in cleaning products. Damage from contaminants is not covered under warranty.
• Clean only by wiping with a slightly water-damp, soft, clean cloth.

CONTROL & SENSORS
Fluxwerx products are designed for simple integration with a wide range of sensors, lighting controls and building management systems. Many projects incorporate occupancy sensing, daylight harvesting, individual or central adjustment of light levels and luminance or space monitoring in order to save energy, reduce costs and maximize occupant comfort. Fluxwerx offers a number of standard driver and controller options to support various wired and wireless network protocols. In our suspended products, the packaging of drivers and controls in the mounting system maintains clean aesthetics, simplifies installation & maintenance, increases flexibility and supports future system upgrades.

Enlighted wireless, networked smart sensor integrates occupancy sensing, daylight harvesting, energy usage, temperature and light level control. Option: Canopy-integrated or remote Enlighted sensor (SE1 or RE1)
Model: SU-5E-CL

nLight wireless, 2-way network supports luminaire light level control as well as occupancy and daylight sensors. Option: Canopy-integrated or remote Enlighted sensor (SE1 or RE1)
Model: nPS-80-EZ or nPS-80-EZ-ER

EldoLED drivers support common wired protocols, 0–10 V and DALI. They also provide access to finer dimming control, dynamic white and Bluetooth low-energy (BLE) wireless.
Options: ECO 1% (E1), SOLO 0.1% (E2)

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Due to continuous product improvements, specifications and dimensions are subject to change without notice. Certain options have limited compatibility with some other product selections. Consult www.fluxwerx.com for most current technical information.

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V1.0a | 2022-10

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LIGHTING FIXTURE CUTS

Lakewood Library
Lakewood, WA
BuildingWork
12/8/22
lblanco@blancalighting.com
206 799 4749

LIGHTING FIXTURE CUTS

Type: L1

Lakewood Library
Lakewood, WA
BuildingWork
12/8/22
lblanco@blancalighting.com
206 799 4749

LIGHTING FIXTURE CUTS

Type: L1

FLUXWERX.

SPECIFICATION DATA

NOTES

CONSTRUCTION
- Anodized, extruded + machined architectural grade aluminum
- Precision machined aluminum joints and ends are factory preinstalled for seamless fit
- Stainless steel fasteners
- 0.04” (1.0 mm) stainless steel aircraft cable suspensions
- Clear anodized surface finish or powdercoated in white, metallic silver or black, canopies in white as standard

OPTICAL
- Anisotropic optical structures with linear light extraction elements
- Precision molded high transmittance clear acrylic lenses
- Long life mid-flux LED system designed for typical TM21 lumen maintenance ≥90 @ 60,000 h
- Available in 3000K, 3500K, 4000K with CRI ≥ 80 and R9 ≥ 0, or CRI ≥ 90 and R9 ≥ 50, all with color accurate binning ≤ 2 SDCM

ELECTRICAL
- No electrical connections are required at fixture level for installation. Low voltage power cords factory preinstalled
- High efficiency multivolt drivers, integrated with suspension and mounting components, for 50-60 Hz 12V-24V or 347V
- Power Factor > 0.90
- Total Harmonic Distortion < 20%
- Dim level: Standard 3%, optional 1% or 0.1%
- Optional Battery Pack delivers 18W Class 2 rated output for 90 min. Use 12W input energy to estimate emergency flux, typically TSDS-TMS (100-115 lm/W)
- Optional GCT (Generator Transfer Switch), 120-277V, disables 0-10 V control during emergency for full light output
- Surge Protection: Meets ANSI/UL 860-2019

WIRE GAUGE
- Recommended low voltage wire gauge (AWG) for minimal losses over distance when REMOTE mounting:
  - 30 ft: 18 ga
  - 50 ft: 14 ga
  - 80 ft: 12 ga

ENVIRONMENTAL & CARE
- Designed for use in dry or damp indoor locations with ambient temperatures of 0–30°C (32–86°F)
- Not suitable for natatorium environments, e.g. swimming pools, hot tubs and saunas.
  - The luminaire may be damaged by chemicals such as chlorine, solvents, ammonia, alcohol or sulfur in the area of operation or in cleaning products. Damage from contaminants is not covered under warranty.
  - Clean only by wiping with a slightly water-damp, soft, clean cloth.

ELECTRICAL
- No electrical connections are required at fixture level for installation; low voltage power cords factory preinstalled
- High efficiency multivolt drivers, integrated with suspension and mounting components, for 50–60 Hz 120–277 V or 347 V
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CONTROL & SENSORS
- Designed for simple integration with a wide range of sensors, lighting controls and building management systems. Many projects incorporate occupancy sensing, daylight harvesting, energy usage, and light level control for optimal energy efficiency.
- Fluxwerx offers a number of standard driver and controller options to support various wired and wireless network protocols.

Lutron EcoSystem network protocol enables on/off, dimming, occupancy sensing and daylight harvesting.

Options:
- Lutron ES1 (LED @ 10,000 h)
- nLight wired, 2-way network supports luminaire light level control as well as occupancy and daylight sensors.
- Option: Canopy-integrated or remote Enlighted sensor (SE1 or RE1)
- Model: SU-5E-CL

ENLIGHTED wireless, networked smart sensor integrates occupancy sensing, daylight harvesting, and light level control for optimal energy efficiency.

Options:
- ECO 1% (E1), SOLO 0.1% (E2)
- EldoLED drivers support common wired protocols, 0–10 V and DALI. They also provide access to finer dimming control, dynamic white and Bluetooth low-energy wireless.
- Option: ECO 1% (E1), SOLO 0.1% (E2)

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LIGHTING DESIGN INTENT

PAGE 1 of 6

VU1xB | 2022-10

Due to continuous product improvements, specifications and dimensions are subject to change without notice. Certain options have limited compatibility with some other product selections. Consult www.fluxwerx.com for most current technical information.
**Lighting Design Intent**

**Portal Pendant 5.5” (TC1-P05)**

**Catalog #**

**Project**

**Notes**

**Performance Focus**

5.5” Medium Beam, 100% Down, 80 CRI 4000 K

<table>
<thead>
<tr>
<th>Energy (W)</th>
<th>Light (lm)</th>
<th>Efficacy (lm/W)</th>
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<td>ENERGY STAR</td>
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<tr>
<td>B 12 W</td>
<td>1750</td>
<td>139</td>
<td>TITLE 24 JA8 (90 CRI)</td>
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<tr>
<td>C 16 W</td>
<td>2350</td>
<td>142</td>
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<tr>
<td>D 21 W</td>
<td>3000</td>
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**Color Matching (SDCM)**

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<th>Lumen Maintenance (hr)</th>
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<tr>
<td>L80 per TM21</td>
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</tbody>
</table>

< 2 | > 72,000 | > 130,000

*Nominal values, refer to back pages for full performance data.

**Features**

- Portal reimagines directional and general area illumination. Proprietary optics deliver exceptional lighting control from a minimalist aesthetic.
- To support your design vision, both 5.5” & 9” sizes are available in six mounting variants – Recessed, Semi-Recessed, Semi-Recessed Adjustable, Surface, Surface Adjustable & Pendant.
- Light outputs range from 1200 lm (5.5”) to 4100 lm (9”) with efficacies exceeding 150 lm/W.
- Flexible lighting schemes are enabled by several beam angles – 30°, 45° & 65° for the 5.5” – and direct/indirect pendant distributions – 20 Up | 80 Down, 50 Up | 50 Down.
- White, Metallic Silver & Black powdercoat finishes (plus RAL colors) can be combined to augment the ceiling design.
- 80 and 90 CRI LEDs are available in four CCTs – 2700 K, 3000 K, 3500 K, 4000 K.
**Lighting Design Intent**

**Portal Pendant 5.5” (TC1-P05)**

---

### Order Guide

<table>
<thead>
<tr>
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<th>2</th>
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<th>4</th>
<th>5</th>
<th>6</th>
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<th>11</th>
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<th>13</th>
<th>OPTIONS</th>
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#### Type: L2

### Specification Data

**Fixture Finish**
- B: Black Powdercoat
- S: Metallic Silver Powdercoat
- W: White Powdercoat
- C: Custom Color (RAL)

**Canopy/Base Finish**
- B: Black Powdercoat
- S: Metallic Silver Powdercoat
- W: White Powdercoat
- C: Custom Color (RAL)

<table>
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<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<tr>
<td>FINISH</td>
<td>BEAM SPREAD</td>
<td>UP/DN DISTRIBUTION</td>
<td>CRI</td>
<td>CCT</td>
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<tr>
<td>B</td>
<td>Narrow (30°)</td>
<td>100 Dn</td>
<td>80 CRI</td>
<td>2700 K</td>
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<td>S</td>
<td>Medium (45°)</td>
<td>20 Up</td>
<td>90 CRI</td>
<td>3000 K</td>
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<tr>
<td>W</td>
<td>Wide (65°)</td>
<td>50 Up</td>
<td>80 CRI</td>
<td>3500 K</td>
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<tr>
<td>C</td>
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<td>70 CRI</td>
<td>4000 K</td>
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<th>OPTIONS</th>
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<td>DRIVER</td>
<td>VOLTAGE</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>9 W</td>
<td>M</td>
<td>B Battery Pack ^6</td>
</tr>
<tr>
<td>B</td>
<td>12 W</td>
<td></td>
<td>C Chicago Plenum</td>
</tr>
<tr>
<td>C</td>
<td>16 W</td>
<td></td>
<td>H Emergency Switch (GTO)</td>
</tr>
<tr>
<td>D</td>
<td>21 W</td>
<td></td>
<td>P Oversize</td>
</tr>
</tbody>
</table>

---

^1 Cord or stem same as fixture except silver cord + white fixture.

^2 Nominal input power. Add 4 W for BP and 2 W for 347V.

^3 Fixed voltage only for L2 Driver or nLight controls.

^4 Remote mounted BP & GTO in Structure ceiling. For drywall ceiling, use Remote (R) or Structure (S) option.

^5 For Structure ceilings. Only Energy C (16 W).

^6 Remote mounted BP & GTO in Structure ceiling. For drywall ceiling, use Remote (R) or Structure (S) option.

^7 For Structure ceilings.
LIGHTING FIXTURE CUTS

Lakewood Library
Lakewood, WA
BuildingWork
12/8/22
lblanco@blancalighting.com
206 799 4749
LIGHTING FIXTURE CUTS
Type: L2

PORTAL PENDANT 5.5" (TC1-P05)

PRODUCT DETAILS

- Integrated suspension and power cord under 1/8" diameter
- Cantilever suspension arm
- Anodized optical technology creates a homogenous circumference of light
- Leveling: Fixtures are factory pre-leveled and site adjustable
- Stem option: 0.4" diameter stem, finish matches fixture. Length options: 12", 18", 24", 36", 48", 60", 72", 84", 96"

FINISHES

All finishes high temperature powder coated. Cord or rigid stem matched to fixture, except silver cord with white fixture.

(D) DRYWALL, (G) GRID CEILING & (R) REMOTE

- (B) BLACK CANOPY
- (S) SILVER CANOPY
- (W) WHITE CANOPY
- BLACK, SILVER or WHITE CANOPY
- (T) RIGID STEM

(B) BLACK FIXTURE + CORD
(S) SILVER FIXTURE + CORD
(W) WHITE FIXTURE (SILVER CORD)
BLACK, SILVER or WHITE FIXTURE + STEM

(S) STRUCTURE CEILING

- BLACK, SILVER or WHITE DRIVER BASE
- BLACK or SILVER FIXTURE + CORD
- WHITE FIXTURE + SILVER CORD
- (T) RIGID STEM
- BLACK, SILVER or WHITE FIXTURE + STEM

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Due to continuous product improvements, specifications and dimensions are subject to change without notice. Certain options have limited compatibility with some other product selections. Consult www.fluxwerx.com for most current technical information.

lblanco@blancalighting.com
206 799 4749
## LIGHTING FIXTURE CUTS

**Lakewood Library**

**Lakewood, WA**

**BuildingWork**

**Type:** L2

**Lighting Design Intent**

**12/8/22**

**lblanco@blancalighting.com**

**206 799 4749**

### OPTICAL
- Circular anidolic optical structures
- Precision molded high transmittance clear acrylic lenses
- Long life LED system designed for typical TM21 lumen maintenance over 50,000 hours
- Available in 2700K, 3000K, 3500K, and 4000K with CRI ≥ 80 and R9 ≥ 0, or CRI ≥ 90 and R9 ≥ 50, all with color accurate binning ≤ 2 SDCM

### ELECTRICAL
- Low voltage power cord factory pre-installed
- Integral high efficiency drivers for 50–60Hz, 120–277V or 347V
- Power Factor:
  - > 0.87 (Drivers F1, F2, E1-E4)
  - > 0.70 (Driver L1, Energy B-E)
- Total Harmonic Distortion:
  - < 20% (Drivers F1, F2, E1-E4)
- Dim level:
  - Standard 3%, optional 1% or 0.1%
- Optional Battery Pack delivers 10 W Class 2 rated output for 90 min. See Family Performance for emergency output
- Optional CTD (Generator Transfer Switch), 120–277V, disables 0–10 V control during emergency for full output
- Surge Protection: Meets ANSI C82.11 spec and ANSI/IEEE (C2-41)
- Imax Current: Meets NEMA 410

### DRIVERS + EMERGENCY

<table>
<thead>
<tr>
<th>STANDARD DRIVER OPTIONS</th>
<th>EMERGENCY OPTIONS</th>
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</thead>
<tbody>
<tr>
<td><strong>ADVANCE</strong></td>
<td><strong>bodine RIB</strong></td>
</tr>
<tr>
<td>Universal Lighting Technologies</td>
<td>Battery Pack Bodine BSL310 (10 W)</td>
</tr>
<tr>
<td>F1 Non-Dim</td>
<td>Bodine BSL310 (10 W)</td>
</tr>
<tr>
<td>F2 0–10 V Dim 3%</td>
<td>Emergency Switching Functional Devices</td>
</tr>
<tr>
<td><strong>eldoLED</strong></td>
<td>ESRB Emergency Lighting Relay</td>
</tr>
<tr>
<td>eldoLED ECO 0–10 V Dim 1%</td>
<td></td>
</tr>
<tr>
<td>eldoLED SOLO 0–10 V Dim 0%</td>
<td></td>
</tr>
<tr>
<td>eldoLED ECO DALI Dim 1%</td>
<td></td>
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<tr>
<td>eldoLED SOLO DALI Dim 0.1%</td>
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<tr>
<td><strong>LUTRON.</strong></td>
<td></td>
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<tr>
<td>L1 Lutron Hi-Lume 1% EcoSystem (LED)</td>
<td>B Battery Pack Bodine BSL310 (10 W)</td>
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<tr>
<td>L2 Lutron Hi-Lume 1% 2-Wire 120V (LTEA)</td>
<td>H Emergency Switching</td>
</tr>
<tr>
<td>L3 Lutron Hi-Lume Premier 0.1% EcoSystem (PEQO)</td>
<td>Functional Devices</td>
</tr>
<tr>
<td></td>
<td>ESRB Emergency Lighting Relay</td>
</tr>
</tbody>
</table>

### NOTES
- Architectural grade aluminum and 22 ga. steel housings
- Canopies and driver enclosures suitable for new build or retrofit in grid, GWB, structure or hard lid ceilings.
- White, metallic silver or black textured powdercoat standard finishes

### CONSTRUCTION
- Optional 5 year limited warranty on all components and workmanship
- Designed for use in dry or damp indoor locations with ambient temperatures of 0–30° C
- Not suitable for natatorium environments, e.g. swimming pools, hot tubs and saunas.
- The luminaire may be damaged by chemicals such as chlorine, solvents, ammonia, alcohol or sulfur in the area of operation or in cleaning products. Damage from contaminants is not covered under warranty.
- Clean only by wiping with a slightly water-damp, soft, clean cloth.

### ENVIRONMENTAL & CARE
- Circular anidolic optical structures
- Precision molded high transmittance clear acrylic lenses
- Long life LED system designed for typical TM21 lumen maintenance over 50,000 hours
- Available in 2700K, 3000K, 3500K, and 4000K with CRI ≥ 80 and R9 ≥ 0, or CRI ≥ 90 and R9 ≥ 50, all with color accurate binning ≤ 2 SDCM

### ELECTRICAL
- Low voltage power cord factory pre-installed
- Integral high efficiency drivers for 50–60Hz, 120–277V or 347V
- Power Factor:
  - > 0.87 (Drivers F1, F2, E1-E4)
  - > 0.70 (Driver L1, Energy B-E)
- Total Harmonic Distortion:
  - < 20% (Drivers F1, F2, E1-E4)
- Dim level:
  - Standard 3%, optional 1% or 0.1%
- Optional Battery Pack delivers 10 W Class 2 rated output for 90 min. See Family Performance for emergency output
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- Surge Protection: Meets ANSI C82.11 spec and ANSI/IEEE (C2-41)
- Imax Current: Meets NEMA 410

### WIRE GAUGE
- Recommended low voltage wire gauge (AWG) for minimal losses over distance whenREMOTE mounting.
- 30 ft | 18 ga
- 50 ft | 14 ga
- 80 ft | 12 ga

### WEIGHT
- Drywall/Grid/Remote: Fixture only 2.3 lbs (1 kg), plus driver enclosure & mounting
- Fixture & driver canopy 4.5 lbs (2 kg)

### INDEPENDENT TESTING
- IESNA LM79
- IESNA LM80 (LED @ 12,000 h)

### APPROVALS
- UL Listed (USA + Canada)
- CEEA Chicago Plenum
- IC Rated
- Energy Star
- Title 24 JA8 (90 CRI versions)
## LIGHTING FIXTURE CUTS

### Light Design Intent

**Portal Pendant 5.5” (TC1-P05)**

<table>
<thead>
<tr>
<th>FAMILY PERFORMANCE</th>
<th>80 CRI</th>
<th>90 CRI</th>
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<tbody>
<tr>
<td><strong>COLOR</strong></td>
<td>4000 K</td>
<td>3500 K</td>
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<tr>
<td>Color Rendering (CRI)</td>
<td>83</td>
<td>82</td>
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<tr>
<td>Red Index (R9)</td>
<td>5</td>
<td>3</td>
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<tr>
<td>Color Matching (SDCM)</td>
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**LUMEN MAINTENANCE**

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<th>B 12 W</th>
<th>C 16 W</th>
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<tr>
<td>L80 per TM-21 (hr)</td>
<td>&gt; 72,000</td>
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<tr>
<td>L70 Estimate (hr)</td>
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**BATTERY OUTPUT - 80 CRI**

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<td>10 W BP Light (Ext. lm)</td>
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**OUTPUT MULTIPLIERS**

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<td>90 CRI Multiplier</td>
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**FACILITY PERFORMANCE**

**90 CRI**

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<td>90 CRI Multiplier</td>
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**COLOR 4000 K 3500 K 3000 K 2700 K**

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<td>Red Index (R9)</td>
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**VERSION PERFORMANCE - NARROW BEAM**

**5.5” Narrow Beam, 80 Do, 100 Do, White Fixture**

<table>
<thead>
<tr>
<th>CONFIGURATION</th>
<th>ENERGY</th>
<th>LIGHT &amp; POWER</th>
<th>LIGHT &amp; POWER</th>
<th>MAX BEAM INTENSITY (DE)</th>
<th>MAX BEAM INTENSITY (DE)</th>
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**COLOR 4000 K 3500 K 3000 K 2700 K**

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**Photometry Reports:** 3500K; 3964K183.24 (24 (18°))

Integrating Sphere and Photometric results by an independent accredited testing laboratory per IES LM-79-2008 and ANSI C78.377-2011. Results for 2700K, 3000K, 3500K and 4000K scaled based on integrating sphere results of TC1-P05 Narrow Beam 100 Do (21W) and TC1-P05 Wide Beam 100 Do. Candlepower Distribution scaled per total lumens of Integrating Sphere results.
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BuildingWork
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lblanco@blancalighting.com
206 799 4749

LIGHTING FIXTURE CUTS

Type: L2

Lighting Design Intent

PORTAL PENDANT 5.5" (TC1-P05)

5.5" Narrow Beam, 80 CRI, 20 Up | 80 Dn, White Fixture

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<th>ENERGY (WATTS)</th>
<th>LIGHT &amp; POWER</th>
<th>VISUAL COMFORT</th>
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Photometry Reports: 3500K; 13694183.25 (21W)

Integrating Sphere and Photometric results by an independent accredited testing laboratory per IES LM-79-2008 and ANSI C78.377-2011. Results for 2700K, 3000K, 3500K and 4000K scaled based on integrating sphere results of TC1-P05 Narrow Beam 20/80 21W (D) and TC1-P05 Wide Beam 50/50. Candlepower Distribution scaled per total lumens of Integrating Sphere results.

5.5" Narrow Beam, 80 CRI, 50 Up | 50 Dn, White Fixture

<table>
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Photometry Reports: 3500K; 13694183.26 (21W)

Integrating Sphere and Photometric results by an independent accredited testing laboratory per IES LM-79-2008 and ANSI C78.377-2011. Results for 2700K, 3000K, 3500K and 4000K scaled based on integrating sphere results of TC1-P05 Narrow Beam 20/80 21W (D) and TC1-P05 Wide Beam 50/50. Candlepower Distribution scaled per total lumens of Integrating Sphere results.
## LIGHTING FIXTURE CUTS

### Portal Pendant — 5.5” (TC1-P05)

#### 5.5” Narrow Beam, 80 CRI, 20 Up | 80 Dn, White Fixture

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<th>EFFICACY</th>
<th>MAX BEAM INTENSITY (Cd)</th>
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#### 5.5” Narrow Beam, 80 CRI, 50 Up | 50 Dn, White Fixture

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<th>EFFICACY</th>
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<th>MAX INTENSITY 45–90° (Cd)</th>
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**Photometry Reports:** 3500K; 13694183.25 (21W)

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---

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BuildingWork

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**Type:** L2

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**Lighting Design Intent**

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**FLUXWERX**

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**page 14 of 59**
## LIGHTING FIXTURE CUTS

### Type: L2

### LIGHTING DESIGN INTENT

**Building Work**

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---

### LIGHT DISTRIBUTION

**Portal Pendant — 5.5” (TC1-P05)**

**VERSION PERFORMANCE — MEDIUM BEAM**

5.5” Medium Beam, 80 CRI, 100 Dn, White Fixture

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<th>LIGHT &amp; POWER</th>
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**Photometry Reports:** 3500 K; 13694183.27 (21 W)

Integrating Sphere and Photometric results by an independent accredited testing laboratory per IES LM-79-2008 and ANSI C78.377-2011. Results for 2700K, 3000K, 3500K and 4000K scaled based on integrating sphere results of TC1-P05 Medium Beam 100Dn 21W (D) and TC1-P05 Wide Beam 50/50. Candlepower Distribution scaled per total lumens of Integrating Sphere results.

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### LIGHT DISTRIBUTION

**Portal Pendant — 5.5” (TC1-P05)**

**5.5” Medium Beam, 80 CRI, 20 Up | 80 Dn, White Fixture**

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<td></td>
<td></td>
<td>3500 K</td>
<td>16 W</td>
<td>2284</td>
<td>16.15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2700 K</td>
<td>9 W</td>
<td>1210</td>
<td>9.35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2700 K</td>
<td>12 W</td>
<td>1635</td>
<td>12.35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2700 K</td>
<td>16 W</td>
<td>2203</td>
<td>16.15</td>
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<tr>
<td></td>
<td></td>
<td>2700 K</td>
<td>21 W</td>
<td>2884</td>
<td>21.68</td>
</tr>
</tbody>
</table>

**Photometry Reports:** 3500 K; 13694183.29A (21 W)

Integrating Sphere and Photometric results by an independent accredited testing laboratory per IES LM-79-2008 and ANSI C78.377-2011. Results for 2700K, 3000K, 3500K and 4000K scaled based on integrating sphere results of TC1-P05 Medium Beam 20/80 21W (D) and TC1-P05 Wide Beam 50/50. Candlepower Distribution scaled per total lumens of Integrating Sphere results.

---

**VERSION PERFORMANCE — MEDIUM BEAM**

5.5” Medium Beam, 80 CRI, 100 Dn, White Fixture

**LIGHT DISTRIBUTION**

Portal Pendant — 5.5” Medium Beam

Beam Angle | 47°

---

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Due to continuous product improvements, specifications and dimensions are subject to change without notice. Certain options have limited compatibility with some other product selections. Consult www.fluxwerx.com for most current technical information.
### LIGHTING FIXTURE CUTS

#### Type: L2

**Lighting Design Intent**

12/8/22

lblanco@blancalighting.com
206 799 4749

**LIGHTING FIXTURE CUTS**

**Type:** L2

---

**PORTAL PENDANT 5.5” (TC1-P05)**

#### 5.5” Medium Beam, 80 CRI, 50 Up | 50 Dn, White Fixture

<table>
<thead>
<tr>
<th>CONFIGURATION</th>
<th>ENERGY (W)</th>
<th>LIGHT (lm)</th>
<th>POWER (W)</th>
<th>EFFICACY (lm/W)</th>
<th>MAX BEAM INTENSITY (Cd)</th>
<th>MAX INTENSITY 45–90° (Cd)</th>
<th>VISUAL COMFORT</th>
<th>LIGHT DISTRIBUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC1-P05-M5840 4000 K</td>
<td>A 9 W</td>
<td>1271</td>
<td>9.35</td>
<td>135.9</td>
<td>909</td>
<td>25</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B 12 W</td>
<td>1718</td>
<td>12.35</td>
<td>139.1</td>
<td>1,228</td>
<td>35</td>
<td></td>
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<tr>
<td></td>
<td>C 16 W</td>
<td>2315</td>
<td>16.15</td>
<td>148.3</td>
<td>1,665</td>
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<tr>
<td></td>
<td>D 21 W</td>
<td>3030</td>
<td>21.28</td>
<td>142.4</td>
<td>2,167</td>
<td>60</td>
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<td>TC1-P05-M5835 3500 K</td>
<td>A 9 W</td>
<td>1254</td>
<td>9.35</td>
<td>134.1</td>
<td>837</td>
<td>25</td>
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<td></td>
<td>B 12 W</td>
<td>1695</td>
<td>12.35</td>
<td>137.3</td>
<td>1,121</td>
<td>35</td>
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<td>C 16 W</td>
<td>2284</td>
<td>16.15</td>
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<td>D 21 W</td>
<td>2990</td>
<td>21.28</td>
<td>140.5</td>
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<td>60</td>
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<tr>
<td>TC1-P05-M5830 3000 K</td>
<td>A 9 W</td>
<td>1210</td>
<td>9.35</td>
<td>129.3</td>
<td>865</td>
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<tr>
<td></td>
<td>B 12 W</td>
<td>1635</td>
<td>12.35</td>
<td>132.4</td>
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<td></td>
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<td>138.5</td>
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<td>60</td>
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</tbody>
</table>

Photometry Reports: 3500K, 13694183.31A (21 W)

Integrating Sphere and Photometric results by an independent accredited testing laboratory per IES LM-79-2008 and ANSI C157.1-2011. Results for 2700K, 3000K, 3500K and 4000K scaled based on integrating sphere results of TC1-P05 Medium Beam 50/50 21W (D) and TC1-P05 Wide Beam 50/50. Candlepower Distribution scaled per total lumens of Integrating Sphere results.

#### 5.5” Wide Beam, 80 CRI, 100 Dn, White Fixture

<table>
<thead>
<tr>
<th>CONFIGURATION</th>
<th>ENERGY (W)</th>
<th>LIGHT (lm)</th>
<th>POWER (W)</th>
<th>EFFICACY (lm/W)</th>
<th>MAX BEAM INTENSITY (Cd)</th>
<th>MAX INTENSITY 45–90° (Cd)</th>
<th>VISUAL COMFORT</th>
<th>LIGHT DISTRIBUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC1-P05-W1840 4000 K</td>
<td>A 9 W</td>
<td>1266</td>
<td>9.64</td>
<td>131.3</td>
<td>1,002</td>
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<tr>
<td></td>
<td>B 12 W</td>
<td>1679</td>
<td>12.64</td>
<td>132.8</td>
<td>1,329</td>
<td>265</td>
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<tr>
<td></td>
<td>C 16 W</td>
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<td>B 12 W</td>
<td>1657</td>
<td>12.64</td>
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<td>129.4</td>
<td>2,238</td>
<td>450</td>
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<tr>
<td>TC1-P05-W1830 3000 K</td>
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<td>126.5</td>
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<td>124.8</td>
<td>2,159</td>
<td>435</td>
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Photometry Reports: 3500K, 13694183.31 (21 W)

Integrating Sphere and Photometric results by an independent accredited testing laboratory per IES LM-79-2008 and ANSI C157.1-2011. Results for 2700K, 3000K, 3500K and 4000K scaled based on integrating sphere results of TC1-P05 Wide Beam 100% Dn (D) and TC1-P05 Wide Beam 50/50. Candlepower Distribution scaled per total lumens of Integrating Sphere results.
## LIGHTING FIXTURE CUTS

### Type: L2

**LIGHTING DESIGN INTENT**

Lakewood Library
Lakewood, WA
BuildingWork
12/8/22
lblanco@blancalighting.com
206 799 4749

### LIGHTING FIXTURE CUTS

**PORTAL PENDANT 5.5” (TC1-P05)**

### LIGHT DISTRIBUTION

**5.5” Wide Beam, 80 CRI, 20 Up | 80 Dn, White Fixture**

<table>
<thead>
<tr>
<th>CONFIGURATION</th>
<th>ENERGY (WATTS)</th>
<th>LIGHT DISTRIBUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC1-P05-W2840 4000K</td>
<td>9 W</td>
<td>25% Up</td>
</tr>
<tr>
<td>TC1-P05-W2835 3500K</td>
<td>9 W</td>
<td>55% Up</td>
</tr>
<tr>
<td>TC1-P05-W2830 3000K</td>
<td>9 W</td>
<td>55% Up</td>
</tr>
<tr>
<td>TC1-P05-W2827 2700K</td>
<td>9 W</td>
<td>55% Up</td>
</tr>
</tbody>
</table>

### SPECIFICATION DATA

**PORTAL PENDANT 5.5” (TC1-P05)**

<table>
<thead>
<tr>
<th>CONFIGURATION</th>
<th>ENERGY (WATTS)</th>
<th>LIGHT DISTRIBUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC1-P05-W2840 4000K</td>
<td>9 W</td>
<td>25% Up</td>
</tr>
<tr>
<td>TC1-P05-W2835 3500K</td>
<td>9 W</td>
<td>55% Up</td>
</tr>
<tr>
<td>TC1-P05-W2830 3000K</td>
<td>9 W</td>
<td>55% Up</td>
</tr>
<tr>
<td>TC1-P05-W2827 2700K</td>
<td>9 W</td>
<td>55% Up</td>
</tr>
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**Photometry Reports:**
- 3500 K: 13694183.35 (21 W)
- 3000 K: 13694183.53 (21 W)
- 3500 K: 13694183.43 (9 W), 13694183.44 (12 W), 13694183.45 (16 W), 13694183.37 (21 W)
- 4000 K: 13694183.54 (21 W)

Integrating Sphere and Photometric results by an independent accredited testing laboratory per IES LM-79-2008 and ANSI C78.377-2011. Results for 2700K, 3000K and 4000K scaled based on integrating sphere results of TC1-P05 Wide Beam 20/80 21W (D) and TC1-P05 Wide Beam 50/50. Candlepower Distribution scaled per total lumens of Integrating Sphere results.
Project:
Location:
Fixture Type:
Catalog Number:

AVAILABLE FINISHES:

Zenyia
PD-74223

PRODUCT DESCRIPTION
Inspired by the Japandi minimalist style integrated with cutting edge LEDs. This stunning pendant renders a tapered metal lattice which illuminates with an etched acrylic diffuser.

FEATURES
• Driver concealed within the canopy
• Three 12" and one 6" down rods included (additional sold separately)
• Slope ceiling adaptable. Hang straight swivels up to 90 degrees
• Spin-on round canopy with minimal hardware

SPECIFICATIONS
Rated Life 50000 Hours
Standards ETL, cETL,Damp Location Listed,Title 24 JA8: 2019 Compliant
Input 120-277V,50/60Hz
Dimming ELV: 100-5%,TRIAC: 100-5%
Color Temp 3000K
CRI 90
Construction Aluminium body with etched acrylic diffuser

REPLACEMENT PARTS
HDW-LG22-CE - Hardware pack
RPL-ROD-IN06-LDBK - 6" Rod
RPL-ROD-IN12-LDBK - 12" Rod

Example: PD-74223-GO
For custom requests please contact customs@modernforms.com

ModernForms.com | Phone: (866) 810-6615 | Fax (800) 526-2585
Central Distribution Center: 1600 Distribution Ct, Lithia Springs, GA 30122
Western Distribution Center: 1750 Archibald Avenue, Ontario, CA 91760

MODERN FORMS
Introducing Gaze, an exercise in reductionism.

Gaze promises smooth, even diffusion of light, and is available in a clean Hard Edge or a distinctively curved Soft Edge with an elegant regress and is undeniably refined. Power over Aircraft Cable (PAC) eliminates power cord clutter. Mix with Gaze acoustics for improved sound absorption.

### SERIES SIZE LED COLOR OUTPUT FIXTURE COLOR DISTRIBUTION CIRCUITING VOLTAGE MOUNTING CEILING SYSTEM DRIVERS OPTIONS

<table>
<thead>
<tr>
<th>LED RS</th>
<th>LED Color</th>
<th>OUTPUT</th>
<th>FIXTURE COLOR</th>
<th>DISTRIBUTION</th>
<th>CIRCUITING</th>
<th>VOLTAGE</th>
<th>MOUNTING</th>
<th>CEILING SYSTEM</th>
<th>DRIVERS</th>
<th>OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>Pendants</td>
<td>120</td>
<td>Cylinder</td>
<td>Single Circuit</td>
<td>DC</td>
<td>120V</td>
<td>X1</td>
<td>X3</td>
<td>Non-Dimming</td>
<td>X</td>
</tr>
<tr>
<td>48</td>
<td>Surface</td>
<td>1200</td>
<td>Cylinder</td>
<td>Single Circuit</td>
<td>DC</td>
<td>120V</td>
<td>X1</td>
<td>X3</td>
<td>Non-Dimming</td>
<td>X</td>
</tr>
</tbody>
</table>

**NOTE:** Combine D1 and D9 IES files for D9 Semi-Direct.
**LIGHTING FIXTURE CUTS**

**Lakewood Library**

Lakewood, WA

BuildingWork

**Type: L4**

Lighting Design Intent

Prudential Ltg. reserves the right to change design specifications or materials without notice. Please visit prulite.com for most current data.

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**Gaze**

**Pendant & Surface**

Choose from one of our Premium Colors with no set-up fee.

For paint chip samples, please email: info@prulite.com

**LED**

**Pendant**

**Surface**

**D1 — DIRECT**

GAZERD-24-LEDS35-MD

3126

Delivered Lumens

27

Watts

115

Im/w

**D9 — INDIRECT**

GAZERD-24-LEDS35-SD-D9

2200

Delivered Lumens

30

Watts

75

Im/w

**Zonal Lumen Summary:**

0-90 (Down) = 100%

**Vertical Angle**

0° 25° 45° 65° 90°

0° 1101 1101 1101 1101 1101

5° 1095 1095 1095 1095 1095

15° 1055 1055 1055 1055 1055

25° 867 867 867 867 867

35° 728 728 728 728 728

45° 566 566 566 566 566

55° 389 389 389 389 389

65° 206 206 206 206 206

75° 51 51 52 52 52

85° 0 0 0 0 0

90° 0 0 0 0 0

**Vertical Angle**

0° 25° 45° 65° 90°

0° 0 0 0 0 0

9° 25 24 23 21 21

11° 230 229 235 246 248

12° 375 377 379 392 396

13° 519 524 524 529 535

14° 653 655 656 654 656

15° 757 759 760 757 756

16° 825 829 830 828 827

17° 860 862 862 861 861

18° 865 865 865 865 865

**Vertical Angle**

0° 25° 45° 65° 90°

0° 0 0 0 0 0

9° 25 24 23 21 21

11° 230 229 235 246 248

12° 375 377 379 392 396

13° 519 524 524 529 535

14° 653 655 656 654 656

15° 757 759 760 757 756

16° 825 829 830 828 827

17° 860 862 862 861 861

18° 865 865 865 865 865

**LUMEN MAINTENANCE**

L70 — 200,000+ Hours

L90 — 100,000+ Hours (L70, MD & SO)

L90 — 60,000+ Hours (HO)

**LED SYSTEM**

Drivers are field replaceable.

**PROG (OPTIONAL)**

Programmable light output. Specify desired lumens or watts per fixture.

**BINNING**

Standard binning (all Prudential LED boards) includes testing at the chip level and board integration to provide consistent color temperature within a 3-step MacAdams ellipse, with ±5% lumen output range and ±.003 Duv.

**LABELS**

CSA and ETL damp labeled and I.B.E.W. manufactured.

**ELECTRICAL**

Must specify LED dimming controls. LED fixtures have constant current driver(s) with less than 20% THD when loaded to a minimum of 60%. Drivers sink a maximum of 6mA per driver. DM01 LED drivers are 0-10V dimmable and are compatible with most 0-10V wall slide dimmers and direct 0-10V analog signal dimmers. Max driver size 1.65” w x 1.25” h.

**CONSTRUCTION**

Housing Extruded aluminum, rolled and welded, >25% PC recycled, 100% recyclable.

Lens Edge Lit Wave Guide with Secondary Acrylic Diffuser.

**WEIGHT**

18 lbs 24 lbs 36 lbs 48 lbs

**MOUNTING**

Surface or suspended by aircraft cables or cast aluminum canopy.

**WARRANTY**

Single-source, 5 year limited warranty covers standard components and construction.

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LIGHTING FIXTURE CUTS

Lakewood Library
Lakewood, WA
BuildingWork
Type: L4
Lighting Design Intent
12/8/22
lblanco@blancalighting.com
206 799 4749

LED | Gaze
Round

Pendant & Surface

MOUNTING OPTIONS

CA Cable
RPM/SPM Canopies
SURF Surface Flush
PAC Powered Aircraft Cable

NOTE: 18" + 24" = 4 Cables / 36" + 48" = 6 Cables

CA CABLE MOUNTING DIMENSIONS

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PRULITE.COM 213.746.0360

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blanca lighting design
lblanco@blancalighting.com
206 799 4749

Page 21 of 59
LIGHTING FIXTURE CUTS

Lakewood Library
Lakewood, WA
BuildingWork
Type: L4
Lighting Design Intent
12/8/22
lblanco@blancalighting.com
206 799 4749

CAST ALUMINUM CANOPIES

RPM48", 96" or 144":
Round Cast Aluminum Canopy

6¼"

6¼"

SPM48", 96" or 144":
Square Cast Aluminum Canopy

15/8"

15/8"

RPM/SPM CANOPY MINIMUM MOUNTING HEIGHT

HARD EDGE

NEW

9" MINIMUM MOUNTING HEIGHT

19"

22¾"

34¾"

46¾"

19¾"

22¾"

35½"

47¾"

18

24

36

48

9½"

12½"

19¾"

22½"

34½"

46½"

2213/16"

2213/16"

357/8"

347/8"

283/16"

283/16"

357/8"

347/8"

PRULITE.COM    213.746.0360

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blanco@blancalighting.com
206 799 4749
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Gaze Acoustic

Gaze Acoustic fixtures offer effective noise reduction with an intentional approach to design. Alternate with coordinating light fixtures for maximum visual appeal in open spaces.
LIGHTING FIXTURE CUTS

Type: L4

Lakewood Library
Lakewood, WA
Building Work
12/8/22
lblanco@blancalighting.com
206 799 4749
LIGHTING FIXTURE CUTS
Type: L4

PACS AND RPACF CROSS SECTIONS

DIRECT CANOPY MOUNT: Canopy Driver Box — Driver access behind canopy

REMOTE: Remote Driver Box — Remote access required

NOTE: Six powered cables are required for Gaze 36-D9 at SO-HO (Osram) or MO-HO (All other drivers), consult factory for details
**LIGHTING FIXTURE CUTS**

**Lakewood Library**
Lakewood, WA
BuildingWork

**Type:** L4
Lighting Design Intent
12/8/22

---

**Gaze Round**

Drivers hidden in Direct Canopy Box

---

**PAC: POWER VIA AIRCRAFT CABLE (NO POWER CORD)**

<table>
<thead>
<tr>
<th>D1 DIRECT ONLY</th>
<th>D9: DIRECT/INDIRECT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LD</strong></td>
<td><strong>MD</strong></td>
</tr>
<tr>
<td>18</td>
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<tr>
<td>24</td>
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</tr>
<tr>
<td>36</td>
<td>NA</td>
</tr>
<tr>
<td>48</td>
<td>NA</td>
</tr>
</tbody>
</table>

O: Osram DM01 Drivers Only, RPAC (Remote) needed for all other drivers
NA: Not Available, RPAC (Remote) needed

---

**RPAC**

<table>
<thead>
<tr>
<th>D1 DIRECT ONLY</th>
<th>D9: DIRECT/INDIRECT</th>
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</thead>
<tbody>
<tr>
<td><strong>LD</strong></td>
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<tr>
<td>24</td>
<td>1</td>
</tr>
<tr>
<td>36</td>
<td>1</td>
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<tr>
<td>48</td>
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**RPAC + EMHE**

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<thead>
<tr>
<th>D1 DIRECT ONLY</th>
<th>D9: DIRECT/INDIRECT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LD</strong></td>
<td><strong>MD</strong></td>
</tr>
<tr>
<td>18</td>
<td>1</td>
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<tr>
<td>24</td>
<td>1</td>
</tr>
<tr>
<td>36</td>
<td>1</td>
</tr>
<tr>
<td>48</td>
<td>1</td>
</tr>
</tbody>
</table>

1: 1 Remote Box needed
2: 2 Remote Box needed
—: Not Applicable, no remote box needed

---

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L Blanco Lighting Design
lblanco@blancalighting.com
206 799 4749

---

Page 26 of 59
**LIGHTING DESIGN INTENT**

**Lakewood Library**  
Lakewood, WA  
BuildingWork  
12/8/22

**LIGHTING FIXTURE CUTS**

**Type: L5**

**LED SnapPro™ | Linear, Surface & Wall**

**PRULITE.COM 213.746.0360**

**CLICK HERE FOR OLDER SNAP SPECS**

![LED SnapPro™ | Linear, Surface & Wall](image)

**Type:**

- **Job:**

**Low Output:**

<table>
<thead>
<tr>
<th>S1-LED35-LO-SAL</th>
<th>2113</th>
<th>Delivered Lumens</th>
<th>15</th>
<th>Watts</th>
<th>144</th>
</tr>
</thead>
</table>

**Lumen output may vary ±5%**

**Light Loss Factor (LLF) for CCTs other than 3500K:**

<table>
<thead>
<tr>
<th>LLP</th>
<th>3.75</th>
<th>6.5</th>
<th>9.4</th>
<th>12.5</th>
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</thead>
<tbody>
<tr>
<td>Sal SA:</td>
<td>31/16˝</td>
<td>115/16˝</td>
<td></td>
<td></td>
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</tbody>
</table>

**Want to keep the older Snap lumen levels?**

Specify: PROG500 = 500 lumens/ft

**PROG7W = 7 watts/ft**

**SERIES** | **LED COLOR** | **OUTPUT NOMINAL LENGTH** | **SHIELDING** | **COLOR FINISH** | **VOLTAGE** | **MOUNTING** | **CEILING SYSTEMS** | **DRIVERS OPTIONS, SENSORS & CORNERS** |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>R1-Pro</td>
<td>LO Low</td>
<td>2.4 W/ft</td>
<td></td>
<td>Matte White</td>
<td>120V, 277V</td>
<td>Surface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R1-Pro</td>
<td>S1-Pr Standard</td>
<td>2.4 W/ft</td>
<td></td>
<td>Matte White</td>
<td>120V, 277V</td>
<td>Surface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R2-Pro</td>
<td>RZ Pro</td>
<td>2.4 W/ft</td>
<td></td>
<td>Matte White</td>
<td>120V, 277V</td>
<td>Surface</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Other options available:**

- **SAL ONLY**
- **S1 and RZ only**
- **NOT in 1´ increments**
- **Output (w/ft) desired**

**NOTE:** Specifications are subject to change without notice.

**CLICK HERE FOR OLDER SNAP SPECS**

**LED Details PDF for more info**

**PRULITE.COM 213.746.0360**

---

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**lblanco@blancalighting.com**

206 799 4749

---

**page 27 of 59**
LIGHTING FIXTURE CUTS

Lakewood Library
Lakewood, WA
BuildingWork
12/8/22
lblanco@blancalighting.com
206 799 4749
LIGHTING FIXTURE CUTS
Type: L5

Lighting Design Intent

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PRULITE.COM 213.746.0360

SnapPro™ | Linear, Surface & Wall

DISTRIBUTIONS

Standard Output:
S1-LED35-MO-04-SAL
5100 Delivered Lumens
38 Watts
Text #104100028GLAX-003

Zonal Lumen Summary: 0-90 (Down) = 84% 90-180 (Up) = 16%

Standard Output:
R1-LED35-SO-LLP
5186 Delivered Lumens
38 Watts
Text #104100028GLAX-003

Zonal Lumen Summary: 0-90 (Down) = 94% 90-180 (Up) = 6%

LUMEN MAINTENANCE

L70 — 200,000+ Hours
L90 — 100,000+ Hours (LO, MO & SO)
L90 — 60,000+ Hours (HO)

LED SYSTEM

LED modules and drivers are field replaceable.

PROG (OPTIONAL)
Programmable light output. Specify desired lumens or watts per linear foot. Min: 3.75 w/ft, Max 12.5 w/ft.

BINNING

Standard binning (all Prudential LED boards) includes testing at the chip level and board integration to provide consistent color temperature within a 3-step MacAdam ellipse, with +/- 5% lumen output range and +/- .004 Duv.

LABELS

CSA and ETL damp labeled and I.B.E.W. manufactured.

ELECTRICAL

Must specify LED dimming controls. LED fixtures have constant current driver(s) with less than 20% THD when loaded to a minimum of 60%. Drivers sink a maximum of 6mA per driver. DM01 LED drivers are 0-10V dimmable and are compatible with most 0-10V wall slide dimmers and direct 0-10V analog signal dimmers. Max driver size 1.65” w x 1.25” h.

CONSTRUCTION

Housing Die-formed 20-gauge steel, >20% PC recycled, 100% recyclable.
End Caps Spring-fastened aluminum, >25% PC recycled, 100% recyclable.
Lens Single-piece (up to 8’ lengths) extruded acrylic, 100% recyclable.
Weight 2 lbs/ft.

MOUNTING

Surface mounted to walls or ceilings or suspended by cable.

WARRANTY

Single-source, 5 year limited warranty covers standard components and construction.
**LIGHTING FIXTURE CUTS**

**Lakewood Library**
Lakewood, WA

**Type: L5**

**BuildingWork**

**Lighting Design Intent**

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---

**SnapPro™ | Linear, Surface & Wall**

**PRULITE.COM 213.746.0360**

---

**Choose from one of our Premium Colors with no set up fee.**

For paint chip samples, please email info@prulite.com

---

**SIDE VIEW:**

505 Sensor

Sensor is centered on all fixtures except on 72° and 96° where it is 6° offset to the right

---

**TOP VIEW:**

211 Sensor Module adds 6" to fixture length, in the center of a 4’, 6’ or 8’ fixture

---

**MOUNTING LOCATIONS**

- **Cable Mount**
- **Surface Mount**
- **7/8˝ Diam. K.O.**
- **1/4˝ 6”**

---

**ADJOINING DETAIL**

- **Wall cutout to clear fixture mounting hole**
- **EBCP Electrical Box Cover Plate**
- **TR5 Tamper Resistant Screw**

---

**Lorem ipsum**

Wall cutout to clear fixture mounting hole

---

**Clients**

Monster

---

**Type: L5**

12/8/22
LIGHTING FIXTURE CUTS

Lakewood Library
Lakewood, WA
Building Work
12/8/22
lblanco@blancalighting.com
206 799 4749
LIGHTING FIXTURE CUTS
Type: L5

LED SnapPro™ | Linear, Surface & Wall

Corners

C2 Unit 90° Corner
C2-120 Unit 120° Corner
C3 Unit 90° 3-Way Corner
C3-120 Unit 120° 3-Way Y Corner
C4 90° 4-Way Corner Unit

Control Sensors

S1 Sensor Box —
205, ENL, LUX, LVOC, LVRF, NXSMP, NLT1
NOTE: Adds 3” to length, ENL: enlighted
control module required

R1 Sensor Box —
205, ENL, LUX, LVOC, LVRF, NXSMP, NLT1
NOTE: Adds 3” to length, ENL: enlighted
control module required

211 —
WattStopper High/Low Passive Infrared Occupancy/DLH Sensor
NOTE: Adds 6” to fixture length in center of fixture,
FSP - L2 or L3 lens only

505 —
WattStopper Ultrasonic Occupancy Sensor
NOTE: Small cut-out of lens around sensor,
Surface mount on walls only

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## LIGHTING FIXTURE CUTS

**Lakewood Library**

Lakewood, WA

BuildingWork

Type: L5

Lighting Design Intent

12/8/22

<table>
<thead>
<tr>
<th>LED27</th>
<th>LED3</th>
<th>LED3-90</th>
<th>LED35</th>
<th>LED35-90</th>
<th>LED4</th>
<th>LED4-90</th>
<th>LED5-90</th>
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<tbody>
<tr>
<td>2680</td>
<td>3042</td>
<td>3016</td>
<td>3482</td>
<td>3417</td>
<td>3952</td>
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<td>80%</td>
<td>95%</td>
<td>85%</td>
<td>100%</td>
<td>85%</td>
<td>102%</td>
<td>85%</td>
<td>85%</td>
</tr>
<tr>
<td>93</td>
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<td>3</td>
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<td>84</td>
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<tr>
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<td>0.001</td>
<td>0.000</td>
<td>0.002</td>
<td>0.000</td>
<td>0.003</td>
<td>0.003</td>
<td>0.002</td>
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**LM79 & TM30 DATA:**

- **MEASURED CCT**
- **MEASURED LUMENS**
- **CRI**
- **R9**
- **DvV**
- **SPD**
- **TM30 — COLOR VECTOR**
- **TM30 — COLOR DISTORTION**

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09-15-2022
## LIGHTING FIXTURE CUTS

**Lighting Design Intent**

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**SENSORS**

<table>
<thead>
<tr>
<th>205:</th>
<th>ENL:</th>
<th>LUX</th>
<th>LVOC</th>
<th>LVRF</th>
<th>NXSMP</th>
</tr>
</thead>
</table>

Low voltage PIR fixture integrated occupancy sensor.

- When configured as an IoT Node, the sensor streams comprehensive live data for use with Enlighted’s real-time location and analytics software applications. This option is available directly from the factory or as a remote upgrade.
- Wireless Internet.

**SnapPro™** | Linear, Surface & Wall

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**lblanco@blancalighting.com**

206 799 4749

blanca
lighting design
**LIGHTING FIXTURE CUTS**

**Lakewood Library**
Lakewood, WA
BuildingWork

**Type: L6**

**Lighting Design Intent**

12/8/22

**lblanco@blancalighting.com**
206 799 4749

**LIGHTING FIXTURE CUTS**

**RETURN INFORMATION**

<table>
<thead>
<tr>
<th>COB NAME</th>
<th>TYPE</th>
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</thead>
<tbody>
<tr>
<td>NU4 LOPRO</td>
<td></td>
</tr>
</tbody>
</table>

**COB**

**Features**

+ Thermally optimized for longevity
+ Double jointed driver box allows 4” shallow plenum installation
+ 10° - 70° beam control
+ UGR < 15
+ Multiple mounting, glare control options, trims, and finishes available

**LED**

+ 90 CRI: SDCM = 2-step MacAdam Ellipse, Lumen Maintenance: L 70 > 49,500 hrs
+ 80 CRI: SDCM = 3-step MacAdam Ellipse, Lumen Maintenance: L 70 > 49,500 hrs

**LIMITING**

+ Listed Listed to UL1598 & UL2108; cUL Listed to CSA C22.2 #250.0
+ Made in the USA - meets the requirements of the Buy American provision within the ARRA
+ NSF/ANSI-2 with lens
+ 5 Year Limited warranty

**Electrical**

+ 120V-277V, 120 only Triac / ELV
+ Power factor: > 0.9
+ 36V driver input surge protection
+ Remote emergency test switch
+ 120W (100 CEC) and 120W EM 90min battery
+ Max. ambient installation temperature 95°F (35°C)

**Construction**

+ Shatter proof acrylic bezel lens
+ Lexan™ (PC) Optimal connectivity for wireless control signal.
+ Impact and chemical resistant at the highest level. Withstands temperatures up to 240°F.
+ Non-conductive, dead-front construction (shower approved)
+ Made in the USA - meets the requirements of the Buy American provision within the ARRA
+ NSF/ANSI-2 with lens
+ 5 Year Limited warranty

**30° - 70° BEAM**

(Not: Specifications are subject to change without notice)

<table>
<thead>
<tr>
<th>LED LIGHT ENGINE</th>
<th>NOMINAL DELIVERED LUMENS</th>
<th>SYSTEM WATTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10LM</td>
<td>660LM @ 30K/80CRI</td>
<td>9W</td>
</tr>
<tr>
<td>15LM</td>
<td>1000LM @ 30K/80CRI</td>
<td>15W</td>
</tr>
<tr>
<td>20LM</td>
<td>1600LM @ 30K/80CRI</td>
<td>20W</td>
</tr>
<tr>
<td>30LM</td>
<td>2400LM @ 30K/80CRI</td>
<td>30W</td>
</tr>
</tbody>
</table>

**6mm COB PERFORMANCE DATA**

Notes: Delivered lumens based on WH5 optic with no lens, (see page 2)

**30° - 70° BEAM**

(Not: Specifications are subject to change without notice)

<table>
<thead>
<tr>
<th>LED LIGHT ENGINE</th>
<th>NOMINAL DELIVERED LUMENS</th>
<th>SYSTEM WATTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10LM</td>
<td>740LM @ 30K/80CRI</td>
<td>11W</td>
</tr>
<tr>
<td>15LM</td>
<td>1100LM @ 30K/80CRI</td>
<td>15W</td>
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<td>20LM</td>
<td>1600LM @ 30K/80CRI</td>
<td>20W</td>
</tr>
<tr>
<td>30LM</td>
<td>2400LM @ 30K/80CRI</td>
<td>30W</td>
</tr>
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</table>

**30° - 70° BEAM**

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<table>
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<th>NOMINAL DELIVERED LUMENS</th>
<th>SYSTEM WATTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10LM</td>
<td>800LM @ 30K/80CRI</td>
<td>9W</td>
</tr>
<tr>
<td>15LM</td>
<td>1200LM @ 30K/80CRI</td>
<td>14W</td>
</tr>
<tr>
<td>20LM</td>
<td>1600LM @ 30K/80CRI</td>
<td>18W</td>
</tr>
<tr>
<td>30LM</td>
<td>2000LM @ 30K/80CRI</td>
<td>24W</td>
</tr>
</tbody>
</table>

**30° - 70° BEAM**

(Not: Specifications are subject to change without notice)

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>10LM</td>
<td>630LM @ 30K/90CRI</td>
<td>9W</td>
</tr>
<tr>
<td>15LM</td>
<td>940LM @ 30K/90CRI</td>
<td>14W</td>
</tr>
<tr>
<td>20LM</td>
<td>1370LM @ 30K/90CRI</td>
<td>18W</td>
</tr>
<tr>
<td>30LM</td>
<td>1800LM @ 30K/90CRI</td>
<td>24W</td>
</tr>
</tbody>
</table>

**30° - 70° BEAM**

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<tbody>
<tr>
<td>10LM</td>
<td>680LM @ 30K/90CRI</td>
<td>9W</td>
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<tr>
<td>15LM</td>
<td>1020LM @ 30K/90CRI</td>
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<td>20LM</td>
<td>1360LM @ 30K/90CRI</td>
<td>18W</td>
</tr>
<tr>
<td>30LM</td>
<td>1700LM @ 30K/90CRI</td>
<td>24W</td>
</tr>
</tbody>
</table>

**30° - 70° BEAM**

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<tr>
<td>15LM</td>
<td>1100LM @ 30K/90CRI</td>
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</tr>
<tr>
<td>20LM</td>
<td>1600LM @ 30K/90CRI</td>
<td>20W</td>
</tr>
<tr>
<td>30LM</td>
<td>2000LM @ 30K/90CRI</td>
<td>24W</td>
</tr>
</tbody>
</table>

**6mm COB PERFORMANCE DATA**

Notes: Delivered lumens based on WH5 optic with no lens, (see page 2)

**FEATURES**

+ Double jointed driver box allows 4” shallow plenum installation
+ 10° - 70° beam control
+ UGR < 15
+ Multiple mounting, glare control options, trims, and finishes available

**DIMMING AND CONTROLS**

+ 0-10V dimming to 1%
+ Leading & trailing edge (Triac / ELV) dimming to 1%

**LISTING**

+ ULus Listed to UL1598 & UL2108; cUL Listed to CSA C22.2 #250.0
+ Made in the USA - meets the requirements of the Buy American provision within the ARRA

**CONSTRUCTION**

+ Shatter proof acrylic bezel lens
+ Lexan™ (PC) Optimal connectivity for wireless control signal.
+ Impact and chemical resistant at the highest level. Withstands temperatures up to 240°F.
+ Non-conductive, dead-front construction (shower approved)
+ Made in the USA - meets the requirements of the Buy American provision within the ARRA

**ELECTRICAL**

+ 120V-277V, 120 only Triac / ELV
+ Power factor: > 0.9
+ 36V driver input surge protection
+ Remote emergency test switch
+ 120W (100 CEC) and 120W EM 90min battery
+ Max. ambient installation temperature 95°F (35°C)

**FEATURES**

+ Thermally optimized for longevity
+ Double jointed driver box allows 4” shallow plenum installation
+ 10° - 70° beam control
+ UGR < 15
+ Multiple mounting, glare control options, trims, and finishes available

**DIMMING AND CONTROLS**

+ 0-10V dimming to 1%
+ Leading & trailing edge (Triac / ELV) dimming to 1%

**LISTING**

+ ULus Listed to UL1598 & UL2108; cUL Listed to CSA C22.2 #250.0
+ Made in the USA - meets the requirements of the Buy American provision within the ARRA
+ NSF/ANSI-2 with lens
+ 5 Year Limited warranty

**CONSTRUCTION**

+ Shatter proof acrylic bezel lens
+ Lexan™ (PC) Optimal connectivity for wireless control signal.
+ Impact and chemical resistant at the highest level. Withstands temperatures up to 240°F.
+ Consult factory about metal trim/bezel option
+ Electrocoated 16-gauge cold-rolled steel construction
+ Made in the USA - meets the requirements of the Buy American provision within the ARRA
+ NSF/ANSI-2 with lens
+ 5 Year Limited warranty

**ELECTRICAL**

+ 120V-277V, 120 only Triac / ELV
+ Power factor: > 0.9
+ 36V driver input surge protection
+ Remote emergency test switch
+ 120W (100 CEC) and 120W EM 90min battery
+ Max. ambient installation temperature 95°F (35°C)
**LIGHTING DESIGN INTENT**

**Project Information**

<table>
<thead>
<tr>
<th>JOB NAME</th>
<th>TYPE</th>
<th>LIGHTING FIXTURE CUTS Type: L6</th>
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<tbody>
<tr>
<td>Lakewood Library</td>
<td>BuildingWork</td>
<td>Lighting Design Intent</td>
</tr>
<tr>
<td>Lakewood, WA</td>
<td></td>
<td>12/8/22</td>
</tr>
</tbody>
</table>

**Lighting Design Intent**

- **Alphabet Lighting.com**
  - Alphabetic by Ledra Brands, Inc.
  - 88 Maxwell Irvine, CA 92618
  - PH: 714.259.9959
  - FAX: 714.259.9969

**Additional Information**

1. **New Construction**
   - Bar Hangers (included)
   - Mounting Length: 14.3/4" to 26"

2. **Extension Kit** p/n: K20266
   - (ordered separately, 1 per fixture)
   - Extends a pair of Bar Hangers
   - Total Mounting Length: 29" to 48"

**Electrical Options**

- **EM7**
  - Emergency battery backup, 90 minutes at 7W to LED
  - Remote emergency battery backup, 90 minutes at 10W to LED

**Electrical Options**

- **EM10**
  - Leading & trailing edge (Triac/ELV) dimming to 1%

**Mounting Options**

- **IC**
  - Insulation contact housing

**Dimensional Information**

- **Series NU4**
  - NU4
- **Type RDLP**
  - Round downlight lopro
  - DELIVERED LUMENS
    - 10LM: 800 lm
    - 15LM: 1200 lm
    - 20LM: 1600 lm
    - 25LM: 2000 lm
    - 30LM: 2400 lm

**CCT**

- 27K: 2700K
- 30K: 3000K
- 35K: 3500K
- 40K: 4000K

**CRI**

- 80: 80 CRI
- 90: 90 CRI

**Optic & Lumen Multiplier**

- **HE40**
  - 40° high efficiency diffused lens
  - (0.96)
- **HE60**
  - 60° high efficiency diffused lens
  - (0.96)
- **HE70**
  - 70° high efficiency diffused lens
  - (0.92)
- **SS30**
  - 30° semi-specular with clear lens
  - (0.90)
- **SS40**
  - 40° semi-specular with clear lens
  - (0.82)
- **SS60**
  - 60° semi-specular with clear lens
  - (0.94)
- **D40**
  - 40° diffused with clear lens
  - (0.86)
- **D50**
  - 50° diffused with clear lens
  - (0.90)
- **D60**
  - 60° diffused with clear lens
  - (0.90)
- **WRD**
  - 70° brilliant white with clear lens
  - (1.00)
- **S60**
  - 10° specular with clear lens
  - (0.95)

**Bezel Lens & Color**

- **BK**
  - Black
- **WH**
  - White
- **MC**
  - Matte chrome
- **BZ**
  - Bronze
- **WT**
  - Wheat

**Bezel Color**

- **BK**
  - Black
- **WH**
  - White
- **MC**
  - Matte chrome
- **BZ**
  - Bronze
- **WT**
  - Wheat

**IC4**

- Insulation contact housing

**RET**

- Retrofit, no ceiling fitting plate

**VOLTAGE**

- 120V
- 120V-277V
- 120V-277V

**DIMMING**

- **DIM10**
  - 0-10V dimming to 1%
  - Leading & trailing edge (Triac/ELV) dimming to 1%

**DESIGN INTENT - LIGHTING**

- 10°-70° BEAM ORDERING CODE

**10°-70° BEAM ORDERING CODE**

<table>
<thead>
<tr>
<th>SERIES</th>
<th>TYPE</th>
<th>LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>NU4</td>
<td>RDLP</td>
<td>8W</td>
</tr>
<tr>
<td></td>
<td>RDTLP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RDTMWL</td>
<td></td>
</tr>
</tbody>
</table>

**Delivered Lumens**

- 10LM: 800 lm
- 15LM: 1200 lm
- 20LM: 1600 lm
- 25LM: 2000 lm
- 30LM: 2400 lm

**CCT**

- 27K: 2700K
- 30K: 3000K
- 35K: 3500K
- 40K: 4000K

**CRI**

- 80: 80 CRI
- 90: 90 CRI

**Optic & Lumen Multiplier**

- HE40: 40° high efficiency diffused lens
- HE60: 60° high efficiency diffused lens
- HE70: 70° high efficiency diffused lens
- SS30: 30° semi-specular with clear lens
- SS40: 40° semi-specular with clear lens
- SS60: 60° semi-specular with clear lens
- D40: 40° diffused with clear lens
- D50: 50° diffused with clear lens
- D60: 60° diffused with clear lens
- WRD: 70° brilliant white with clear lens
- S60: 10° specular with clear lens

**Bezel Lens & Color**

- BK: Black
- WH: White
- MC: Matte chrome
- BZ: Bronze
- WT: Wheat

**Bezel Color**

- BK: Black
- WH: White
- MC: Matte chrome
- BZ: Bronze
- WT: Wheat

**Accessories**

- HCL: Honeycomb louver

**Additional Mounting Info**

- **New Construction**
  - Bar Hangers (included)
  - Mounting Length: 14.3/4" to 26"
  - Extension Kit p/n: K20266
  - (ordered separately, 1 per fixture)
  - Extends a pair of Bar Hangers
  - Total Mounting Length: 29" to 48"

**Additional Notes**

1. **EM7** not available in 20LM, 25LM, or 30LM.
2. **“No lens” option available for SS30, SS40, SS60, D40, D50, D60, or WH70.
3. **HL** option does not meet requirement for dead-front, airtight, wet and NSF. It is damp location rated.
4. **HCL** not available in 30LM.
5. **HCL** not available with lens. Multiply delivered lumens by (0.78) and beam spread by (0.80) when honeycomb louver is chosen.
6. **ELV** dimming available in 120V only.
7. **EM12** not available in 10LM.
8. **EM2** not available in 10LM.
↑ UGR calculation based on CIE 117-1995; room size: 4H X 8H, reflectance: 70/50/20;
• UGR calculation based on TGLM fixtures, unless otherwise noted.
• Cutoff angle of CL is 35 degrees;

**OPTICAL OPTIONS**

<table>
<thead>
<tr>
<th>CL Clear Lens</th>
<th>OPTIC</th>
<th>BEAM ANGLE</th>
<th>UGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>S10</td>
<td>12.6</td>
<td>14.7</td>
<td></td>
</tr>
<tr>
<td>S30</td>
<td>30.8</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td>S40</td>
<td>44.6</td>
<td>16.6</td>
<td></td>
</tr>
<tr>
<td>S50</td>
<td>59</td>
<td>16.9</td>
<td></td>
</tr>
<tr>
<td>D40</td>
<td>41.8</td>
<td>16.2</td>
<td></td>
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<tr>
<td>D50</td>
<td>47.9</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>D60</td>
<td>61.2</td>
<td>17.2</td>
<td></td>
</tr>
</tbody>
</table>

**ACCESSORY Honeycomb Louver**

<table>
<thead>
<tr>
<th>OPTIC</th>
<th>BEAM ANGLE</th>
<th>UGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>S10</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>SS30</td>
<td>24.5</td>
<td>5</td>
</tr>
<tr>
<td>SS40</td>
<td>35.7</td>
<td>5</td>
</tr>
<tr>
<td>SS50</td>
<td>47.2</td>
<td>5</td>
</tr>
<tr>
<td>D40</td>
<td>33.4</td>
<td>5</td>
</tr>
<tr>
<td>D50</td>
<td>38.2</td>
<td>5</td>
</tr>
<tr>
<td>D60</td>
<td>49</td>
<td>5</td>
</tr>
</tbody>
</table>

**GLARE CONTROL**

**CUT-OFF ANGLE**
Visual comfort is achieved with a lower cut-off angle due to improved glare control. The smaller the cut-off angle, the easier it is on the eye.

Alphabet downlights have been thoughtfully engineered to eliminate glare while still delivering functional illumination.

• Cutoff angle of CL is 16 degrees;
## LIGHTING FIXTURE CUTS

### PROJECT INFORMATION

- **Project Name**: Lakewood Library
- **Location**: Lakewood, WA
- **Type**: BuildingWork
- **Date**: 12/8/22
- **Contact**: lblanco@blancalighting.com
- **Phone**: 206 799 4749
- **Lighting Design Intent**

### PHOTOMETRIC DATA

#### LIGHTING FIXTURE CUTS

<table>
<thead>
<tr>
<th>Lighting System</th>
<th>Specification</th>
<th>WATTS</th>
<th>LPW</th>
<th>LUMENS</th>
<th>CCT</th>
<th>INTENSITY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>31° SEMI-SPECULAR WITH CLEAR LENS</strong></td>
<td>-</td>
<td>12.7</td>
<td>87.3</td>
<td>1109</td>
<td>3000K</td>
<td></td>
</tr>
<tr>
<td><strong>45° HIGH EFFICIENCY DIFFUSED LENS</strong></td>
<td>-</td>
<td>12.7</td>
<td>92.2</td>
<td>1177</td>
<td>3000K</td>
<td></td>
</tr>
<tr>
<td><strong>59° HIGH EFFICIENCY DIFFUSED LENS</strong></td>
<td>-</td>
<td>12.7</td>
<td>92.5</td>
<td>1174</td>
<td>3000K</td>
<td></td>
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<tr>
<td><strong>76° HIGH EFFICIENCY DIFFUSED LENS</strong></td>
<td>-</td>
<td>12.7</td>
<td>93.2</td>
<td>1137</td>
<td>3000K</td>
<td></td>
</tr>
</tbody>
</table>

### LIGHTING DESIGN INTENT

- **Lighting Design Intent**

### LIGHTING FIXTURE CUTS

- **Lighting System**: AlphabetLighting.com
- **Contact**: Alphabet by Ledra Brands, Inc.
- **Address**: 88 Maxwell Irvine, CA 92618
- **Phone**: 714.259.9959
- **Fax**: 714.259.9969

---

In a continuing effort to offer the best product possible we reserve the right to change, without notice, specifications or materials that in our opinion will not alter the function of the product.

---

*Alphabet by Ledra Brands, Inc.*

[Alphabet by Ledra Brands, Inc.]

Phone: 714.259.9959  Fax: 714.259.9969

AlphabetLighting.com

---

Contact: lblanco@blancalighting.com
Phone: 206 799 4749

---

Page 36 of 59

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### LIGHTING FIXTURE CUTS

**Lakewood Library**

**Lakewood, WA**

**Building Work**

**Type: L6**

**Lighting Design Intent**

12/8/22

### PHOTOMETRIC DATA

#### 10LM CCT MULTIPLIERS

<table>
<thead>
<tr>
<th>CCT</th>
<th>80CRI</th>
<th>90CRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2700K</td>
<td>0.96</td>
<td>0.81</td>
</tr>
<tr>
<td>3000K</td>
<td>1</td>
<td>0.85</td>
</tr>
<tr>
<td>3500K</td>
<td>1.03</td>
<td>0.88</td>
</tr>
<tr>
<td>4000K</td>
<td>1.06</td>
<td>0.91</td>
</tr>
</tbody>
</table>

**FC Formula = CBCP / Distance²**

<table>
<thead>
<tr>
<th>CCT</th>
<th>80CRI</th>
<th>90CRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2700K</td>
<td>0.96</td>
<td>0.81</td>
</tr>
<tr>
<td>3000K</td>
<td>1</td>
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<tr>
<td>3500K</td>
<td>1.03</td>
<td>0.88</td>
</tr>
<tr>
<td>4000K</td>
<td>1.06</td>
<td>0.91</td>
</tr>
</tbody>
</table>

#### 12.5° SPECULAR WITH CLEAR LENS

<table>
<thead>
<tr>
<th>WATTS: 8.2</th>
<th>LPW: 90.1</th>
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</thead>
<tbody>
<tr>
<td>LUMENS: 739</td>
<td>CCT: 3000K</td>
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</table>

**INTENSITY**

<table>
<thead>
<tr>
<th>DEGREE</th>
<th>CANDELA</th>
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<tbody>
<tr>
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<tr>
<td>5</td>
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<td>25</td>
<td>338</td>
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<td>35</td>
<td>163</td>
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<tr>
<td>45</td>
<td>9</td>
</tr>
</tbody>
</table>

#### 15LM CCT MULTIPLIERS

<table>
<thead>
<tr>
<th>CCT</th>
<th>80CRI</th>
<th>90CRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2700K</td>
<td>0.96</td>
<td>0.81</td>
</tr>
<tr>
<td>3000K</td>
<td>1</td>
<td>0.85</td>
</tr>
<tr>
<td>3500K</td>
<td>1.03</td>
<td>0.88</td>
</tr>
<tr>
<td>4000K</td>
<td>1.06</td>
<td>0.91</td>
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</tbody>
</table>

**FC Formula = CBCP / Distance²**

<table>
<thead>
<tr>
<th>CCT</th>
<th>80CRI</th>
<th>90CRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2700K</td>
<td>0.96</td>
<td>0.81</td>
</tr>
<tr>
<td>3000K</td>
<td>1</td>
<td>0.85</td>
</tr>
<tr>
<td>3500K</td>
<td>1.03</td>
<td>0.88</td>
</tr>
<tr>
<td>4000K</td>
<td>1.06</td>
<td>0.91</td>
</tr>
</tbody>
</table>

#### 12.5° SPECULAR WITH CLEAR LENS

<table>
<thead>
<tr>
<th>WATTS: 12.2</th>
<th>LPW: 93.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUMENS: 1143</td>
<td>CCT: 3000K</td>
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</table>

**INTENSITY**

<table>
<thead>
<tr>
<th>DEGREE</th>
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<tr>
<td>0</td>
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<tr>
<td>5</td>
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<td>15</td>
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<td>25</td>
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<td>35</td>
<td>261</td>
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<tr>
<td>45</td>
<td>14</td>
</tr>
</tbody>
</table>

---

**Alphabet by Ledra Brands, Inc.**

**88 Maxwell Irvine, CA 92618**

**PH: 714.259.9959**

**FAX: 714.259.9969**

**lblanco@blancalighting.com**

**206 799 4749**

---

In a continuing effort to offer the best product possible we reserve the right to change, without notice, specifications or materials that in our opinion will not alter the function of the product.
LIGHTING DESIGN INTENT

AlphabetLighting.com Alphabet by Ledra Brands, Inc.
88 Maxwell Irvine, CA 92618
PH: 714.259.9959 FAX: 714.259.9969

PROJECT INFORMATION

<table>
<thead>
<tr>
<th>ORDERING CODE</th>
<th>TYPE</th>
</tr>
</thead>
</table>

LIGHTING FIXTURE CUTS

NC - NEW CONSTRUCTION

TRIM

TRIMLESS

TRIMLESS/MILLWORK

In a continuing effort to offer the best products possible we reserve the right to change, without notice, specifications or materials that in our opinion will not alter the function of the product.

lblanco@blancalighting.com
206 799 4749
LIGHTING FIXTURE CUTS

Type: L6

LIGHTING DESIGN INTENT

AlphabetLighting.com
88 Maxwell Irvine, CA 92618
PH: 714.259.9959
FAX: 714.259.9969

BRIEF INFORMATION

JOB NAME TYPE

ORDERING CODE

HEIGHT

LENGTH (2)

LENGTH (1)

WIDTH

HEIGHT

LENGTH (2)

LENGTH (1)

WIDTH

MOUNTING OPTIONS (CONTINUED)

RET - RETRO

TRIM/TRIMLESS

IC - INSULATION CONTACT HOUSING

RATINGS / CERTIFICATIONS

NC RET IC

TYPE NON-IC ✔ ✔

TYPE IC ✔ ✔

CHICAGO PLENUM (CECA) ✔ ✔ ✔

SUITABLE FOR AIR HANDLING PLENUMS ✔ ✔

REDUCED AIRFLOW (WITH LENS) ASTM E223 ✔ ✔

CEILING THICKNESS

FIXTURE TYPE MOUNTING TYPE

TRIM NC, IC, RET STANDARD CEILING THICKNESS

TRIMLESS 3/16" to 1/2"

MILLWORK (TRIMLESS) 1/2" to 2"
The FLOW-RD (model #: 5160) features a smooth flow of uniform illumination, utilizing an ultra slim diffuser (2” dia.), a contemporary yet minimal mounting plate, and three decorative end cap options. This unit is available in four sizes, each of which can be mounted horizontally over a mirror or vertically as a sconce. Brushed Nickel standard with optional finishes available. For a square profile refer to Model #: 5165.

**FINISHES**

<table>
<thead>
<tr>
<th>BN</th>
<th>BL</th>
<th>BZ</th>
<th>GM</th>
<th>MT</th>
<th>PL</th>
<th>MS</th>
<th>MG</th>
<th>WH</th>
</tr>
</thead>
</table>

EC1 End Cap | Brushed Nickel
LIGHTING FIXTURE CUTS

**FLOOR RD**

**STANDARD SPECIFICATIONS**

**HOUSING**
Assembly is comprised of an aluminum extrusion with a cold rolled steel housing and your choice of decorative end caps.

**DIFFUSER**
Ultra slim 2.0” diameter UV stabilized white acrylic. Diffuser is specifically designed to maximize light output with minimal energy consumption. Extruded in the USA. For a square profile, refer to Model #: 5165.

**LED PERFORMANCE**
3500K standard, 82 CRI - L6 rating - 60,000 hrs - L70 rating (projected) - 100,000 hrs Amperage rated @ 110V input. Operating ambient temperature: -30°C / -29°F to 40°C / 104°F Delivered 3500K lumens noted. Consult Brownlee.com for performance of all CCTs.

**5160**

- **13 Size**
  - H08 - 8W nominal, 0.7 A input - 766 lm. Dimmable (0-10V), 120-277V.
  - H10 - 10W nominal, 0.8 A input - 919 lm. Dimmable (Triac), 120V Only.
  - H13 - 13W nominal, 1.1 A input - 1660 lm. Dimmable (Triac), 120V Only.
  - H16 - 16W nominal, 1.4 A input - 1890 lm. Dimmable (Triac), 120-277V.
  - H20 - 20W nominal, 1.9 A input - 2400 lm. Dimmable (Triac), 120V Only.
  - H25 - 25W nominal, 2.1 A input - 2988 lm. Dimmable (0-10V), 120-277V.
  - 36 Size
  - H32 - 32W nominal, 2.7 A input - 3841 lm. Dimmable (0-10V), 120-277V.

**MOUNTING**
Fixture mounts to a 2x4 single gang j-box (by others), positioned in the direction of the fixture. Box to be positioned vertically if mounting fixture horizontally. Box to be positioned horizontally if mounting fixture vertically. Diffuser and housing assembly ship pre-assembled for simplified installation. Refer to accessories section for optional cover plates.

**FINISH**
The 5160 series is finished in brushed nickel as standard. It is available in all Brownlee paint finishes as an optional offering. Plated finishes such as Brushed Nickel are suitable for indoor applications only. Installation outdoors voids the Brownlee Limited Warranty.

**WARRANTY**
5 year limited warranty on this LED product. Consult factory for details.

**ORDERING INFORMATION**

**5160**

<table>
<thead>
<tr>
<th>Model</th>
<th>2. SIZE</th>
<th>3. FINISH</th>
<th>4. WATTAGE</th>
<th>5. END CAP</th>
<th>6. COLOR (if required)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>L: 1.3&quot;</td>
<td>BN</td>
<td>H08</td>
<td>End Cap 1</td>
<td>35K 3500K standard color temperature</td>
</tr>
<tr>
<td>24</td>
<td>L: 2.4&quot;</td>
<td>BN</td>
<td>H10</td>
<td>End Cap 2</td>
<td>30K 3000K color temperature</td>
</tr>
<tr>
<td>36</td>
<td>L: 3.0&quot;</td>
<td>BN</td>
<td>H13</td>
<td>End Cap 3</td>
<td>40K 4000K color temperature</td>
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<tr>
<td>48</td>
<td>L: 4.8&quot;</td>
<td>BN</td>
<td>H25</td>
<td></td>
<td>50K 5000K color temperature</td>
</tr>
</tbody>
</table>

**NOTES:**
- Refer to model # 1380 for a coordinating wall sconce.
- Available in a select number of finishes. Refer to the Options section of this sheet for details (WMP).

**ACCESSORIES** (field installed — order separately)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100043BN</td>
<td>Cover Plate - Brushed Nickel (Covers 4x4 jbox)</td>
</tr>
<tr>
<td>100043AX</td>
<td>Cover Plate - Specify Finish (xx) (Covers 4x4 jbox)</td>
</tr>
</tbody>
</table>

**5. END CAP**

<table>
<thead>
<tr>
<th>End Cap</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC1</td>
<td>H08</td>
<td>H10</td>
<td>H13</td>
</tr>
<tr>
<td>EC2</td>
<td>H16</td>
<td>H16</td>
<td>H16</td>
</tr>
<tr>
<td>EC3</td>
<td>H20</td>
<td>H25</td>
<td>H20</td>
</tr>
</tbody>
</table>

**6. COLOR** (if required)

- **35K** 3500K standard color temperature
- **30K** 3000K color temperature
- **40K** 4000K color temperature

**7. AVAILABLE OPTIONS**

- **90R** 0° 90 CRI (3000K only)
- **AMF** Antimicrobial Finish (BL, NT, WH only)

**LED PERFORMANCE**
- **H20** 20W H Series LED, 1.9 A input - 2400 lm. Dimmable (Triac), 120V Only.
- **H25** 25W H Series LED, 2.1 A input - 2988 lm. Dimmable (0-10V), 120-277V.
- **H32** 32W H Series LED, 2.7 A input - 3841 lm. Dimmable (0-10V), 120-277V.

**DIRECTIONS**
- **EC1** E12, H25, H32 only (See DTR note)
- **EC2** French Canadian Labels

**AMF Note:** Antimicrobial powder coat is applied to the exposed metal fixture parts and can inhibit the growth of mold and reduce staining caused by condensation. The finish will be detected by the requesting municipality. Consult your Brownlee Lighting representative for availability and ordering information.

**NOTE:**
- Antimicrobial powder coat is applied to the exposed metal fixture parts and can inhibit the growth of mold and reduce staining caused by condensation. The finish will be detected by the requesting municipality. Consult your Brownlee Lighting representative for availability and ordering information.

**DISCLAIMER:** Specifications and dimensions subject to change without notice.

**CONTACT:**
lblanco@blancalighting.com
206 799 4749

**WEB:**
www.brownleelighting.com

**ABRAHAM LIGHTING**
www.abrahamlighting.com

**LAKESIDE LIBRARY**
Lakewood, WA
BuildingWork
12/8/22
lblanco@blancalighting.com
206 799 4749
Scaler™ 2x2 Panel
2’X2’ EDGE-LIT FLAT PANEL

FEATURES
- Edge-lit flat panel with options provides a wide variety of configurations to match any application
- Appropriate for offices, schools, medical, and public spaces
- Superior construction provides even light across the face of the fixture
- Standard and HE lumen packages available
- IC rated
- Suitable for ISO Class 5–9 positive pressure cleanrooms

CONTROLS TECHNOLOGY
- Optional SpectraSync™ offers a Tunable White solution and integrates seamlessly into a variety of control systems
- NX Lighting Controls provides options for wired or wireless connectivity for NX system deployments

CERTIFICATIONS (CONTINUED)
- DLC® (DesignLights Consortium) Qualified, with some Premium Qualified configurations. Please refer to the DLC website for specific product qualifications at www.designlights.org
- The DTS, Dimming Bypass Module, is for emergency circuit control loads including sensors and wireless systems UL certified to UL 924. See page 8 for wiring diagram.
- Adheres to LM79, LM80, and TM21 industry standards for photometrics and lifetime calculations

WARRANTY
- 5 year warranty

SPECIFICATIONS
CONSTRUCTION
- Extruded aluminum frame has a matte white finish and clean frame-to-lens transition

OPTICS
- Acrylic blend light guide with housed/textured outer lens provides edge to edge illumination without pixelation or bright spots

INSTALLATION
- Integral T-bar clips for secure mounting to grid ceiling
- For surface/cable mount applications use surface/cable mount kit accessories
- For plaster or sheet rock installations, use flange kit

ELECTRICAL
- 54,000 hour LEDs at L70 for reduced maintenance

CONTROLS
- Optional SpectraSync™ offers a Tunable White solution and integrates seamlessly into a variety of control systems
- NX Lighting Controls provides options for wired or wireless connectivity for NX system deployments

CERTIFICATIONS
- All luminaires are built to UL 1598 standards and bear appropriate cULus labels
- CSA certified to UL 924 standards with battery pack
- Damp location label standard
- Tested in accordance with ISO 14644-1; suitable for ISO Class 5–9 positive and negative pressure clean rooms
- NX is available in U.S., Canada and Mexico. For other locations consult factory
- UL Sanitation certified to NSF standards

WARRANTY
- 5 year warranty

KEY DATA
- Lumen Range 1492–4746
- Wattage Range 12–41
- Efficacy Range (LPW) 103–142
- Reported Life (Hours) 170/54,000
LIGHTING FIXTURE CUTS

Lakewood Library
Lakewood, WA
Building Work
12/8/22
lblanco@blancalighting.com
206 799 4749

Columbia LIGHTING
Scaler™ 2x2 Panel
2’x2’ EDGE-LIT FLAT PANEL

ORDERING GUIDE

CATALOG #

SRP22
2 x 2 Scaler™ Panel Edge Lit

Voltage Options

Options

Driver Options

Accessories

1 Limitations apply based on lumen packages (see Product Exceptions & Details)
2 Not available in 347V
3 For use only with Lutron T series controls
4 For compatibility with Dual Lite Longwell inverters, contact lighting representative
5 Not available for use in Canada
6 For emergency circuit control/loads, consult factory
7 For NX control and flex wire together consult factory
8 Not available with ESD, LUTH or LUTT driver options
9 Use with emergency battery pack
10 Surface mount kit can not be used with NWE options

PRODUCT EXCEPTIONS & DETAILS

Driver options listed below are available for the outputs as shown.

PRODUCT EXCEPTIONS & DETAILS

Driver options listed below are available for the outputs as shown.

DRIVER AVAILABILITY TABLE

<table>
<thead>
<tr>
<th>DRIVER</th>
<th>VW</th>
<th>VWHE</th>
<th>MW</th>
<th>MWHE</th>
<th>LW</th>
<th>LWHE</th>
<th>ML</th>
<th>MLHE</th>
<th>HL</th>
<th>HLHE</th>
<th>VL</th>
<th>VLHE</th>
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</thead>
<tbody>
<tr>
<td>ED</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>ED1</td>
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<td>X</td>
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<td>LUTH</td>
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<tr>
<td>LUTT</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>347</td>
<td>X</td>
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<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Notes:
1 Limitations apply based on lumen packages (see Product Exceptions & Details)
2 Not available in 347V
3 For use only with Lutron T series controls
4 For compatibility with Dual Lite Longwell inverters, contact lighting representative
5 Not available for use in Canada
6 For emergency circuit control/loads, including sensors and wireless systems, UL certified to UL 924. See page 6 for wiring diagram

For questions about configuration options, contact lighting representative
## LIGHTING FIXTURE CUTS

**Type: L8**

**Lighting Design Intent**

12/8/22

---

### Scaler™ 2x2 Panel

**2’X2’ EDGE-LIT FLAT PANEL**

---

### ORDERING GUIDE

**Example:** SRP22–35LWG–EDU–ELL14–NXE

---

### CATALOG #

---

### DRIVER AVAILABILITY TABLE

<table>
<thead>
<tr>
<th>Driver</th>
<th>Options</th>
<th>Notes</th>
</tr>
</thead>
</table>
| VW     | ELL14   | Emergency Battery Pack Installed, 1400 Luminous | For use with Lutron T series controls for NX control and flex wire together consult factory. Not available with ESD, LUTH or LUTT drivers. Use with emergency battery packs. Surface mount kit can not be used with NXW options. For questions about configuration options, contact lighting representative.
| VWHE   | ELL14ST | Emergency Battery Pack Installed, 1400 Lumen/w Self Test | Not available in 347V. For compatibility with Dual-Lite Inverters, contact lighting representative.
| MW     | ELL1MH2 | Emergency Battery Pack, 2-Hour Run Time | Not available in Canada.
| MWHE   | DTS     | Dimming Bypass Module | For NX control and flex wire together consult factory.
| NL     | CP      | Chicago Panel | Not available for use in Canada.
| ML     | GLR     | Fast Blow Fuse | For emergency, consult control loads including sensors and wireless systems: UL certified to UL 924. See page 6 for wiring diagram.
| MLHE   | C3XX    | 3-wire Flex | NX In-Fixture Control Options: 7 For NX control and flex wire together consult factory.
| HL     | C4XX    | 4-wire Flex | NXW Networked Wireless Radio Module/NKMO and Bluetooth Programming, without Sensor
| HLHE   | C5XX    | 5-wire Flex | 10 Surface mount kit can not be used with NXW options.
| VL     | C5XX    | 5-wire Flex | For questions about configuration options, contact lighting representative.
| VLHE   | C5XX    | 5-wire Flex |

---

### PRODUCT EXCEPTIONS & DETAILS

Driver options listed below are available for the outputs as shown.

---

**ACCESSORIES**

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>FK22</td>
<td>2x2 Single Flange Kit (Shipped separately)</td>
</tr>
<tr>
<td>PLTS</td>
<td>Remote Test Switch Module</td>
</tr>
<tr>
<td>SRPSMK-22</td>
<td>2x2 SRP Surface Mount Kit (HE lumen packages available on)</td>
</tr>
<tr>
<td>CSF-SCF-KIT</td>
<td></td>
</tr>
</tbody>
</table>

---

**NOTES:**

1. Limitations apply based on lumen packages (see Product Exceptions & Details)
2. Not available in 347V.
3. For use only with Lutron T series controls.
4. For compatibility with Dual-Lite Inverters, contact lighting representative.
5. Not available for use in Canada.
6. For emergency, consult control loads including sensors and wireless systems: UL certified to UL 924. See page 6 for wiring diagram.
**Lighting Design Intent**

**Scaler™ 2x2 Panel**

*2’X2’ EDGE-LIT FLAT PANEL*

**CONTROLS**

**NX Lighting Controls:**
Supports both indoor and outdoor applications in a variety of deployment options: wired, wireless, hybrid.

Integrates with and enables a wide array of luminaires including those with SpectraSync™ Color Tuning Technology.

<table>
<thead>
<tr>
<th>NX INTEGRATED CONTROLS REFERENCE</th>
<th>Sensor</th>
<th>Networkable</th>
<th>Scheduling</th>
<th>Occupancy</th>
<th>Daylight Harvesting</th>
<th>0–10V Dimming</th>
<th>On/off Control</th>
<th>Bluetooth App Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td>NX Networked — Wired</td>
<td>N/A</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Requires NXBTC/R*</td>
</tr>
<tr>
<td>NX Networked — Wireless</td>
<td>N/A</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

1. NXBTC/R needs to be plugged into an available NX SmartPORT™ on the fixture network.
2. To program NXW option, need to consult factory. If connected to an area controller, programming can be done from that.

**SpectraSync™ Color Tuning Technology:**
Control your space based on the needs of the application, specific activities throughout the day and preferences of the occupants with distinct SpectraSync™ Color Tuning Technologies.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Kelvin Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tunable White</td>
<td>3000K–5000K</td>
<td>Offers users the ability to tailor CCT to their personal preference, enhancing task visibility, material and colors or the aesthetics of the space</td>
</tr>
</tbody>
</table>

**SpectraSync Tunable White**

30501 (3000K–5000K). Requires two 0–10V controllers, one for intensity and one for CCT. Minimum 5% dimming.

**Controller Manufacturer Data**
SpectraSync Tunable White was designed to be used with sinking style dimmers (provided by others) and is compatible with:
- NX Lighting Controls Room Controller (NXRC) and In-fixture Controllers (NXFM)
- Lutron: DVTV, DVSTV, and NFTV dimmers
- Wattstopper: ADF120277 and CD4BL (Titan) dimmers

**Color Tuning Profile**

To enable scheduling and for use with NX wall control preset stations please refer to NX SpectraSync technical sheet.
LIGHTING FIXTURE CUTS

Lakewood Library
Lakewood, WA
BuildingWork
12/8/22
Type: L8
Lighting Design Intent

Scalers 2x2 Panel
2'x2' EDGE-LIT FLAT PANEL

DELIVERED LUMENS, SPECTRASYNC™

<table>
<thead>
<tr>
<th>Lumen Output</th>
<th>Watts</th>
<th>3000</th>
<th>3500</th>
<th>4000</th>
<th>5000</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Lumens</td>
<td>LPW</td>
<td>Lumens</td>
<td>LPW</td>
<td>Lumens</td>
</tr>
<tr>
<td>VW</td>
<td>13</td>
<td>1492</td>
<td>111</td>
<td>1554</td>
<td>115</td>
</tr>
<tr>
<td>MW</td>
<td>18</td>
<td>2071</td>
<td>113</td>
<td>2157</td>
<td>118</td>
</tr>
<tr>
<td>LW</td>
<td>23</td>
<td>2643</td>
<td>114</td>
<td>2753</td>
<td>118</td>
</tr>
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<td>ML</td>
<td>30</td>
<td>3062</td>
<td>103</td>
<td>3190</td>
<td>107</td>
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<tr>
<td>HL</td>
<td>33</td>
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<tr>
<td>VL</td>
<td>41</td>
<td>4218</td>
<td>104</td>
<td>4394</td>
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</table>

DELIVERED LUMENS

Product Availability

<table>
<thead>
<tr>
<th>Lumen Package</th>
<th>Lumen</th>
<th>Input Watts</th>
<th>LPW</th>
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</thead>
<tbody>
<tr>
<td>SRP22-30VW-EDU</td>
<td>1492</td>
<td>13</td>
<td>111</td>
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<tr>
<td>SRP22-30VWHE-EDU</td>
<td>1567</td>
<td>12</td>
<td>130</td>
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<tr>
<td>SRP22-35VW-EDU</td>
<td>1554</td>
<td>13</td>
<td>115</td>
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<tr>
<td>SRP22-35VWHE-EDU</td>
<td>1618</td>
<td>12</td>
<td>132</td>
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<tr>
<td>SRP22-40VW-EDU</td>
<td>1616</td>
<td>13</td>
<td>120</td>
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<td>SRP22-40VWHE-EDU</td>
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<td>118</td>
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<tr>
<td>SRP22-35MWHE-EDU</td>
<td>2126</td>
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<tr>
<td>SRP22-40MW-EDU</td>
<td>2243</td>
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<td>122</td>
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<td>SRP22-40MWHE-EDU</td>
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<td>18</td>
<td>127</td>
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<td>114</td>
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<tr>
<td>SRP22-30LWHE-EDU</td>
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<td>133</td>
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<tr>
<td>SRP22-35LW-EDU</td>
<td>2753</td>
<td>23</td>
<td>118</td>
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<tr>
<td>SRP22-35LWHE-EDU</td>
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<td>123</td>
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<tr>
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<td>139</td>
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<tr>
<td>SRP22-50LW-EDU</td>
<td>2973</td>
<td>23</td>
<td>128</td>
</tr>
<tr>
<td>SRP22-50LWHE-EDU</td>
<td>2795</td>
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<td>141</td>
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</tbody>
</table>
**Lakewood Library**

**Lakewood, WA**

**BuildingWork**

**12/8/22**

**lblanco@blancalighting.com**

**206 799 4749**

**LIGHTING FIXTURE CUTS**

<table>
<thead>
<tr>
<th>Type:</th>
<th>L8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting Design Intent</td>
<td></td>
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</tbody>
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---

**Scaler™ 2x2 Panel**

**2’X2’ EDGE-LIT FLAT PANEL**

**DIMENSIONS**

**GRID**

<table>
<thead>
<tr>
<th>Width</th>
<th>Height</th>
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</thead>
<tbody>
<tr>
<td>23.7” (602mm)</td>
<td>23.7” (602mm)</td>
</tr>
<tr>
<td>1.0” (25.4mm)</td>
<td>2.5” (63mm)</td>
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</table>

**SURFACE MOUNT**

<table>
<thead>
<tr>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.0” (608.6mm)</td>
<td>24.0” (608.6mm)</td>
</tr>
<tr>
<td>2.5” (63mm)</td>
<td></td>
</tr>
</tbody>
</table>

**CEILING COMPATIBILITY**

**Type G**

For lay-in installation in exposed grid ceilings, maximum tee widths of 2” and maximum tee heights of 2” allowed.

For hard ceiling applications, order FK22 flange kit. Flange kit wires directly into concealed ceiling opening for a clean, finished appearance.

**FK22 Flange Kit**

For flanged fixtures in row configurations, the FKCR adapter bracket kit is required in addition to the FK22 kit. Order one less FK22 than the total number of fixtures in row. (Example: Row of ten, order 9 FK22 & 1 FKCR)

Row cutout dimensions using FK22s & FKCR adapters:

- Width 241/8” Length 24” + [Inches] 1/16”
- Example: (24” + 2” + 1/16”) = 480/16= 480.0125"

Flange kit cutout dimension for single unit only: 241/4” x 241/4”

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**LIGHTING FIXTURE CUTS**

**Lakewood Library**
Lakewood, WA
BuildingWork

**Type:** L8

**Lighting Design Intent**

**Scaler™ 2x2 Panel**
2'x2' EDGE-LIT FLAT PANEL

**PHOTOMETRY**

**SRP22-35LW**

<table>
<thead>
<tr>
<th>TEST NO.</th>
<th>DESCRIPTION</th>
<th>DELIVERED LUMENS</th>
<th>WATTS</th>
<th>EFFICACY</th>
<th>MOUNTING</th>
<th>SPACING CRITERION</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.02119</td>
<td>2’ x 2’ LED SRP Scaler Panel</td>
<td>2755</td>
<td>23.28</td>
<td>118</td>
<td>Recessed</td>
<td>0° = 1.26 90° = 1.26</td>
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</table>

<table>
<thead>
<tr>
<th>ZONAL LUMEN SUMMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone</td>
</tr>
<tr>
<td>0–30</td>
</tr>
<tr>
<td>0–40</td>
</tr>
<tr>
<td>0–60</td>
</tr>
<tr>
<td>0–180</td>
</tr>
</tbody>
</table>

**POLAR GRAPH**

**SRP22-35ML**

<table>
<thead>
<tr>
<th>TEST NO.</th>
<th>DESCRIPTION</th>
<th>DELIVERED LUMENS</th>
<th>WATTS</th>
<th>EFFICACY</th>
<th>MOUNTING</th>
<th>SPACING CRITERION</th>
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</thead>
<tbody>
<tr>
<td>19.01989</td>
<td>2’ x 2’ LED SRP Scaler Panel</td>
<td>3192</td>
<td>29.83</td>
<td>107</td>
<td>Recessed</td>
<td>0° = 1.26 90° = 1.26</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ZONAL LUMEN SUMMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone</td>
</tr>
<tr>
<td>0–30</td>
</tr>
<tr>
<td>0–40</td>
</tr>
<tr>
<td>0–60</td>
</tr>
<tr>
<td>0–180</td>
</tr>
</tbody>
</table>

**POLAR GRAPH**

**SRP22-35HL**

<table>
<thead>
<tr>
<th>TEST NO.</th>
<th>DESCRIPTION</th>
<th>DELIVERED LUMENS</th>
<th>WATTS</th>
<th>EFFICACY</th>
<th>MOUNTING</th>
<th>SPACING CRITERION</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.02070</td>
<td>2’ x 2’ LED SRP Scaler Panel</td>
<td>3696</td>
<td>32.86</td>
<td>112</td>
<td>Recessed</td>
<td>0° = 1.26 90° = 1.26</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ZONAL LUMEN SUMMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone</td>
</tr>
<tr>
<td>0–30</td>
</tr>
<tr>
<td>0–40</td>
</tr>
<tr>
<td>0–60</td>
</tr>
<tr>
<td>0–180</td>
</tr>
</tbody>
</table>

**POLAR GRAPH**

**ADDITIONAL INFORMATION**

**DTS WIRING DIAGRAM** (0–10V DIMMING DRIVER SHOWN)

- **Driver**: Dimming
- **Red**: Switched Hot
- **Blue**: Emergency Line
- **Red**: Emergency Neutral
- **White/Blue**: Dimming
- **White**: Utility Neutral
- **Black**: Utility Line (Unswitched Hot)
- **Yellow (#5)**: Black
- **White**: White/Blue
- **Violet**: Blue

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**Currentlighting.com/columbialighting**

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**lblanco@blancalighting.com**

**206 799 4749**

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LIGHTING FIXTURE CUTS

Lakewood Library
Lakewood, WA
BuildingWork

Type: L9
Lighting Design Intent
12/8/22
lblanco@blancalighting.com
206 799 4749

 AVAILABLE FINISHES:

Sydney
PD-64256

PRODUCT DESCRIPTION
A modern expressionist style inspired by the world’s famous opera house, SYDNEY evokes a creative, innovative and structural design. A Multi-faceted, high performer.

FEATURES
• Driver concealed within the canopy
• Up and downward illumination
• Slide-on almond shaped canopy with minimal hardware
• Thin powered aircraft cables provide an ultra clean look for adjustable suspension height

SPECIFICATIONS
Rated Life
50000 Hours
Standards
ETL, cETL,Damp Location Listed,Title 24 JA8: 2019 Compliant
Input
120-277V,50/60Hz
Dimming
ELV, 0-10V, TRIAC
Color Temp
3000K
CRI
90
Construction
Die cast aluminum body with PC diffuser

<table>
<thead>
<tr>
<th>Model &amp; Size</th>
<th>Color Temp</th>
<th>Finish</th>
<th>LED Watts</th>
<th>LED Lumens</th>
<th>Delivered Lumens</th>
</tr>
</thead>
<tbody>
<tr>
<td>PD-64256</td>
<td>3000K</td>
<td>AB</td>
<td>41.4W</td>
<td>3600</td>
<td>2568</td>
</tr>
</tbody>
</table>

Example: PD-64256-AB
For custom requests please contact customs@modernforms.com
Lakewood Library  
Lakewood, WA  
BuildingWork

Type: L10

Lighting Design Intent

<table>
<thead>
<tr>
<th>Model &amp; Size</th>
<th>Color Temp</th>
<th>Finish</th>
<th>LED Watts</th>
<th>LED Lumens</th>
<th>Delivered Lumens</th>
</tr>
</thead>
<tbody>
<tr>
<td>PD-59922</td>
<td>3000K</td>
<td>BN</td>
<td>31.5W</td>
<td>2718</td>
<td>2333</td>
</tr>
</tbody>
</table>

Example: PD-59922-BN

For custom requests please contact customs@modernforms.com

Fluffy
PD-59922

FEATURES
• Driver concealed within the canopy
• Thin powered aircraft cables provide an ultra clean look for adjustable suspension height
• Glowing cluster of interlocked petal shades
• Magnetic tool free shade installation for easy cleaning
• Can be mounted on a sloped ceiling

SPECIFICATIONS
Rated Life: 50000 Hours
Standards: ETL, cETL, Damp Location Listed, Title 24 JA8: 2019 Compliant
Input: 120-277V, 50/60Hz
Dimming: ELV, 0-10V, TRIAC
Color Temp: 3000K
CRI: 90
Construction: Aluminum hardware with handcrafted interlocked acrylic petal shades
# LIGHTING FIXTURE CUTS

## Fluffy

**PD-59933**

**PRODUCT DESCRIPTION**

A soft feathered piece with a heavenly look. Handcrafted detailed acrylic that emerges into a glowing cluster of interlocked petals with frosted edges. Celestial silk screened petals diffuse the light with texture around the fixture for a tone on tone style.

**FEATURES**

- Driver concealed within the canopy
- Thin powered aircraft cables provide an ultra clean look for adjustable suspension height
- Glowing cluster of interlocked petal shades
- Magnetic tool free shade installation for easy cleaning
- Can be mounted on a sloped ceiling

**SPECIFICATIONS**

| Rated Life | 50000 Hours |
| Standards | ETL, cETL, Damp Location Listed, Title 24 JA8: 2019 Compliant |
| Input | 120-277V, 50/60Hz |
| Dimming | ELV, 0-10V, TRIAC |
| Color Temp | 3000K |
| CRI | 90 |
| Construction | Aluminum hardware with handcrafted interlocked acrylic petal shades |

### Model & Size

<table>
<thead>
<tr>
<th>Model &amp; Size</th>
<th>Color Temp</th>
<th>Finish</th>
<th>LED Watts</th>
<th>LED Lumens</th>
<th>Delivered Lumens</th>
</tr>
</thead>
<tbody>
<tr>
<td>PD-59933-33&quot;</td>
<td>3000K</td>
<td>BN Brushed Nickel</td>
<td>44W</td>
<td>3980</td>
<td>3375</td>
</tr>
</tbody>
</table>

Example: **PD-59933-BN**

For custom requests please contact customs@modernforms.com
NU4 LOPRO
Round Downlight Standard White

**FEATURES**
- Thermally optimized for longevity
- Double jointed driver box allows 4” shallow plenum installation
- 10° - 70° beam control
- UGR < 15
- Multiple mounting, glare control options, trims, and finishes available

**DIMMING AND CONTROLS**
- 0-10V dimming to 1%
- Leading & trailing edge (Triac / ELV) dimming to 1%

**CONSTRUCTION**
- Shatter proof acrylic bezel lens
- Lexan® (PC) Optimal connectivity for wireless control signal. Impact and chemical resistant at the highest level. Withstands temperatures up to 240°F.
- Consult factory about metal trim/bezel option
- Electrocoated 16-gauge cold-rolled steel construction
- Accommodates ceiling thickness from 3/8” to 2”

**LISTING**
- ULus Listed to UL1598 & UL2108; cUL Listed to CSA C22.2 #250.0
- IP65 with lens - Suitable for wet locations with lens - Suitable for damp locations without lens
- Non-conductive, dead-front construction (shower approved)
- Made in the USA - meets the requirements of the Buy American provision within the ARRA
- NSF/ANSI-2 with lens
- 5 Year Limited warranty

**ELECTRICAL**
- 120V-277V, 120 only Triac / ELV
- Power factory ≥ 0.9
- 2kV driver input surge protection
- Remote emergency test switch
- 7W, 10W (T20 CEC) and 12W EM 90min battery
- Max. ambient installation temperature 95°F (35°C)

**PERFORMANCE DATA**

<table>
<thead>
<tr>
<th>COB LIGHT ENGINE</th>
<th>NOMINAL DELIVERED LUMENS</th>
<th>SYSTEM WATTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10LM</td>
<td>800LM @ (30K/80CRI)</td>
<td>9W</td>
</tr>
<tr>
<td>15LM</td>
<td>1200LM @ (30K/80CRI)</td>
<td>14W</td>
</tr>
<tr>
<td>20LM</td>
<td>1600LM @ (30K/80CRI)</td>
<td>18W</td>
</tr>
<tr>
<td>25LM</td>
<td>2000LM @ (30K/80CRI)</td>
<td>20W</td>
</tr>
<tr>
<td>30LM</td>
<td>2400LM @ (30K/80CRI)</td>
<td>24W</td>
</tr>
<tr>
<td>60LM</td>
<td>8000LM @ (30K/90CRI)</td>
<td>9W</td>
</tr>
<tr>
<td>10LM</td>
<td>1020LM @ (30K/90CRI)</td>
<td>14W</td>
</tr>
<tr>
<td>15LM</td>
<td>1200LM @ (30K/90CRI)</td>
<td>16W</td>
</tr>
<tr>
<td>20LM</td>
<td>1600LM @ (30K/90CRI)</td>
<td>16W</td>
</tr>
<tr>
<td>25LM</td>
<td>2000LM @ (30K/90CRI)</td>
<td>20W</td>
</tr>
<tr>
<td>30LM</td>
<td>2400LM @ (30K/90CRI)</td>
<td>24W</td>
</tr>
</tbody>
</table>

Notes: Delivered lumens based on WH70 optic with no lens, (see page 2)

**TECHNICAL SPECIFICATIONS**

- Fixture type: XL1
- Trimmed or Trimless Millwork

**CONTACT INFORMATION**

AlphabetLighting.com
Alphabet by Ledra Brands, Inc.
88 Maxwell Irvine, CA 92618
PH: 714.259.9959 FAX: 714.259.9969

In a continuing effort to offer the best product possible we reserve the right to change, without notice, specifications or materials theft in our opinion will not alter the function of the product.
**LIGHTING FIXTURE CUTS**

**Lakewood Library**
Lakewood, WA
BuildingWork

**12/8/22**

lblanco@blancalighting.com
206 799 4749

---

**PROJECT INFORMATION**

<table>
<thead>
<tr>
<th>JOB NAME</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIGHTING FIXTURE CUTS</td>
<td>XL1</td>
</tr>
</tbody>
</table>

---

**AlphabetLighting.com**
Alphabet by Ledra Brands, Inc.
88 Maxwell Irvine, CA 92618
PH: 714.259.9959

---

**10°-70° BEAM ORDERING CODE**

<table>
<thead>
<tr>
<th>SERIES</th>
<th>TYPE</th>
<th>DELIVERED LUMENS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NU4</td>
<td>RDLP</td>
<td>10LM 1000 lm *Shipping JAN 2023</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15LM 1200 lm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20LM 1600 lm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25LM 2000 lm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30LM 2400 lm</td>
</tr>
</tbody>
</table>

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**CCT**

<table>
<thead>
<tr>
<th>CRI</th>
<th>27K</th>
<th>30K</th>
<th>35K</th>
<th>40K</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>3000K</td>
<td>3000K</td>
<td>3000K</td>
<td>4000K</td>
</tr>
<tr>
<td>90</td>
<td>2700K</td>
<td>2700K</td>
<td>2700K</td>
<td>2700K</td>
</tr>
</tbody>
</table>

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**OPTIC & LM MULTIPLIER**

<table>
<thead>
<tr>
<th>OPTIC</th>
<th>LM MULTIPLIER</th>
</tr>
</thead>
<tbody>
<tr>
<td>HE40</td>
<td>(0.96)</td>
</tr>
<tr>
<td>HE60</td>
<td>(0.96)</td>
</tr>
<tr>
<td>HE70</td>
<td>(0.92)</td>
</tr>
<tr>
<td>SS30</td>
<td>(0.80)</td>
</tr>
<tr>
<td>SS40</td>
<td>(0.82)</td>
</tr>
<tr>
<td>SS60</td>
<td>(0.84)</td>
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<tr>
<td>D40</td>
<td>(0.86)</td>
</tr>
<tr>
<td>D50</td>
<td>(0.80)</td>
</tr>
<tr>
<td>D60</td>
<td>(0.90)</td>
</tr>
<tr>
<td>WR07</td>
<td>(0.10)</td>
</tr>
<tr>
<td>510</td>
<td>(0.95)</td>
</tr>
</tbody>
</table>

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**ACCESSORY**

<table>
<thead>
<tr>
<th>ACCESSORY</th>
<th>SEE PAGE 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEZEL LENS</td>
<td>no lens</td>
</tr>
</tbody>
</table>

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**TRIM COLOR**

<table>
<thead>
<tr>
<th>TRIM COLOR</th>
<th>SEE PAGE 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK</td>
<td>black</td>
</tr>
<tr>
<td>WH</td>
<td>white</td>
</tr>
<tr>
<td>MC</td>
<td>matte chrome</td>
</tr>
<tr>
<td>EZ</td>
<td>bronze</td>
</tr>
<tr>
<td>WT</td>
<td>wheat</td>
</tr>
</tbody>
</table>

---

**BEZEL COLOR**

<table>
<thead>
<tr>
<th>BEZEL COLOR</th>
<th>SEE PAGE 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK</td>
<td>black</td>
</tr>
<tr>
<td>WH</td>
<td>white</td>
</tr>
<tr>
<td>MC</td>
<td>matte chrome</td>
</tr>
<tr>
<td>EZ</td>
<td>bronze</td>
</tr>
<tr>
<td>WT</td>
<td>wheat</td>
</tr>
</tbody>
</table>

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**MOUNTING OPTIONS**

<table>
<thead>
<tr>
<th>MOUNTING OPTIONS</th>
<th>SEE PAGE 2, 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC</td>
<td>new construction with ceiling fitting plate</td>
</tr>
<tr>
<td>IC4</td>
<td>insulation contact housing</td>
</tr>
<tr>
<td>RET</td>
<td>retrofit, no ceiling fitting plate</td>
</tr>
</tbody>
</table>

---

**VOLTAGE**

<table>
<thead>
<tr>
<th>VOLTAGE</th>
<th>SEE PAGE 4, 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>0-10V dimming to 1%</td>
</tr>
<tr>
<td>UNV</td>
<td>leading &amp; trailing edge (Triac/ELV) dimming to 1%</td>
</tr>
</tbody>
</table>

---

**DIMMING**

**ELECTRICAL OPTIONS**

<table>
<thead>
<tr>
<th>ELECTRICAL OPTIONS</th>
<th>SEE PAGE 6, 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM7</td>
<td>emergency battery backup, 90 minutes at 7W to LED</td>
</tr>
<tr>
<td>EM10</td>
<td>emergency battery backup, 90 minutes at 10W to LED</td>
</tr>
<tr>
<td>EM10CA20</td>
<td>remote emergency battery backup, 90 minutes at 10W to LED, CA title 20</td>
</tr>
</tbody>
</table>

---

**NEW CONSTRUCTION**

<table>
<thead>
<tr>
<th>NEW CONSTRUCTION</th>
<th>MOUNTING LENGTH:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar Hangers (included)</td>
<td>14&quot;-34&quot; to 26&quot;</td>
</tr>
<tr>
<td>Extension Kit p/n: K20266 (ordered separately, 1 per fixture)</td>
<td>Extends a pair of Bar Hangers Total Mounting Length: 26&quot; to 48&quot;</td>
</tr>
</tbody>
</table>

---

**ADDITIONAL MOUNTING INFO**

**NOTES**

1. **NC** not available in 20LM, 25LM, or 30LM.
2. "No lens" option available for SS30, SS40, SS60, D40, D50, or WH70.
3. CRI not available in NU4.
4. IC not available in NU4.
5. HCL not available with lens. Multiply delivered lumens by (0.78) and beam spread by (0.80) when honeycomb louver is chosen.
6. EM7 dimming available in 120V only.
7. EM10 not available in 10LM.

---

**YOUR COMPLETED ORDERING CODE**

Follow the steps to specify your fixture, example:


---

**Alphabet Lighting Design Intent**

In an effort to offer the best product possible we reserve the right to change, without notice, specifications or materials that in our opinion will not alter the function of the product.
**LIGHTING FIXTURE CUTS**

**Type: XL1**

**Lakewood Library**
Lakewood, WA
BuildingWork

**Lighting Design Intent**

---

**TRIM OPTIONS**

**TRIM BEZEL COLORS**

![Trim Bezel Colors](image)

**OPTICAL OPTIONS**

- **CL (Clear Lens)**

<table>
<thead>
<tr>
<th>OPTIC</th>
<th>BEAM ANGLE</th>
<th>UGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>S10</td>
<td>12.6</td>
<td>14.7</td>
</tr>
<tr>
<td>S30</td>
<td>30.6</td>
<td>16.4</td>
</tr>
<tr>
<td>S40</td>
<td>44.6</td>
<td>20.2</td>
</tr>
<tr>
<td>S50</td>
<td>59</td>
<td>26.3</td>
</tr>
<tr>
<td>D40</td>
<td>40.0</td>
<td>16.2</td>
</tr>
<tr>
<td>D50</td>
<td>47.6</td>
<td>17.1</td>
</tr>
<tr>
<td>D60</td>
<td>61.2</td>
<td>17.7</td>
</tr>
</tbody>
</table>

- **HE (High Efficiency Diffused Lens)**

<table>
<thead>
<tr>
<th>OPTIC</th>
<th>BEAM ANGLE</th>
<th>UGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>40D</td>
<td>45.7</td>
<td>21.2</td>
</tr>
<tr>
<td>50D</td>
<td>53.5</td>
<td>21.8</td>
</tr>
<tr>
<td>60D</td>
<td>79.8</td>
<td>23.1</td>
</tr>
</tbody>
</table>

**ACCESSORY**

- **Honeycomb Louver**

<table>
<thead>
<tr>
<th>OPTIC</th>
<th>BEAM ANGLE</th>
<th>UGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>S10</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>S30</td>
<td>24.5</td>
<td>5</td>
</tr>
<tr>
<td>S40</td>
<td>35.7</td>
<td>5</td>
</tr>
<tr>
<td>S50</td>
<td>45.2</td>
<td>5</td>
</tr>
<tr>
<td>D40</td>
<td>33.4</td>
<td>5</td>
</tr>
<tr>
<td>D50</td>
<td>38.2</td>
<td>5</td>
</tr>
<tr>
<td>D60</td>
<td>49</td>
<td>5</td>
</tr>
</tbody>
</table>

**GLARE CONTROL**

**CUT-OFF ANGLE**

Visual comfort is achieved with a lower cut-off angle due to improved glare control. The smaller the cut-off angle, the easier it is on the eye.

Alphabet downlights have been thoughtfully engineered to eliminate glare while still delivering functional illumination.

- **Cutoff angle of CL is 36 degrees;**

---

In a continuing effort to offer the best products possible, we reserve the right to change without notice, specification or materials that in our opinion will not alter the function of the product.

Alphabet by Ledra Brands, Inc. 88 Maxwell Irvine, CA 92618 Phone: 714.259.9959 Fax: 714.259.9969 AlphabetLighting.com
### LIGHTING FIXTURE CUTS

**Lakewood Library**
Lakewood, WA
BuildingWork
12/8/22
lblanco@blancalighting.com
206 799 4749

#### LIGHTING DESIGN INTENT

**Type:** XL1

**Lighting Design Intent**

**AlphabetLighting.com**
Alphabet by Ledra Brands, Inc.
88 Maxwell Irvine, CA 92618
PH: 714.259.9959
FAX: 714.259.9969

---

#### PHOTOMETRIC DATA

**15LM CCT MULTIPLIERS**

<table>
<thead>
<tr>
<th>CCT</th>
<th>80CRI</th>
<th>90CRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2700K</td>
<td>0.96</td>
<td>0.81</td>
</tr>
<tr>
<td>3000K</td>
<td>1</td>
<td>0.85</td>
</tr>
<tr>
<td>3500K</td>
<td>1.03</td>
<td>0.88</td>
</tr>
<tr>
<td>4000K</td>
<td>1.06</td>
<td>0.91</td>
</tr>
</tbody>
</table>

FC Formula = CBCP / Distance^2

---

**31° SEMI-SPECULAR WITH CLEAR LENS**

<table>
<thead>
<tr>
<th>Distance (ft)</th>
<th>Intensity</th>
<th>DEGREES</th>
<th>CANDELA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1568</td>
<td>0</td>
<td>2400</td>
</tr>
<tr>
<td>5</td>
<td>1568</td>
<td>5</td>
<td>2400</td>
</tr>
<tr>
<td>15</td>
<td>1568</td>
<td>15</td>
<td>2400</td>
</tr>
<tr>
<td>25</td>
<td>1568</td>
<td>25</td>
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<td>35</td>
<td>1568</td>
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<td>2400</td>
</tr>
<tr>
<td>45</td>
<td>1568</td>
<td>45</td>
<td>2400</td>
</tr>
</tbody>
</table>

---

**45° HIGH EFFICIENCY DIFFUSED LENS**

<table>
<thead>
<tr>
<th>Distance (ft)</th>
<th>Intensity</th>
<th>DEGREES</th>
<th>CANDELA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3042</td>
<td>0</td>
<td>2400</td>
</tr>
<tr>
<td>5</td>
<td>3042</td>
<td>5</td>
<td>2400</td>
</tr>
<tr>
<td>15</td>
<td>3042</td>
<td>15</td>
<td>2400</td>
</tr>
<tr>
<td>25</td>
<td>3042</td>
<td>25</td>
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<td>2400</td>
</tr>
<tr>
<td>45</td>
<td>3042</td>
<td>45</td>
<td>2400</td>
</tr>
</tbody>
</table>

---

**59° HIGH EFFICIENCY DIFFUSED LENS**

<table>
<thead>
<tr>
<th>Distance (ft)</th>
<th>Intensity</th>
<th>DEGREES</th>
<th>CANDELA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td>0</td>
<td>2400</td>
</tr>
<tr>
<td>5</td>
<td>1551</td>
<td>5</td>
<td>2400</td>
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<tr>
<td>15</td>
<td>1551</td>
<td>15</td>
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<tr>
<td>25</td>
<td>1551</td>
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<tr>
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<td>2400</td>
</tr>
<tr>
<td>45</td>
<td>1551</td>
<td>45</td>
<td>2400</td>
</tr>
</tbody>
</table>

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**110LM CCT MULTIPLIERS**

<table>
<thead>
<tr>
<th>CCT</th>
<th>80CRI</th>
<th>90CRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2700K</td>
<td>0.96</td>
<td>0.81</td>
</tr>
<tr>
<td>3000K</td>
<td>1</td>
<td>0.85</td>
</tr>
<tr>
<td>3500K</td>
<td>1.03</td>
<td>0.88</td>
</tr>
<tr>
<td>4000K</td>
<td>1.06</td>
<td>0.91</td>
</tr>
</tbody>
</table>

FC Formula = CBCP / Distance^2

---

**31° SEMI-SPECULAR WITH CLEAR LENS**

<table>
<thead>
<tr>
<th>Distance (ft)</th>
<th>Intensity</th>
<th>DEGREES</th>
<th>CANDELA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1157</td>
<td>0</td>
<td>2400</td>
</tr>
<tr>
<td>5</td>
<td>1157</td>
<td>5</td>
<td>2400</td>
</tr>
<tr>
<td>15</td>
<td>1157</td>
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**45° HIGH EFFICIENCY DIFFUSED LENS**

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**76° HIGH EFFICIENCY DIFFUSED LENS**

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**CCT MULTIPLIERS**

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FC Formula = CBCP / Distance^2

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**SX30**

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LIGHTING FIXTURE CUTS

Lakewood Library
Lakewood, WA
BuildingWork
Type: XL1

12/8/22
lblanco@blancalighting.com
206 799 4749

PHOTOMETRIC DATA

15LM CCT MULTIPLIERS

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<tr>
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FC Formula = CBCP / Distance^2

12.5° SPECULAR WITH CLEAR LENS

WATTS: 8.2  LPW: 90.1
LUMENS: 739  CCT: 3000K

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15LM CCT MULTIPLIERS

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FC Formula = CBCP / Distance^2

12.5° SPECULAR WITH CLEAR LENS

WATTS: 12.2  LPW: 93.7
LUMENS: 1143  CCT: 3000K

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LIGHTING FIXTURE CUTS

Lakewood Library
Lakewood, WA
BuildingWork

**Type:** XL1

**Lighting Design Intent**

### PROJECT INFORMATION

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### MOUNTING OPTIONS

#### FIXTURE HEIGHT

**NC - NEW CONSTRUCTION**

**TRIM**

- Ceiling cutout: 4 3/8" diameter
- Ceiling thickness: 1/2" to 2"
- Aperture dimensions: 1 1/2" to 4" (2 9/16" to 4"

**TRIMLESS**

- Ceiling cutout: 4 3/8" diameter
- Ceiling thickness: 1/2" to 2"
- Aperture dimensions: 2 1/2" to 4" (2 9/16" to 4"

**TRIMLESS/MILLWORK**

- Ceiling cutout: 4 3/8" diameter
- Ceiling thickness: 1/2" to 2"
- Aperture dimensions: 4" (4" to 4"

---

AlphabetLighting.com Alphabet by Ledra Brands, Inc. 88 Maxwell Irvine, CA 92618
PH: 714.259.9959 FAX: 714.259.9969

In a continuing effort to offer the best product possible we reserve the right to change, without notice, specifications or materials that in our opinion will not alter the function of the product.
### LIGHTING FIXTURE CUTS

#### Lakewood Library
Lakewood, WA
BuildingWork
Type: **XL1**

**Lighting Design Intent**

12/8/22

lblanco@blancalighting.com
206 799 4749

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**PROJECT INFORMATION**

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**MOUNTING OPTIONS (CONTINUED)**

**RET - RETRO**

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**IC - INSULATION CONTACT HOUSING**

- **BOX SIZE**
  - **A**
    - **L1**: 15 - 2/16""""  
    - **L2**: 11 - 3/4""""  
    - **W**: 8 - 1/8""""  
    - **H**: 3 - 3/4""""

**RATINGS / CERTIFICATIONS**

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**CEILING THICKNESS**

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In a continuing effort to offer the best product possible we reserve the right to change, without notice, specifications or materials that in our opinion will not alter the function of the product.
EMERGENCY BATTERY
IKF’s ILB Battery Backups are UL Listed LED emergency drivers that allow the same LED fixture to be used for both normal and emergency operation. In the event of a power failure, the ILB switches to the emergency mode and operates the existing fixture for 90 minutes. The unit contains a battery, charger, and converter circuit in a single can. The Constant Power design of the ILB maintains the output wattage to the LED array even as the system voltage diminishes. UL SUH Listed for U.S. and Canada. UL 1310 Certified, Output Class 2 Compliant. Includes single-piece TBTS test switch and charge indicator accessory kit. For use with switched and unswitched fixtures, and includes Two-wire universal AC input. Meets or exceeds all National Electric Code and Life Safety Code Emergency Lighting Requirements. Rated for use in Plenum, Damp Location, Recessed Type IC, and Enclosed and Gasketed Luminaires.

REMOTE TEST SWITCH
The Remote Test Switch may be mounted adjacent to the LED Fixture by others.

REMOTE TEST ACCESS
Remote location wiring provided by others. Follow all Local and National Electric/Building Codes.

NC - NEW CONSTRUCTION
WITH EM BATTERY (REMOTE TEST SWITCH)

IC - INSULATION CONTACT HOUSING
WITH EM BATTERY (REMOTE TEST SWITCH)
SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Rod electrodes.
   2. Active electrodes.
   3. Wire.
   4. Grounding well components.
   5. Mechanical connectors.

B. Related Sections:
   1. Section 032000 - Concrete Reinforcing: Bonding or welding bars when reinforcing steel is used for electrodes.
   2. Section 096900 - Access Flooring: Grounding systems for access flooring.
   3. Section 264100 - Facility Lightning Protection: Grounding of lightning protection system.
   4. Section 337900 - Site Grounding: Site related grounding components for buildings and facilities.

1.2 REFERENCES

A. Institute of Electrical and Electronics Engineers:
   2. IEEE 1100 - Recommended Practice for Powering and Grounding Electronic Equipment.

B. International Electrical Testing Association:

C. National Fire Protection Association:
   1. NFPA 70 - National Electrical Code.

1.3 SYSTEM DESCRIPTION

A.Grounding systems use the following elements as grounding electrodes:
1. Metal underground water pipe.
2. Metal building frame.
3. Concrete-encased electrode.
4. Rod electrode.
5. Plate electrode.

1.4 DESIGN REQUIREMENTS
A. Construct and test grounding systems for access flooring systems on conductive floors accordance with IEEE 1100.

1.5 PERFORMANCE REQUIREMENTS
A. Grounding System Resistance: 25 ohms maximum.

1.6 SUBMITTALS
A. Section 013300 - Submittal Procedures: Requirements for submittals.
B. Product Data: Submit data on grounding electrodes and connections.
C. Test Reports: Indicate overall resistance to ground and resistance of each electrode.
D. Manufacturer's Installation Instructions: Submit for active electrodes.
E. Manufacturer's Certificate: Certify products are NRTL listed.

1.7 CLOSEOUT SUBMITTALS
A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.
B. Project Record Documents: Record actual locations of components and grounding electrodes.

1.8 QUALITY ASSURANCE
A. Provide grounding materials conforming to requirements of NEC, IEEE 142.
B. Perform Work in accordance with NEC and Pierce County requirements.
C. Maintain one copy of each document on site.

1.9 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum 3 years experience.
1.10 PRE-INSTALLATION MEETINGS
   A. Section 013000 - Administrative Requirements: Pre-installation meeting.
   B. Convene minimum one week prior to commencing work of this section.

1.11 DELIVERY, STORAGE, AND HANDLING
   A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
   B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
   C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.
   D. Do not deliver items to project before time of installation. Limit shipment of bulk and multiple-use materials to quantities needed for immediate installation.

1.12 COORDINATION
   A. Section 013000 - Administrative Requirements: Requirements for coordination.
   B. Complete grounding and bonding of building reinforcing steel prior concrete placement.

PART 2 - PRODUCTS

2.1 ROD ELECTRODES
   A. Product Description:
      1. Material: Copper-clad steel or Copper
      2. Diameter: 3/4 inch
      3. Length: 10 feet
   B. Connector: Connector for exothermic welded connection

2.2 WIRE
   A. Material: Stranded copper.
   B. Foundation Electrodes: 4 AWG.
   C. Grounding Electrode Conductor: Copper conductor bare or insulated
   D. Bonding Conductor: Copper conductor bare or insulated
2.3 MECHANICAL CONNECTORS
   A. Furnish NRTL listed mechanical connectors, listed for the use and location.
   B. Description: Bronze connectors, suitable for grounding and bonding applications, in
      configurations required for particular installation.

2.4 EXOTHERMIC CONNECTIONS
   A. Furnish NRTL listed exothermic connectors, listed for the use and location.
   B. Product Description: Exothermic materials, accessories, and tools for preparing and making
      permanent field connections between grounding system components.

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Section 013000 - Administrative Requirements: Verification of existing conditions before
      starting work.
   B. Verify final backfill and compaction has been completed before driving rod electrodes.

3.2 PREPARATION
   A. Remove paint, rust, mill oils, and surface contaminants at connection points.

3.3 EXISTING WORK
   A. Modify existing grounding system to maintain continuity to accommodate renovations.
   B. Extend existing grounding system using materials and methods [compatible with existing
      electrical installations, or] as specified.

3.4 INSTALLATION
   A. Install in accordance with IEEE 142 and 1100
   B. Install at least two rod electrodes. Install additional rod electrodes to achieve specified 25 ohm
      resistance to ground.
   C. Install grounding and bonding conductors concealed from view.
   D. Install 4 AWG bare copper wire in foundation footing
E. Install grounding electrode conductor and connect to reinforcing steel in foundation footing. Electrically bond steel together.

F. Bond together metal siding not attached to grounded structure; bond to ground.

G. Bond together reinforcing steel and metal accessories.

H. Bond together each metallic raceway, pipe, duct and other metal object. Install 2 AWG bare copper bonding conductor.

I. Equipment Grounding Conductor: Install separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

J. Permanently ground underground cold water system and building steel.

K. Permanently ground entire light and power system in accordance with NEC, including service equipment, distribution panels, lighting panelboards, switch and starter enclosures, motor frames, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.

L. Accomplish grounding of electrical system by using insulated grounding conductor installed with feeders and branch circuit conductors in conduits. Size grounding conductors in accordance with NEC. Install from grounding bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes or metal enclosures of service equipment. Ground conduits by means of grounding bushings on terminations at panelboards with installed number 12 conductor to grounding bus.

M. Grounding electrical system using continuous metal raceway system enclosing circuit conductors in accordance with NEC.

N. Permanently attach equipment and grounding conductors prior to energizing equipment.

3.5 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Grounding and Bonding: Perform inspections and tests listed in NETA ATS, Section 7.13.

C. Perform ground resistance testing in accordance with IEEE 142.

D. Perform leakage current tests in accordance with NFPA 99.

E. Perform continuity testing in accordance with IEEE 142.

F. When improper grounding is found on receptacles, check receptacles in entire project and correct. Perform retest.

END OF SECTION 260526
SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Conduit supports.
2. Formed steel channel.
4. Sleeves.
5. Mechanical sleeve seals.
6. Firestopping relating to electrical work.
7. Firestopping accessories.
8. Equipment bases and supports.

B. Related Sections:

1. Section 033000 - Cast-In-Place Concrete: Product requirements for concrete for placement by this section.
2. Section 078400 - Firestopping: Product requirements for firestopping for placement by this section.

1.2 REFERENCES

A. ASTM International:


B. FM Global:


C. National Fire Protection Association:

1. NFPA 70 - National Electrical Code.

D. Underwriters Laboratories Inc.
3. UL 1479 - Fire Tests of Through-Penetration Firestops.
5. UL - Fire Resistance Directory.

E. Intertek Testing Services (Warnock Hersey Listed):
   1. WH - Certification Listings.

1.3 DEFINITIONS
A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.4 SYSTEM DESCRIPTION
A. Firestopping Materials: Comply with requirements of Section 078400.
B. Firestop interruptions to fire rated assemblies, materials, and components.

1.5 PERFORMANCE REQUIREMENTS
A. Firestopping Materials: Comply with requirements of Section 078400.

1.6 SUBMITTALS
A. Section 013300 - Submittal Procedures: Requirements for submittals.
B. Shop Drawings: Indicate system layout with location and detail of trapeze hangers.
C. Product Data:
   1. Hangers and Supports: Submit manufacturers catalog data including load capacity.
   2. Firestopping: Submit data on product characteristics, performance and limitation criteria.
D. Firestopping Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
E. Design Data: Indicate load carrying capacity of trapeze hangers and hangers and supports.
F. Manufacturer's Installation Instructions:
   1. Hangers and Supports: Submit special procedures and assembly of components.
   2. Firestopping: Submit preparation and installation instructions.
G. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

H. Firestopping Engineering Judgments: For conditions not covered by UL or WH listed designs, submit judgments by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting code fire protection requirements.

1.7 QUALITY ASSURANCE

A. Through Penetration Firestopping of Fire Rated Assemblies: UL 1479 or ASTM E814 with 0.10 inch water gage minimum positive pressure differential to achieve fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.

1. Wall Penetrations: Fire F-Ratings as indicated on Drawings, but not less than 1-hour.
2. Floor [and Roof] Penetrations: Fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.

   a. Floor Penetrations Within Wall Cavities: T-Rating is not required.

B. Through Penetration Firestopping of Non-Fire Rated Floor [and Roof] Assemblies: Materials to resist free passage of flame and products of combustion.

2. Penetrating Items: Materials approved by authorities having jurisdiction for penetrating items connecting maximum of two stories.

C. Fire Resistant Joints in Fire Rated Floor, Roof, and Wall Assemblies: ASTM E1966 or UL 2079 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.

D. Fire Resistant Joints Between Floor Slabs and Exterior Walls: ASTM E119 with 0.10 inch water gage minimum positive pressure differential to achieve fire resistant rating as indicated on Drawings for floor assembly.

E. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

F. Perform Work in accordance with NEC and Pierce County requirements.

G. Maintain one copy of each document on site.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

1.9 PRE-INSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Pre-installation meeting.
B. Convene minimum one week prior to commencing work of this section.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

1.11 ENVIRONMENTAL REQUIREMENTS

A. Section 016000 - Product Requirements: Environmental conditions affecting products on site.

B. Do not apply firestopping materials when temperature of substrate material and ambient air is below 60 degrees F.

C. Maintain this minimum temperature before, during, and for minimum 3 days after installation of firestopping materials.

D. Provide ventilation in areas to receive solvent cured materials.

PART 2 - PRODUCTS

2.1 CONDUIT SUPPORTS

A. Furnish materials in accordance with Pierce County Standards.

B. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.

C. Beam Clamps: Malleable Iron, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.

D. Conduit clamps for trapeze hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.

E. Conduit clamps - general purpose: One hole malleable iron for surface mounted conduits.

F. Cable Ties: High strength nylon temperature rated to 185 degrees F. Self locking.

2.2 FORMED STEEL CHANNEL

A. Furnish materials in accordance with Pierce County Standards.
B. Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

2.3 SPRING STEEL CLIPS
A. Furnish materials in accordance with Pierce County Standards.
B. Product Description: Mounting hole and screw closure.

2.4 SLEEVES
A. Furnish materials in accordance with Pierce County Standards.
B. Sleeves Through Non-fire Rated Floors: 18 gage thick galvanized steel.
C. Sleeves Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage thick galvanized steel.
D. Sleeves Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL listed.
E. Stuffing or Fire-stopping Insulation: Glass fiber type, non-combustible.

2.5 MECHANICAL SLEEVE SEALS
A. Furnish materials in accordance with Pierce County Standards.
B. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.6 FIRESTOPPING
A. Firestopping Materials: Comply with requirements of Section 078400.
B. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
   1. Silicone Firestopping Elastomeric Firestopping: [Single] [Multiple] component silicone elastomeric compound and compatible silicone sealant.
   2. Foam Firestopping Compounds: [Single] [Multiple] component foam compound.
   3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
5. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
6. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
7. Firestop Pillows: Formed mineral fiber pillows.

C. Color: As selected from manufacturer's full range of colors

2.7 FIRESTOPPING ACCESSORIES

A. Installation Accessories: Comply with requirements of Section 078400.

B. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

C. General:
   1. Furnish NRTL listed products.
   2. Select products with rating not less than rating of wall or floor being penetrated.

D. Non-Rated Surfaces:
   1. Stamped steel, chrome plated, hinged, split ring escutcheons or floor plates or ceiling plates for covering openings in occupied areas where conduit is exposed.
   2. For exterior wall openings below grade, furnish modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill annular space between conduit and cored opening or water-stop type wall sleeve.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify openings are ready to receive sleeves.

C. Verify openings are ready to receive firestopping.

3.2 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.

B. Remove incompatible materials affecting bond.

C. Install backing or damming materials to arrest liquid material leakage.
D. Obtain permission from Architect before using powder-actuated anchors.
E. Do not drill or cut structural members.

3.3 INSTALLATION - HANGERS AND SUPPORTS

A. Anchors and Fasteners:
   1. Concrete Structural Elements: Provide powder actuated anchors and preset inserts.
   2. Steel Structural Elements: Provide beam clamps, spring steel clips, steel ramset fasteners, and/or welded fasteners.
   3. Concrete Surfaces: Provide self-drilling anchors and/or expansion anchors
   4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts and/or hollow wall fasteners.
   5. Solid Masonry Walls: Provide expansion anchors and/or preset inserts.
   7. Wood Elements: Provide wood screws.

B. Inserts:
   1. Install inserts for placement in concrete forms.
   2. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
   3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
   4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
   5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut [above] [flush with top of] [recessed into and grouted flush with] slab.

C. Install conduit and raceway support and spacing in accordance with NEC.
D. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
E. Install multiple conduit runs on common hangers.
F. Supports:
   1. Fabricate supports from structural steel or formed steel channel. Install hexagon head bolts to present neat appearance with adequate strength and rigidity. Install spring lock washers under nuts.
   2. Install surface mounted cabinets and panelboards with minimum of four anchors.
   3. In wet and damp locations install steel channel supports to stand cabinets and panelboards 1 inch off wall.

3.4 INSTALLATION - FIRESTOPPING

A. Firestopping Materials: Comply with requirements of Section 078400.
B. Non-Rated Surfaces:

1. Seal opening through non-fire rated wall, partition, floor, ceiling, and roof openings as follows:
   a. Install sleeve through opening and extending beyond minimum of 1 inch on both sides of building element.
   b. Size sleeve allowing minimum of 1 inch void between sleeve and building element.
   c. Install type of firestopping material recommended by manufacturer.

2. Install escutcheons, floor plates, or ceiling plates where conduit penetrates non-fire rated surfaces in occupied spaces. Occupied spaces include rooms with finished ceilings and where penetration occurs below finished ceiling.

3. Exterior wall openings below grade: Assemble rubber links of mechanical seal to size of conduit and tighten in place, in accordance with manufacturer's instructions.

4. Interior partitions: Seal pipe penetrations at computer rooms and telecommunication rooms. Apply sealant to both sides of penetration to completely fill annular space between sleeve and conduit.

3.5 INSTALLATION - EQUIPMENT BASES AND SUPPORTS

A. Using templates furnished with equipment, install anchor bolts, and accessories for mounting and anchoring equipment.

3.6 INSTALLATION - SLEEVES

A. Exterior watertight entries: Seal with adjustable interlocking rubber links.

B. Conduit penetrations not required to be watertight: Sleeve and fill with silicon foam.

C. Set sleeves in position in forms. Provide reinforcing around sleeves.

D. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

E. Extend sleeves through floors 1 inch above finished floor level. Caulk sleeves.

F. Where conduit or raceway penetrates floor, ceiling, or wall, close off space between conduit or raceway and adjacent work with stuffing or fire stopping insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

G. Install chrome plated steel or stainless steel escutcheons at finished surfaces.

3.7 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
B. Inspect installed firestopping for compliance with specifications and submitted schedule.

3.8 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean adjacent surfaces of firestopping materials.

3.9 PROTECTION OF FINISHED WORK

A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Protect adjacent surfaces from damage by material installation.

END OF SECTION 260529.00
SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes conduit and tubing, surface raceways, wireways, outlet boxes, pull and junction boxes, and handholes.

B. Related Sections:

1. Section 260503 - Equipment Wiring Connections.
2. Section 260526 - Grounding and Bonding for Electrical Systems.
4. Section 260534 - Floor Boxes for Electrical Systems.
5. Section 260536 - Cable Trays for Electrical Systems.
7. Section 260553 - Identification for Electrical Systems.
8. Section 262716 - Electrical Cabinets and Enclosures.
9. Section 262723 - Indoor Service Poles.
10. Section 262726 - Wiring Devices.
11. Section 270533 - Conduits and Backboxes for Communications Systems.
12. Section 270536 - Cable Trays for Communications Systems.
14. Section 280528.36 - Cable Trays for Electronic Safety and Security.
15. Section 337119 - Electrical Underground Ducts and Manholes.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Raceway:

1. Basis of Measurement: By linear foot
2. Basis of Payment: Includes materials, delivery, handling, and installing.

B. Boxes:

1. Basis of Measurement: By cubic foot
2. Basis of Payment: Includes materials, delivery, handling, and installing.

1.3 REFERENCES

A. American National Standards Institute:

1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
2. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc Coated.
3. ANSI C80.5 - Aluminum Rigid Conduit - (ARC).
B. National Electrical Manufacturers Association:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
3. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
4. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports.
5. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
6. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
7. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.4 SYSTEM DESCRIPTION

A. Raceway and boxes located as indicated on Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.

B. Outdoor Locations, Above Grade: Provide rigid steel conduit. Provide cast metal or nonmetallic outlet, pull, and junction boxes.

C. Wet and Damp Locations: Provide thickwall nonmetallic conduit. Provide cast metal or nonmetallic outlet, junction, and pull boxes. Provide flush mounting outlet box in finished areas.


1.5 DESIGN REQUIREMENTS

A. Minimum Raceway Size: ¾ inch unless otherwise specified.

B. All raceway shall be NRTL listed for its use and location.

C. All raceway shall installed per NEC and manufacturer requirements.

1.6 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit for the following:

1. Flexible metal conduit.
2. Liquidtight flexible metal conduit.
3. Nonmetallic conduit.
4. Flexible nonmetallic conduit.
5. Nonmetallic tubing.
6. Raceway fittings.
7. Conduit bodies.
8. Surface raceway.
9. Wireway.
10. Pull and junction boxes.
11. Handholes.

C. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.7 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents:
   1. Record actual routing of conduits larger than 2 inch.
   2. Record actual locations and mounting heights of outlet, pull, and junction boxes.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Product storage and handling requirements.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

C. Protect PVC conduit from sunlight.

1.9 COORDINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Coordinate installation of outlet boxes for equipment connected under Section 260503.

C. Coordinate mounting heights, orientation and locations of outlets mounted above counters, benches, and backsplashes.
PART 2 - PRODUCTS

2.1 METAL CONDUIT

A. Manufacturers:
   1. Wheatland Tube
   2. Or approved equal

B. Rigid Steel Conduit: ANSI C80.1.

C. Rigid Aluminum Conduit: ANSI C80.5.

D. Intermediate Metal Conduit (IMC): Rigid steel.

E. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

2.2 PVC COATED METAL CONDUIT

A. Manufacturers:
   1. Wheatland Tube
   2. Or approved equal

B. Product Description: NEMA RN 1; rigid steel conduit with external PVC coating, 20 mil thick.

C. Fittings and Conduit Bodies: NEMA FB 1; steel fittings with external PVC coating to match conduit.

2.3 FLEXIBLE METAL CONDUIT

A. Manufacturers:
   1. Wheatland Tube
   2. Or approved equal

B. Product Description: Interlocked steel or aluminum construction.

C. Fittings: NEMA FB 1.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Manufacturers:
   1. Wheatland Tube
   2. Or approved equal

B. Product Description: Interlocked [steel] [aluminum] construction with PVC jacket.

C. Fittings: NEMA FB 1.
2.5 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:
   1. Wheatland Tube
   2. Or approved equal

B. Product Description: ANSI C80.3; galvanized tubing.

C. Fittings and Conduit Bodies: NEMA FB 1; steel and/or malleable iron, compression, set screw, or indenter type.

2.6 NONMETALLIC CONDUIT

A. Manufacturers:
   1. Wheatland Tube
   2. Or approved equal

B. Product Description: NEMA TC 2; Schedule 40 PVC.

C. Fittings and Conduit Bodies: NEMA TC 3.

2.7 NONMETALLIC TUBING

A. Manufacturers:
   1. Wheatland Tube
   2. Or approved equal

B. Product Description: NEMA TC 2.

C. Fittings and Conduit Bodies: NEMA TC 3.

2.8 SURFACE METAL RACEWAY

A. Manufacturers:
   1. Wiremold
   2. Or approved equal

B. Product Description: Sheet metal channel with fitted cover, suitable for use as surface metal raceway.

C. Size: As required by fill.

D. Finish: Gray, Buff, or Stainless steel.

E. Fittings, Boxes, and Extension Rings: Furnish manufacturer's standard accessories; match finish on raceway.
2.9 SURFACE NONMETAL RACEWAY

A. Manufacturers:
   1. Wiremold
   2. Or approved equal

B. Product Description: Plastic or Fiberglass channel with fitted cover, suitable for use as surface raceway.

C. Size: as required

D. Finish: Gray or match wall color

E. Fittings, Boxes, and Extension Rings: Furnish manufacturer's standard accessories, finish to match raceway.

2.10 WIREWAY

A. Manufacturers:
   1. Wiremold
   2. Or approved equal

B. Product Description: General purpose type wireway.

C. Knockouts: Manufacturer's standard

D. Cover: Hinged or Screw

E. Connector: Slip-in or Flanged

F. Fittings: Lay-in type with removable top, bottom, or side; captive screws

G. Finish: Rust inhibiting primer coating with gray enamel finish

2.11 OUTLET BOXES

A. Manufacturers:
   1. Carlon
   2. Or approved equal

B. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
   1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 1/2 inch male fixture studs where required.
   2. Concrete Ceiling Boxes: Concrete type.

C. Nonmetallic Outlet Boxes: NEMA OS 2.

D. Cast Boxes: NEMA FB 1, Type FD, aluminum or cast feralloy. Furnish gasketed cover by box manufacturer.
E. Wall Plates for Finished Areas: As specified in Section 262726.

F. Wall Plates for Unfinished Areas: Furnish gasketed cover.

2.12 PULL AND JUNCTION BOXES

A. Manufacturers:
   1. Hoffman
   2. Or approved equal

B. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

C. Hinged Enclosures: As specified in Section 262716.

D. Surface Mounted Cast Metal Box: NEMA 250, Type 4 flat-flanged, surface mounted junction box:
   1. Material: Galvanized cast iron or Cast aluminum.
   2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

E. Fiberglass Handholes: Die-molded, glass-fiber hand holes:
   1. Cable Entrance: Pre-cut 6 inch x 6 inch cable entrance at center bottom of each side.
   2. Cover: Glass-fiber weatherproof cover with nonskid finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Verify outlet locations and routing and termination locations of raceway prior to rough-in.

3.2 INSTALLATION

A. Ground and bond raceway and boxes in accordance with Section 260526.

B. Fasten raceway and box supports to structure and finishes in accordance with Section 260529.

C. Identify raceway and boxes in accordance with Section 260553.

D. Arrange raceway and boxes to maintain headroom and present neat appearance.

3.3 INSTALLATION - RACEWAY

A. Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system.
B. Arrange raceway supports to prevent misalignment during wiring installation.

C. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

D. Group related raceway; support using conduit rack. Construct rack using steel channel specified in Section 260529 provide space on each for 25 percent additional raceways.

E. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports.

F. Do not attach raceway to ceiling support wires or other piping systems.

G. Construct wireway supports from steel channel specified in Section 260529.

H. Route exposed raceway parallel and perpendicular to walls.

I. Route raceway installed above accessible ceilings parallel and perpendicular to walls.

J. Maintain clearance between raceway and piping for maintenance purposes.

K. Maintain 12 inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F.

L. Cut conduit square using saw or pipe cutter; de-burr cut ends.

M. Bring conduit to shoulder of fittings; fasten securely.

N. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for minimum 20 minutes.

O. Install conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

P. Install no more than equivalent of three 90 degree bends between boxes. Install conduit bodies to make sharp changes in direction, as around beams. Install hydraulic one-shot bender to fabricate or factory elbows for bends in metal conduit larger than 2 inch size.

Q. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.

R. Install fittings to accommodate expansion and deflection where raceway crosses seismic, control and expansion joints.

S. Install suitable pull string or cord in each empty raceway except sleeves and nipples.

T. Install suitable caps to protect installed conduit against entrance of dirt and moisture.

U. Surface Raceway: Install flat-head screws, clips, and straps to fasten raceway channel to surfaces; mount plumb and level. Install insulating bushings and inserts at connections to outlets and corner fittings.
V. Close ends and unused openings in wireway.

3.4 INSTALLATION - BOXES
A. Install wall mounted boxes at elevations to accommodate mounting heights as indicated on Drawings and specified in section for outlet device.
B. Adjust box location up to 10 feet prior to rough-in to accommodate intended purpose.
C. Orient boxes to accommodate wiring devices oriented as specified in Section 262726.
D. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
E. In Accessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
F. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
G. Do not install flush mounting box back-to-back in walls; install with minimum 6 inches separation. Install with minimum 24 inches separation in acoustic rated walls.
H. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
I. Install stamped steel bridges to fasten flush mounting outlet box between studs.
J. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
K. Install adjustable steel channel fasteners for hung ceiling outlet box.
L. Do not fasten boxes to ceiling support wires or other piping systems.
M. Support boxes independently of conduit.
N. Install gang box where more than one device is mounted together. Do not use sectional box.
O. Install gang box with plaster ring for single device outlets.

3.5 INTERFACE WITH OTHER PRODUCTS
A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods in accordance with Section 078400.
B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket.
C. Locate outlet boxes to allow luminaires positioned as indicated on lighting drawings.
D. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
3.6 ADJUSTING
   A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.
   B. Adjust flush-mounting outlets to make front flush with finished wall material.
   C. Install knockout closures in unused openings in boxes.

3.7 CLEANING
   A. Section 017000 - Execution and Closeout Requirements: Final cleaning.
   B. Clean interior of boxes to remove dust, debris, and other material.
   C. Clean exposed surfaces and restore finish.

END OF SECTION 280528.33
SECTION 260533.16 - BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes floor boxes; floor box service fittings; poke-through fittings; and access floor boxes.

B. Related Sections:
   1. Section 078400 - Firestopping: Firestopping for electrical work.
   4. Section 262726 - Wiring Devices: Receptacles for installation in floor boxes.

1.2 REFERENCES

A. National Electrical Manufacturers Association:
   1. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit catalog data for floor boxes service fittings.

C. Samples: Submit two of each service fitting illustrating size, material, configuration, and finish.

1.4 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of each floor box and poke-through fitting.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years [documented] experience.
1.6 EXTRA MATERIALS
   A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.
   B. Furnish two protective rings and split nozzles.
   C. Furnish two carpet rings.

PART 2 - PRODUCTS

2.1 FLOOR BOXES
   A. Manufacturers:
      1. Leviton
      2. Or approved equal
   B. Floor Boxes: NEMA OS 1, 1-1/2 inches deep.
   C. Adjustability: Fully adjustable
   D. Material: Formed steel
   E. Shape: Round, Rectangular, or Octagonal.

2.2 FLUSH-COVER-TYPE CONVENIENCE RECEPTACLE SERVICE FITTING
   A. Manufacturers:
      1. Steel City
      2. Or approved equal
   B. Material: Aluminum
   C. Configuration: Duplex opening.

2.3 FLUSH-COVER-TYPE COMMUNICATION OUTLET
   A. Manufacturers:
      1. CommScope
      2. Or approved equal
   B. Material: Aluminum
   C. Configuration: 2-1/8 x 1 inch combination threaded opening.

2.4 FLUSH-COVER-TYPE COMBINATION FITTING
   A. Manufacturers:
1. Hoffman
2. Or approved equal

B. Material: Aluminum

C. Configuration: Duplex opening with 2-1/8 x 1 inch combination threaded opening.

2.5 FLUSH-COVER-SERVICE FITTING ACCESSORIES

A. Manufacturers:
   1. Legrand
   2. Or approved equal

B. Protective Ring: Brass or Aluminum finish.

C. Split Nozzle: Brass or Aluminum finish.

D. Carpet Ring: Brass

2.6 POKE-THROUGH FITTINGS

A. Manufacturers:
   1. Legrand
   2. Or approved equal

B. Product Description: Assembly comprising service fitting, poke-through component, fire stops and smoke barriers, and junction box for conduit termination

C. Fire Rating: as required

D. Service Fitting Type: Pedestal or Flush

E. Housing: Satin aluminum

F. Device Plate: Stainless steel

G. Configuration: As required

2.7 ACCESS FLOOR BOX

A. Manufacturers:
   1. Hubbel
   2. Or approved equal

B. Basis of design: Hubbel 4-Gang AFB series 5.5" deep rectangular box w/ 4-gang AFB series cover assembly, black powder coated paint finish and carpet flange.

C. Convenience Receptacle: Two
D. Communications Receptacle: Two

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.
B. Verify locations of floor boxes and outlets prior to rough-in.
C. Verify openings in access floor are in proper locations.

3.2 EXISTING WORK

A. Disconnect abandoned service fitting devices and remove service fittings. Install blank cover for abandoned floor boxes not removed.
B. Maintain access to existing floor boxes remaining active and requiring access. Modify installation or provide access panel.
C. Extend existing service fitting installations using materials and methods as specified.
D. Clean and repair existing service fittings to remain or to be reinstalled.

3.3 INSTALLATION

A. Boxes and fittings are indicated on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet to accommodate intended purpose.
B. Floor Box Requirements: Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.
C. Set floor boxes level.
D. Install boxes and fittings to preserve fire resistance rating of slabs and other elements, using materials and methods specified in Section 078400 and 260529.
E. Install protective rings or split nozzle on active flush cover service fittings.
F. Coordinate installation of access floor boxes with client.

3.4 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.
B. Adjust floor box flush with finish flooring material.
3.5 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Final cleaning.

B. Clean interior of boxes to remove dust, debris, and other material.

END OF SECTION 260533.16
SECTION 260536 - CABLE TRAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cable tray.

B. Related Sections:
   1. Section 260526 - Grounding and Bonding for Electrical Systems.
   2. Section 260529 - Hangers and Supports for Electrical Systems

1.2 REFERENCES

A. ASTM International:
   2. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. National Electrical Manufacturers Association:
   1. NEMA FG 1 - Nonmetallic Cable Tray Systems.
   2. NEMA VE 1 - Metal Cable Tray Systems.
   3. NEMA VE 2 - Metal Cable Tray Installation Guidelines.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate tray type, dimensions, support points, and finishes.

C. Product Data: Submit fittings and accessories.

D. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.4 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual routing of cable tray and locations of supports.
1.5 QUALIFICATIONS
   A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience

1.6 PRE-INSTALLATION MEETINGS
   A. Section 013000 - Administrative Requirements: Pre-installation meeting.
   B. Convene minimum one week prior to commencing work of this section.

PART 2 - PRODUCTS

2.1 METAL LADDER-TYPE CABLE TRAY
   A. Manufacturers:
      1. B-Line
      2. Or Approved Equal
   B. Product Description: NEMA VE 1, ladder type tray.
   C. Material: Steel or Aluminum.
   D. Finish: Galvanized to ASTM A123/A123M; galvanize after fabrication or ASTM A653/A653M, G01 mill-galvanized before fabrication or Painted with gray epoxy
   E. Inside Width: 12 inches
   F. Inside Depth: 4 inches
   G. Straight Section Rung Spacing: 9 inches on center.
   H. Inside Radius of Fittings: 24 inches
   I. Furnish manufacturer's standard clamps, hangers, brackets, splice plates, reducer plates, blind ends, barrier strips, connectors, and grounding straps.
   J. Covers: No cover.

2.2 WARNING SIGNS
   A. Engraved Nameplates: ½” black letters on yellow laminated plastic nameplate, engraved with: WARNING! DO NOT USE CABLE TRAY AS WALKWAY, LADDER, OR SUPPORT. USE ONLY AS MECHANICAL SUPPORT FOR CABLES AND TUBING!
PART 3 - EXECUTION

3.1 INSTALLATION

A. Install metal cable tray in accordance with NEMA VE 2.

B. Install fiberglass cable tray in accordance with NEMA FG 1.

C. Support trays and fasten to structure and finishes in accordance with Section 260529. Install supports at each connection point, at end of each run, and at other points to maintain spacing between supports of 3 ft maximum.

D. Install expansion connectors where recommended by manufacturer

E. Install firestopping in accordance with Section 078400 and 260529 to sustain ratings when passing cable tray through fire-rated elements.

F. Ground and bond metal cable tray in accordance with Section 260526.
   1. Provide continuity between tray components.
   2. Use anti-oxidant compound to prepare aluminum contact surfaces before assembly.
   3. Install 2AWG bare copper equipment grounding conductor through entire length of tray; bond to each component.
   4. Make connections to tray using mechanical, compression or exothermic connectors.

G. Install warning signs at 20 feet centers along cable tray, located to be visible.

END OF SECTION 260536
SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Nameplates.
   2. Labels.
   3. Wire markers.
   5. Stencils.
   7. Lockout Devices.

B. Related Sections:
   1. Section 099000 - Painting and Coating: Execution requirements for painting specified by this section.
   2. Section 270553 - Identification for Communications Systems.

1.2 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Product Data:
   1. Submit manufacturer's catalog literature for each product required.
   2. Submit electrical identification schedule including list of wording, symbols, letter size, color coding, tag number, location, and function.

C. Samples:
   1. Submit two tags, actual size, of each type.
   2. Submit two labels, actual size, of each type.

D. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.

1.3 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of tagged devices; include tag numbers.
1.4 QUALITY ASSURANCE
A. Perform Work in accordance with NEC, NESC, and Pierce County requirements.

1.5 DELIVERY, STORAGE, AND HANDLING
A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
B. Accept identification products on site in original containers. Inspect for damage.
C. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.
D. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.6 ENVIRONMENTAL REQUIREMENTS
A. Section 016000 - Product Requirements: Environmental conditions affecting products on site.
B. Install labels and nameplates only when ambient temperature and humidity conditions for adhesive are within range recommended by manufacturer.

1.7 EXTRA MATERIALS
A. Section 017000 - Execution and Closeout Requirements: Requirements for extra materials.
B. Furnish two containers of spray-on adhesive

PART 2 - PRODUCTS

2.1 NAMEPLATES
A. Furnish materials in accordance with NEC, NESC, and Pierce County requirements.
B. Product Description: Laminated three-layer plastic.
   1. Electrical Equipment - with engraved black letters on light contrasting background color.
   2. Fire Alarm and Security Equipment - NEC, NFPA, and Pierce County requirements.
C. Letter Size:
   1. 1/8 inch high letters for identifying individual equipment and loads.
   2. ¼ inch high letters for identifying grouped equipment and loads.
   3. ½ inch high letters for identifying Fire Alarm and Security equipment and loads.
D. Minimum nameplate thickness: 1/8 inch.
2.2 LABELS
   A. Furnish materials in accordance with NEC, NESC, and Pierce County requirements.
   B. Labels: Embossed adhesive tape, with 3/16 inch white letters on black background.

2.3 WIRE MARKERS
   A. Furnish materials in accordance with NEC, NESC, and Pierce County requirements.
   B. Description: Cloth tape, split sleeve, or tubing type wire markers.
   C. Legend:
      1. Power and Lighting Circuits: Branch circuit or feeder number
      2. Control Circuits: Control wire number as indicated on shop drawings

2.4 CONDUIT AND RACEWAY MARKERS
   A. Furnish materials in accordance with NEC, NFPA, NESC, and Pierce County requirements.
   B. Description: Nameplate fastened with straps, Nameplate fastened with adhesive, Labels fastened with adhesive, or Stencils.
   C. Color: Black lettering on white background.
   D. All Conduits, raceway, and external overall cable jackets for Fire Alarm systems shall be red.
   E. Legend:
      1. Medium Voltage System: HIGH VOLTAGE.
      2. 480 Volt System: 480 VOLTS.
      3. 208 Volt System: 208 VOLTS.

2.5 STENCILS
   A. Furnish materials in accordance with NEC, NESC, and Pierce County requirements.
   B. Stencils: With clean cut symbols and letters of following size:
      1. Up to 2 inches Outside Diameter of Raceway: 1/2 inch high letters.
      2. 2-1/2 to 6 inches Outside Diameter of Raceway: 1 inch high letters.
   C. Stencil Paint: As specified in Section 099000, semi-gloss enamel, colors conforming to the following:
      1. Black lettering on white background.
2.6 LOCKOUT DEVICES

A. Lockout Hasps:

1. Manufacturers:
   a. Master Lock
   b. Or Approved Equal

2. Anodized aluminum or [Reinforced nylon hasp with erasable label surface; size minimum 7-1/4 x 3 inches.

PART 3 - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces in accordance with Section 099000 for stencil painting.

3.2 INSTALLATION

A. Install identifying devices after completion of painting.

B. Nameplate Installation:

1. Install nameplate parallel to equipment lines.
2. Install nameplate for each electrical distribution and control equipment enclosure with corrosive-resistant mechanical fasteners, or adhesive.
3. Install nameplates for each control panel and major control components located outside panel with corrosive-resistant mechanical fasteners, or adhesive.
4. Secure nameplate to equipment front using screws, rivets, or adhesive.
5. Secure nameplate to inside surface of door on recessed panelboard in finished locations.
6. Install nameplates for the following:
   a. Switchboards.
   b. Panelboards.
   c. Transformers.
   d. Service Disconnects.

C. Label Installation:

1. Install label parallel to equipment lines.
2. Install label for identification of individual control device stations, receptacles, dedicated receptacles, data outlets, lights, disconnects, disconnecting means, and all permanently installed equipment.
3. Install labels for permanent adhesion and seal with clear lacquer.
D. Wire Marker Installation:
   1. Install wire marker for each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection.
   2. Mark data cabling at each end. Install additional marking at accessible locations along the cable run.
   3. Install labels at data outlets identifying patch panel and port designation. Coordinate labeling scheme with owner.

E. Conduit and Raceway Marker Installation:
   1. Install conduit and raceway marker for each conduit or raceway longer than 20 feet.
   2. Marker Spacing: 20 feet on center.
   3. Raceway Painting: Identify conduit using field painting in accordance with this section, with NEC, NESC, Pierce County requirements, and with Section 099000
      a. For Fire Alarm conduits, the entirely of the conduit shall be red.

F. Stencil Installation:
   1. Apply stencil painting in accordance with Section 099000.

END OF SECTION 260553
SECTION 260573 - POWER SYSTEM STUDIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes short circuit and protective device coordination study encompassing portions of electrical distribution system from normal power source or sources up to and including breakers in service entrance switchboard, fuses in service entrance switchboard, main breaker in sub-distribution panels, fuses in sub-distribution panels and main breaker in each panelboard.

B. Related Sections:
   2. Section 220513 - Common Motor Requirements for Plumbing Equipment.
   3. Section 230513 - Common Motor Requirements for HVAC Equipment.
   4. Section 260513 - Medium-Voltage Cables.
   5. Section 260519 - Low-Voltage Electrical Power Conductors and Cables.
   6. Section 262200 - Low-Voltage Transformers.
   7. Section 262413 - Switchboards.
   8. Section 262416 - Panelboards.
   9. Section 262600 - Power Distribution Units.
  10. Section 262813 - Fuses.
  11. Section 262819 - Enclosed Switches.
  12. Section 262823 - Enclosed Circuit Breakers.
  13. Section 262826 - Enclosed Transfer Switches.
  15. Section 262916 - Enclosed Contactors.
  16. Section 262923 - Variable-Frequency Motor Controllers.

1.2 REFERENCES

A. Institute of Electrical and Electronics Engineers:
   1. IEEE 242 - Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (Buff Book).

B. National Fire Protection Association:
   1. NFPA 70 - National Electrical Code.

1.3 DESIGN REQUIREMENTS

A. Complete Short Circuit and Protective Device Coordination Study to meet requirements of NFPA 70.
B. Report Preparation:

1. Prepare study prior to ordering distribution equipment to verify equipment ratings required.
2. Perform study with aid of computer software program.
3. Obtain actual settings for equipment incorporated into Work.
4. Calculate short circuit interrupting and, when applicable, momentary duties for assumed 3-phase bolted fault short circuit current and phase to ground fault short circuit current at each of the following:
   a. Utility supply bus.
   b. Medium voltage air interrupter switchgear.
   c. Medium voltage circuit breaker switchgear.
   d. Secondary unit substations.
   e. Automatic transfer switch.
   g. Engine generator.
   h. Medium voltage motor controllers.
   i. Low-voltage switchgear.
   j. Switchboards.
   k. Motor control centers.
   l. Distribution panelboards.
   m. Branch circuit panelboards.
   n. Busway.
   o. Each other significant equipment location throughout system.

C. Report Contents:

1. Include the following:
   a. Calculation methods and assumptions.
   b. Base per unit value selected.
   c. One-line diagram.
   d. Source impedance data including power company system available power and characteristics.
   e. Typical calculations.
      1) Fault impedance.
      2) X to R ratios.
      3) Asymmetry factors.
      4) Motor fault contribution.
      5) Short circuit kVA.
      6) Symmetrical and asymmetrical phase-to-phase and phase-to-ground fault currents.
      7) Tabulations of calculation quantities and results.
   f. One-line diagram revised by adding actual instantaneous short circuits available.
   g. State conclusions and recommendations.

2. Prepare time-current device coordination curves graphically indicating coordination proposed for system, centered on conventional, full-size, log-log forms.
3. Prepare with each time-curve sheet complete title and one-line diagram with legend identifying specific portion of system covered by that particular curve sheet.

4. Prepare detailed description of each protective device identifying its type, function, manufacturer, and time-current characteristics. Tabulate recommended device tap, time dial, pickup, instantaneous, and time delay settings.

5. Plot device characteristic curves at point reflecting maximum symmetrical fault current to which device is exposed. Include on curve sheets the following:

   a. Power company relay characteristics.
   b. Power company fuse characteristics.
   c. Medium voltage equipment protective relay characteristics.
   d. Medium voltage equipment protective fuse characteristics.
   e. Low voltage equipment circuit breaker trip device characteristics.
   f. Low voltage equipment fuse characteristics.
   g. Cable damage point characteristics.
   h. Pertinent transformer characteristics including:
      1) Transformer full load current.
      2) Transformer magnetizing inrush.
      3) ANSI transformer withstand parameters.
      4) Significant symmetrical fault current.
   i. Pertinent motor characteristics.
   j. Generator characteristics including:
      1) Phase and ground coordination of generator protective devices.
      2) Decrement curve and damage curve.
      3) Operating characteristic of protective devices.
      4) Actual impedance value.
      5) Time constants.
      6) Current boost data.
      7) Do not use typical values for generator.
   k. Transfer switch characteristics.
   l. Other system load protective device characteristics.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Qualifications Data: Submit the following for review prior to starting study.
   1. Submit qualifications and background of firm.
   2. Submit qualifications of Professional Engineer performing study.

C. Software: Submit for review information on software proposed to be used in performing study.

D. Product Data: Submit the following:
   1. Report: Summarize results of study in report format including the following:
a. Descriptions, purpose, basis, and scope of study.
b. Tabulations of circuit breaker, fuse and other protective device ratings versus calculated short-circuit duties, and commentary regarding same.
c. Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip settings, fuse selection, and commentary regarding same.
d. Fault current calculations including definition of terms and guide for interpretation of computer printout.

E. Submit copies of final report signed by professional engineer. Make additions or changes required by review comments.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with NEC requirements.
B. Maintain one copy of document on site.
C. Use commercially available software, designed specifically for short circuit and protective device coordination studies with minimum of 3 years documented availability.
D. Perform study in accordance with IEEE 242

1.6 QUALIFICATIONS

A. Study Preparer: Company specializing in performing work of this section with minimum 3 years experience and having completed 3 projects of similar size and complexity within the past 3 years.
B. Perform study under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Washington State with minimum of five years experience in power system analysis.
C. Demonstrate company performing study has capability and experience to provide assistance during system start up.

1.7 SEQUENCING

A. Section 011000 - Summary: Requirements for sequencing.
B. Complete study within 4 weeks after substantial completion.
C. Allow 2 weeks for review of completed study by engineer.

1.8 SCHEDULING

A. Schedule work to expedite collection of data to ensure completion of study for final approval of distribution equipment shop drawings prior to release of equipment for manufacturing.
1.9 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate work with local power company.

PART 2 - PRODUCTS

2.1 Not used.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Provide assistance to electrical distribution system equipment manufacturer during start up of electrical system and equipment.

C. Select each primary protective device for delta-wye connected transformer so device's characteristic or operating band is within transformer characteristics, including point equal to 58 percent of ANSI withstand point to provide secondary line-to-ground fault protection.

D. Separate transformer primary protective device characteristic curves from associated secondary device characteristics by 16 percent current margin to provide proper coordination and protection in event of secondary line-to-line faults.

E. Separate medium-voltage relay characteristic curves from curves for other devices by at least 0.4 second time margin.

3.2 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Requirements for starting and adjusting.

B. Perform field adjustments of protective devices and modifications to equipment to place equipment in final operating condition. Adjust settings in accordance with approved short circuit and protective device coordination study.

END OF SECTION 260573
SECTION 260583 - WIRING CONNECTIONS

PART 1 - GENERAL

1.1 SUMMARY
   A. Section includes electrical connections to equipment.
   B. Related Sections:
      1. Section 260519 - Low-Voltage Electrical Power Conductors and Cables.
      2. Section 260533 - Raceway and Boxes for Electrical Systems.

1.2 REFERENCES
   A. National Electrical Manufacturers Association:
      1. NEMA WD 1 - General Requirements for Wiring Devices.
      2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.3 SUBMITTALS
   A. Section 013300 - Submittal Procedures: Submittal procedures.
   B. Product Data: Submit wiring device manufacturer's catalog information showing dimensions, configurations, and construction.
   C. Manufacturer's installation instructions.

1.4 CLOSEOUT SUBMITTALS
   A. Section 017000 - Execution and Closeout Requirements: Submittal procedures.
   B. Project Record Documents: Record actual locations, sizes, and configurations of equipment connections.

1.5 COORDINATION
   A. Section 013000 - Administrative Requirements: Coordination and project conditions.
   B. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
   C. Determine connection locations and requirements.
D. Sequence rough-in of electrical connections to coordinate with installation of equipment.
E. Sequence electrical connections to coordinate with start-up of equipment.

PART 2 - PRODUCTS

2.1 CORD AND PLUGS

A. Manufacturers:
   1. Leviton
   2. Or Approved Equal.
B. Attachment Plug Construction: Conform to NEMA WD 1.
C. Configuration: NEMA WD 6; match receptacle configuration at outlet furnished for equipment.
D. Cord Construction: Type SO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
E. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.
B. Verify equipment is ready for electrical connection, for wiring, and to be energized.

3.2 INSTALLATION

A. Make electrical connections.
B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit withwatertight connectors in damp or wet locations.
C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
D. Install receptacle outlet to accommodate connection with attachment plug.
E. Install cord and cap for field-supplied attachment plug.
F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

H. Install terminal block jumpers to complete equipment wiring requirements.

I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

J. Coolers and Freezers: Cut and seal conduit openings in freezer and cooler walls, floor, and ceilings.

3.3 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Cooperate with utilization equipment installers and field service personnel during checkout and starting of equipment to allow testing and balancing and other startup operations. Provide personnel to operate electrical system and checkout wiring connection components and configurations.

END OF SECTION 260583
SECTION 260919 - ENCLOSED CONTACTORS

PART 1 - GENERAL

1.1 SUMMARY
   A. Section includes enclosed contactors for lighting and general purposes.
   B. Related Sections:
      1. Section 262813 - Fuses.

1.2 REFERENCES
   A. National Electrical Manufacturers Association:
      1. NEMA FU 1 - Low Voltage Cartridge Fuses.
      2. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.
      3. NEMA ICS 5 - Industrial Control and Systems: Control Circuit and Pilot Devices.
      4. NEMA ICS 6 - Industrial Control and Systems: Enclosures.
      5. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
   B. International Electrical Testing Association:
   C. Underwriters Laboratories Inc.:
      1. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures.

1.3 SUBMITTALS
   A. Section 013300 - Submittal Procedures: Submittal procedures.
   B. Product Data: Submit dimensions, size, voltage ratings and current ratings.

1.4 CLOSEOUT SUBMITTALS
   A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.
   B. Project Record Documents: Record actual locations and ratings of enclosed contactors.
C. Operation and Maintenance Data: Submit instructions for replacing and maintaining coil and contacts.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

PART 2 - PRODUCTS

2.1 GENERAL PURPOSE CONTACTORS and LIGHTING CONTACTORS

A. Manufacturers:

1. Eaton
2. Or approved Equal.

B. Product Description: NEMA ICS 2, AC general purpose magnetic contactor.

C. Coil operating voltage: 120, 208, 240, 277, or 480 volts, 60 Hertz.

D. Poles: To match circuit configuration and control function.

E. Product Features:

1. Cover Mounted Pilot Devices: NEMA ICS 5, standard-duty type with Form Z contacts,
2. Pushbutton: ON/OFF function, with covered, lockable configuration.
3. Selector Switch: ON/OFF/AUTOMATIC function, with rotary action.
4. Indicating Light: GREEN lens, transformer or resistor type, with incandescent or led lamp.
5. Auxiliary Contacts: One, normally open, in addition to seal-in contact.
6. Relays: NEMA ICS 2

F. Combination Contactors: Combine contactors with thermal magnetic circuit breaker conforming to UL 489, with integral thermal and instantaneous magnetic trip in each pole.

G. Enclosure: NEMA ICS 6, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray enamel, aluminum, or gray plastic.

1. Interior Dry Locations: Type 1.
2. Exterior Locations: Type 3R

PART 3 - EXECUTION

3.1 EXISTING WORK

A. Disconnect abandoned enclosed contactors and remove abandoned enclosed contactors.
B. Maintain access to existing enclosed contactors and other installations remaining active and requiring access. Modify installation or provide access panel.

C. Clean and repair existing enclosed contactors to remain or to be reinstalled.

3.2 INSTALLATION

A. Install enclosed contactors in accordance with NECA "Standard of Installation."

B. Install enclosed contactors plumb. Provide supports in accordance with Section 260529.

C. Height: 5 ft to operating handle.

D. Install fuses for fusible switches. Refer to Section 262813 for product requirements.

E. Install engraved plastic nameplates. Refer to Section 260553 for product requirements and location.

3.3 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.16.1.

END OF SECTION 260919
SECTION 262200 - LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Two-winding transformers.
   2. Shielded transformers.
   3. Autotransformers.

B. Related Requirements:
   1. Section 033000 - Cast-In-Place Concrete: Housekeeping pads.
   2. Section 260526 - Grounding and Bonding for Electrical Systems.
   4. Section 260533 - Raceway and Boxes for Electrical Systems.
   5. Section 260553 - Identification for Electrical Systems.

1.2 REFERENCE STANDARDS

A. National Electrical Manufacturers Association:
   1. NEMA ST 1 - Specialty Transformers (Except General Purpose Type).
   2. NEMA ST 20 - Dry Type Transformers for General Applications.

B. International Electrical Testing Association:

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit outline and support point dimensions of enclosures and accessories, unit weight, voltage, kVA, and impedance ratings and characteristics, tap configurations, insulation system type, and rated temperature rise.

C. Test and Evaluation Reports: Indicate loss data, efficiency at 25, 50, 75 and 100 percent rated load, and sound level.

D. Source Quality Control Submittals: Indicate results of factory tests and inspections.

E. Field Quality Control Submittals: Indicate results of Contractor furnished tests and inspections.
1.4 CLOSEOUT SUBMITTALS
   A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.
   B. Record Documentation: Record actual locations of transformers.

1.5 QUALIFICATIONS
   A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

1.6 DELIVERY, STORAGE, AND HANDLING
   A. Section 016000 - Product Requirements: Product storage and handling requirements.
   B. Store in clean, dry space. Maintain factory wrapping or provide additional canvas or plastic cover to protect units from dirt, water, construction debris, and traffic.
   C. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided. Handle carefully to avoid damage to transformer internal components, enclosure, and finish.

PART 2 - PRODUCTS

2.1 TWO-WINDING TRANSFORMERS
   A. Manufacturers:
      1. Eaton
      2. Or approved Equal
   B. Description: NEMA ST 20, factory-assembled, air-cooled, dry type transformers. Modular fabricator required to specify voltage and KVA ratings.
   C. Materials:
      1. Ground core and coil assembly to enclosure by means of visible flexible copper grounding strap.
      2. Coil Conductors: Continuous copper windings with terminations brazed or welded.
      3. Enclosure: NEMA ST 20, Type 1, or Type 3R. Furnish lifting eyes or brackets.
   D. Fabrication:
      1. Isolate core and coil from enclosure using vibration-absorbing mounts.
      2. Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise.
2.2 AUTOTRANSFORMERS
A. Manufacturers:
   1. Eaton
   2. Or Approved Equal
B. Description: NEMA ST 20, factory-assembled, air-cooled, dry type autotransformers. Ratings and voltage to be determined by modular fabricator.

2.3 BUCK-AND-BOOST TRANSFORMERS
A. Manufacturers:
   1. Eaton
   2. Or Approved Equal
B. Description: NEMA ST 1, factory-assembled, air-cooled, dry type autotransformers. Ratings and voltage to be determined by modular fabricator.

2.4 SOURCE QUALITY CONTROL
A. Section 014000 - Quality Requirements: Testing, inspection and analysis requirements.
B. Production test each unit according to NEMA ST20.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
B. Verify mounting supports are properly sized and located including concealed bracing in walls.

3.2 PREPARATION
A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

3.3 INSTALLATION
A. Set transformer plumb and level.
B. Use flexible conduit, in accordance with Section 260533, 2 feet minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.
C. Support transformers in accordance with Section 260529.
1. Mount wall-mounted transformers using integral flanges or accessory brackets furnished by manufacturer.
2. Mount floor-mounted transformers on vibration isolating pads suitable for isolating transformer noise from building structure.
3. Mount trapeze-mounted transformers as indicated on Drawings.

D. Provide seismic restraints.

E. Install grounding and bonding in accordance with Section 260526.

3.4 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.2.1.

3.5 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Measure primary and secondary voltages and make appropriate tap adjustments.

3.6 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean existing transformers to remain or to be reinstalled.

END OF SECTION 262200
SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Distribution and branch circuit panelboards.
   2. Electronic grade branch circuit panelboards.
   3. Load centers.

B. Related Requirements:
   1. Section 260526 - Grounding and Bonding for Electrical Systems.
   2. Section 260553 - Identification for Electrical Systems.
   3. Section 262813 - Fuses.

1.2 REFERENCE STANDARDS

A. Institute of Electrical and Electronics Engineers:
   1. IEEE C62.41 - Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.

B. National Electrical Manufacturers Association:
   1. NEMA FU 1 - Low Voltage Cartridge Fuses.
   2. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.
   3. NEMA ICS 5 - Industrial Control and Systems: Control Circuit and Pilot Devices.
   4. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
   5. NEMA PB 1 - Panelboards.
   6. NEMA PB 1.1 - General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.

C. International Electrical Testing Association:

D. National Fire Protection Association:
   1. NFPA 70 - National Electrical Code.

E. UL:
1. UL 50 - Cabinets and Boxes
2. UL 67 - Safety for Panelboards.
4. UL 1283 - Electromagnetic Interference Filters.
5. UL 1449 - Transient Voltage Surge Suppressors.
6. UL 1699 - Arc-Fault Circuit Interrupters.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.
B. Product Data: Submit catalog data showing specified features of standard products.
C. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker, and fusible switch arrangement and sizes.
D. Source Quality control submittals: Indicate results of factory tests and inspections.
E. Field Quality Control Submittals: Indicate results of Contractor furnished tests and inspections.

1.4 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.
B. Project Record Documents: Record actual locations of panelboards and record actual circuiting arrangements.
C. Operation and Maintenance Data: Submit spare parts listing, source and current prices of replacement parts and supplies, and recommended maintenance procedures and intervals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance products.
B. Extra Stock Materials:
   1. Furnish two of each panelboard key. Panelboards keyed alike to Owner's current keying system.

1.6 QUALITY ASSURANCE

A. Qualifications
   1. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' experience.
PART 2 - PRODUCTS

2.1 DISTRIBUTION PANELBOARDS

A. Manufacturers:
   1. Square D
   2. Or Approved Equal

B. Description: NEMA PB 1, circuit breaker type, or fusible switch type panelboard.

C. Operation:
   1. Minimum integrated short circuit rating: 10,000A rms symmetrical for all panelboards, unless calculated greater by Modular Fabricator

D. Materials
   1. Panelboard Bus: Copper, or Aluminum, current carrying components, ratings as indicated on Drawings. Furnish copper ground bus in each panelboard.
   2. Fusible Switch Assemblies: NEMA KS 1, quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle. Furnish interlock to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse clips: Designed to accommodate NEMA FU 1, Class R fuses.
   3. Molded Case Circuit Breakers: UL 489, circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Furnish circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.
   4. Molded Case Circuit Breakers with Current Limiters: UL 489, circuit breakers with replaceable current limiting elements, in addition to integral thermal and instantaneous magnetic trip in each pole.
   5. Current Limiting Molded Case Circuit Breakers: UL 489, circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical A, let-through current and energy level less than permitted for same size NEMA FU 1, Class RK-5 fuse.
   6. Circuit Breaker Accessories: Trip units and auxiliary switches as indicated by Modular Fabricator Drawings.
   8. Enclosure: NEMA PB 1, Type 1 cabinet box.
   9. Cabinet Front: Surface door-in-door type, fastened with concealed trim clamps

E. Finishes:
   1. Manufacturer's standard gray

2.2 BRANCH CIRCUIT PANELBOARDS

A. Manufacturers:
1. Square D
2. Or Approved Equal

B. Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.

C. Materials:
   1. Panelboard Bus: Copper, or Aluminum, current carrying components, ratings as indicated on Drawings. Furnish copper ground bus in each panelboard.
   2. Neutral may be derated by 70% if Modular Fabricator calculations indicate it is allowed by NEC.
   3. Minimum Integrated Short Circuit Rating: 10,000 A
   4. Molded Case Circuit Breakers: UL 489, bolt-on or plug-on type thermal magnetic trip circuit breakers, with common trip handle for all poles, listed as Type SWD for lighting circuits, Type HACR for air conditioning equipment circuits, Class A ground fault interrupter circuit breakers as indicated on Drawings. Provide UL class 760 arc-fault interrupter circuit breakers as indicated on Drawings. Do not use tandem circuit breakers.
   5. Current Limiting Molded Case Circuit Breakers: UL 489, circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical A, let-through current and energy level less than permitted for same size NEMA FU 1, Class RK-5 fuse.
   6. Enclosure: NEMA PB 1, Type 1

D. Cabinet Front: Flush or Surface cabinet front with concealed trim clamps, concealed hinge, metal directory frame, and flush lock keyed alike. Finishes:
   1. Finish in manufacturer's standard gray enamel.

2.3 SOURCE QUALITY CONTROL

A. Section 014000 - Quality Requirements: Testing, inspection, and analysis requirements.

B. Independently test integral surge suppressers with category C3 high exposure waveform (20 kV-1.2/50us, 10kA-8/20 us) per IEEE C62.41.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards according to NEMA PB 1.1.

B. Install panelboards level and plumb.

C. Install recessed panelboards flush with wall finishes.

D. Height: 6 feet to top of panelboard, install panelboards taller than 6 feet with bottom no more than 4 inches above floor.
E. Install filler plates for unused spaces in panelboards.

F. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes to balance phase loads. Identify each circuit as to its clear, evident and specific purpose of use.

G. Install engraved plastic nameplates according to Section 260553.

H. Install spare conduits out of each recessed panelboard to accessible location above ceiling. Minimum spare conduits: two empty 1 inch. Identify each as spare.

I. Ground and bond panelboard enclosure according to Section 260526. Connect equipment ground bars of panels according to NFPA 70.

3.2 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

B. Inspect and test according to NETA ATS, except Section 4.

C. Perform circuit breaker inspections and tests listed in NETA ATS, Section 7.6.

D. Perform switch inspections and tests listed in NETA ATS, Section 7.5.

E. Perform controller inspections and tests listed in NETA ATS, Section 7.16.1.

3.3 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Requirements for starting and adjusting.

B. Measure steady state load currents at each panelboard feeder; rearrange circuits in panelboard to balance phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

3.4 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean existing panelboards to remain or to be reinstalled.

END OF SECTION 262416
SECTION 262716 - ELECTRICAL CABINETS AND ENCLOSURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Hinged cover enclosures.
   2. Cabinets.
   3. Terminal blocks.
   4. Accessories.

B. Related Requirements:
   1. Section 260526 - Grounding and Bonding for Electrical Systems.
   2. Section 260529 - Hangers and Supports for Electrical Systems.
   4. Section 270533 - Conduits and Backboxes for Communications Systems.
   5. Section 280528.33 - Conduits and Backboxes for Electronic Safety and Security.

1.2 REFERENCE STANDARDS

A. National Electrical Manufacturers Association:
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
   2. NEMA ICS 4 - Industrial Control and Systems: Terminal Blocks.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit manufacturer's standard data for enclosures, cabinets, and terminal blocks.

C. Manufacturer's Instructions: Submit application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

D. Qualification Statements:
   1. Submit manufacturer experience qualifications.
1.4 MAINTENANCE MATERIAL SUBMITTALS
   A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.
   B. Extra Stock Materials:
      1. Furnish two of each key.

1.5 QUALIFICATIONS
   A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.

PART 2 - PRODUCTS

2.1 HINGED COVER ENCLOSURES
   A. Manufacturers:
      1. Hoffman
      2. Or Approved Equal
   B. Description: NEMA 250, Type 1, fiberglass, or plastic enclosure.
      1. Covers: Continuous hinge, held closed by flush latch operable by key
      2. Furnish interior metal panel for mounting terminal blocks and electrical components; finish with white enamel.
      3. Enclosure Finish: Manufacturer’s standard enamel

2.2 CABINETS
   A. Manufacturers:
      1. Hoffman
      2. Or Approved Equal
   B. Description:
      1. Boxes: Galvanized steel with removable end walls.
      2. Box Size: As required
   C. Fabrication:
      1. Furnish metal barriers to form separate compartments wiring of different systems and voltages.
      2. Furnish accessory feet for free-standing equipment.
D. Finishes:
   1. Finish with gray baked enamel

2.3 PLASTIC RACEWAY

A. Manufacturers:
   1. Panduit
   2. Or Approved Equal

B. Description: Plastic channel with hinged or snap-on cover.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install enclosures and boxes plumb. Anchor securely to wall and structural supports at each corner in accordance with Section 260529.

B. Install cabinet fronts plumb.

3.2 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Final cleaning.

B. Clean existing cabinets and enclosures to remain or to be reinstalled.

C. Clean electrical parts to remove conductive and harmful materials.

D. Remove dirt and debris from enclosure.

E. Clean finishes and touch up damage.

END OF SECTION 280528.33
SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY
A. Section includes wall switches; wall dimmers; receptacles; multioutlet assembly; and device plates and decorative box covers.
B. Related Sections:
   1. Section 260521 - Undercarpet Cable.
   2. Section 260533 - Raceway and Boxes for Electrical Systems: Outlet boxes for wiring devices.
   5. Section 260539 - Underfloor Raceways for Electrical Systems: Service fittings for receptacles installed in underfloor raceways.

1.2 REFERENCES
A. National Electrical Manufacturers Association:
   1. NEMA WD 1 - General Requirements for Wiring Devices.
   2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.3 SUBMITTALS
A. Section 013300 - Submittal Procedures: Submittal procedures.
B. Product Data: Submit manufacturer's catalog information showing dimensions, colors, and configurations.
C. Samples: Submit two samples of each wiring device and wall plate illustrating materials, construction, color, and finish.

1.4 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years [documented] experience.

1.5 EXTRA MATERIALS
A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.
B. Furnish two of each style, size, and finish wall plate.

PART 2 - PRODUCTS

2.1 WALL SWITCHES

A. Manufacturers:
   1. Leviton
   2. Or approved Equal

B. Color: Match Wall

2.2 WALL DIMMERS

A. Manufacturers:
   1. Leviton
   2. Or Approved Equal

B. Power Rating: As required for circuit

C. Accessory Wall Switch: Match dimmer appearance.

2.3 RECEPTACLES

A. Manufacturers:
   1. Leviton
   2. Substitutions: Or approved Equal

B. Product Description: NEMA WD 1, General-duty general use receptacle.

C. Device Body: Match wall, plastic.

D. Configuration: NEMA WD 6, type

E. Convenience Receptacle: Type 5-20

F. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

2.4 WALL PLATES

A. Manufacturers:
   1. Leviton
   2. Or approved equal
B. Decorative Cover Plate: Match wall color, or 302 Stainless
C. Jumbo Cover Plate: Match wall color, or 302 Stainless
D. Weatherproof Cover Plate: Gasketed cast metal plate with hinged and gasketed device cover.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Section 013000 - Administrative Requirements: Coordination and project conditions.
B. Verify outlet boxes are installed at proper height.
C. Verify wall openings are neatly cut and completely covered by wall plates.
D. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION
A. Clean debris from outlet boxes.

3.3 INSTALLATION
A. Install devices plumb and level.
B. Install switches with OFF position down.
C. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
D. Do not share neutral conductor on load side of dimmers.
E. Install receptacles with grounding pole on top
F. Connect wiring device grounding terminal to outlet box with bonding jumper and branch circuit equipment grounding conductor.
G. Install wall plates on flush mounted switches, receptacles, and blank outlets.
H. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
I. Connect wiring devices by wrapping solid conductor around screw terminal. Install stranded conductor for branch circuits 10 AWG and smaller. When stranded conductors are used in lieu of solid, use crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under device screws.
J. Use jumbo size plates for outlets installed in masonry walls.

K. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations of outlet boxes provided under Section 260533 to obtain mounting heights as specified and as indicated on drawings.

B. Install wall switch 48 inches above finished floor.

C. Install convenience receptacle 18 inches above finished floor.

D. Install convenience receptacle 6 inches above back splash of counter.

E. Install dimmer 48 inches above finished floor.

3.5 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect each wiring device for defects.

C. Operate each wall switch with circuit energized and verify proper operation.

D. Verify each receptacle device is energized.

E. Test each receptacle device for proper polarity.

F. Test each GFCI receptacle device for proper operation.

3.6 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Adjust devices and wall plates to be flush and level.

3.7 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Final cleaning.

B. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION 262726
SECTION 262813 - FUSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fuses.

1.2 REFERENCE STANDARDS

A. National Electrical Manufacturers Association:
   1. NEMA FU 1 - Low Voltage Cartridge Fuses.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data sheets showing electrical characteristics, including time-current curves.

1.4 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual sizes, ratings, and locations of fuses.

1.5 MAINTENANCE MATERIALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials

B. Spare Parts:
   1. Furnish two fuse pullers.

C. Extra Materials:
   1. Furnish three spare fuses of each Class, size, and rating installed.
1.6 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years [documented] experience.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:
   1. Littelfuse
   2. Or Approved equal

2.2 DESIGN REQUIREMENTS

A. Select fuses to provide appropriate levels of short circuit and overcurrent protection for the following components: wire, cable, bus structures, and other equipment. Design system to maintain component damage within acceptable levels during faults.

B. Select fuses to coordinate with time current characteristics of other overcurrent protective elements, including other fuses, circuit breakers, and protective relays. Design system to maintain operation of device closest to fault operates.

2.3 FUSES PERFORMANCE REQUIREMENTS

A. Main Service Switches Larger than 600 amperes: Class L time delay
B. Main Service Switches: Class RK1 time delay
C. Power Load Feeder Switches: Class [RK1 [(time delay).]
D. Motor Load Feeder Switches: Class RK1 time delay
E. Motor Branch Circuits: Class RK1 time delay

2.4 FUSES

A. Dimensions and Performance: NEMA FU 1, Class as specified or as indicated on Drawings.
B. Voltage: Rating suitable for circuit phase-to-phase voltage.
2.5 CLASS RK1 (TIME DELAY) FUSES
   A. Dimensions and Performance: NEMA FU 1.
   B. Voltage: Rating suitable for circuit phase-to-phase voltage.

2.6 CLASS RK1 (NON-TIME-DELAY) FUSES
   A. Dimensions and Performance: NEMA FU 1.
   B. Voltage: Rating suitable for circuit phase-to-phase voltage.

PART 3 - EXECUTION

3.1 INSTALLATION
   A. Install fuse with label oriented so manufacturer, type, and size are easily read.

END OF SECTION 262813
SECTION 26 28 16.13
ENCLOSED CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY
A. Section includes molded-case and insulated-case circuit breakers in individual enclosures for service duty at the Intake Building
B. Related Sections:
   1. Section 260526 - Grounding and Bonding for Electrical Systems.
   2. Section 260529 - Hangers and Supports for Electrical Systems.

1.2 REFERENCES
A. International Electrical Testing Association:
B. Underwriters Laboratories Inc.:
   1. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures.

1.3 SUBMITTALS
A. Section 013300 - Submittal Procedures: Submittal procedures.
B. Product Data: Submit catalog sheets showing ratings, trip units, time current curves, dimensions, and enclosure details.

1.4 CLOSEOUT SUBMITTALS
A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.
B. Project Record Documents: Record actual locations and continuous current ratings of enclosed circuit breakers.
1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

PART 2 - PRODUCT

2.1 MOLDED CASE CIRCUIT BREAKER

A. Manufacturers:

1. Siemens
2. Square D
3. Allen Bradley
4. Substitutions: Section 016000 - Product Requirements.

B. Product Description: Enclosed, molded-case circuit breaker conforming to UL 489, suitable for use as service entrance equipment where applied.

C. Service Conditions:

1. Temperature: 70 degrees.
2. Altitude: 1000 feet.

D. Field-Adjustable Trip Circuit Breaker: Circuit breakers with frame sizes 200 amperes and larger have mechanism for adjusting long time short time continuous current [short time] [long time] pickup current setting for automatic operation.

E. Field-Changeable Ampere Rating Circuit Breaker: Circuit breakers with frame sizes 200 amperes and larger have changeable trip units.

F. Accessories: As indicated on Drawings. Conform to UL 489.

2. Grounding Lug: In each enclosure.

G. Enclosure: UL 489, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray enamel.

1. Exterior Locations: Type 4.

H. Service Entrance: Switches identified for use as service equipment are to be labeled for this application. Furnish solid neutral assembly and equipment ground bar.
PART 3 - EXECUTION

3.1 INSTALLATION
   A. Install enclosed circuit breakers plumb. Provide supports in accordance with Section 260529.
   B. Height: 5 feet to operating handle.
   C. Install grounding and bonding in accordance with requirements of Section 260526.
   D. Locate and install engraved plastic nameplates in accordance with Section 260553.

3.2 FIELD QUALITY CONTROL
   A. Section 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
   B. Inspect and test in accordance with NETA ATS, except Section 4.
   C. Perform inspections and tests listed in NETA ATS, Section 7.6.1.1.

3.3 ADJUSTING
   A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.
   B. Adjust trip settings to coordinate circuit breakers with other overcurrent protective devices in circuit.
   C. Adjust trip settings to provide adequate protection from overcurrent and fault currents.

END OF SECTION
SECTION 262816.16 - ENCLOSED SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fusible.
   2. Nonfusible switches.

B. Related Requirements:
   2. Section 260553 - Identification for Electrical Systems.
   3. Section 262813 - Fuses.

1.2 REFERENCE STANDARDS

A. National Electrical Manufacturers Association:
   1. NEMA FU 1 - Low Voltage Cartridge Fuses.
   2. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).

B. International Electrical Testing Association:

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit switch ratings and enclosure dimensions.

1.4 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of enclosed switches and ratings of installed fuses.
1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCH ASSEMBLIES

A. Manufacturers:
   1. Square D
   2. Or Approved equal

B. Description: NEMA KS 1, Type GD with externally operable handle interlocked to prevent opening front cover with switch in ON position, enclosed load interrupter knife switch. Handle lockable in OFF position.

C. Operation:
   1. Switch Ratings
      a. Switch Rating: Horsepower rated for AC or DC indicated on Modular Fabricator Drawings
      b. Short Circuit Current Rating: UL listed for [10,000 rms symmetrical amperes when used with or protected by fuses

D. Materials:
   1. Fuse clips: Designed to accommodate NEMA FU 1, Class R fuses.
   2. Enclosure: NEMA KS 1, to meet conditions. Fabricate enclosure from [steel finished with manufacturer's standard gray enamel
      a. Interior Dry Locations: Type 1.
      b. Exterior Locations: Type 3R

   3. Service Entrance: Switches identified for use as service equipment are to be labeled for this application. Furnish solid neutral assembly and equipment ground bar.
   4. Furnish switches with entirely copper current carrying parts.

2.2 NONFUSIBLE SWITCH ASSEMBLIES

A. Manufacturers:
   1. Square D
   2. Or Approved equal
B. Description: NEMA KS 1, Type GD with externally operable handle interlocked to prevent opening front cover with switch in ON position enclosed load interrupter knife switch. Handle lockable in OFF position.

C. Operation:

1. Switch Ratings
   a. Switch Rating: Horsepower rated for AC or DC as indicated on Drawings.
   b. Short Circuit Current Rating: UL listed for 10,000 rms symmetrical amperes

D. Materials:

1. Enclosure: NEMA KS 1, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray enamel
   a. Interior Dry Locations: Type 1.
   b. Exterior Locations: Type 3R

2. Service Entrance: Switches identified for use as service equipment are to be labeled for this application. Furnish solid neutral assembly and equipment ground bar.
3. Furnish switches with entirely copper current carrying parts.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install enclosed switches where indicated.

B. Install enclosed switches plumb. Provide supports in accordance with Section 260529.

C. Height: 5 feet to operating handle.

D. Install fuses for fusible disconnect switches. Refer to Section 262813 for product requirements.

E. Install engraved plastic nameplates in accordance with Section 260553. Engrave nameplates with the equipment served and the panel and circuit number supplying the switch.

F. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

3.2 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.5.
3.3 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean existing enclosed switches to remain or to be reinstalled.

END OF SECTION 262816.16
SECTION 262913 - ENCLOSED CONTROLLERS

PART 1 - GENERAL

1.1 SUMMARY
A. Section includes manual and magnetic motor controllers in individual enclosures.
B. Related Sections:
   1. Section 262813 - Fuses.

1.2 REFERENCES
A. National Electrical Manufacturers Association:
   1. NEMA FU 1 - Low Voltage Cartridge Fuses.
   2. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.
   3. NEMA ICS 5 - Industrial Control and Systems: Control Circuit and Pilot Devices.
   4. NEMA ICS 6 - Industrial Control and Systems: Enclosures.
   5. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
B. International Electrical Testing Association:
C. Underwriters Laboratories Inc.:
   1. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures.

1.3 SUBMITTALS
A. Section 013300 - Submittal Procedures: Submittal procedures.
B. Product Data: Submit catalog sheets showing voltage, controller size, ratings and size of switching and overcurrent protective devices, short circuit ratings, dimensions, and enclosure details.
C. Test Reports: Indicate field test and inspection procedures and test results.
1.4 CLOSEOUT SUBMITTALS
   A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.
   B. Project Record Documents: Record actual locations and ratings of enclosed controllers.
   C. Operation and Maintenance Data: Submit Replacement parts list for controllers.

1.5 QUALIFICATIONS
   A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

PART 2 - PRODUCTS

2.1 MANUAL MOTOR CONTROLLER
   A. Manufacturers:
      1. Square D
      2. Or Approved Equal
   B. Product Description: NEMA ICS 2, AC general-purpose, Class A, manually operated, full-voltage controller with overload element, red pilot light, NO auxiliary contact, and toggle operator.
   C. Enclosure: NEMA ICS 6, Type to meet conditions of installation

2.2 FRACTIONAL-HORSEPOWER MANUAL CONTROLLER
   A. Manufacturers:
      1. Square D
      2. Or Approved Equal
   B. Product Description: NEMA ICS 2, AC general-purpose, Class A, manually operated, fractional-voltage controller with overload element, red pilot light, NO auxiliary contact, and toggle operator.
   C. Enclosure: NEMA ICS 6, Type to meet conditions of installation

2.3 MOTOR STARTING SWITCH
   A. Manufacturers:
      1. Square D
      2. Or Approved Equal
B. Product Description: NEMA ICS 2, AC general-purpose, Class A, manually operated, full-voltage controller with overload element, red pilot light, NO auxiliary contact, and toggle operator.

C. Enclosure: NEMA ICS 6, Type to meet conditions of installation

2.4 FULL-VOLTAGE NON-REVERSING CONTROLLERS

A. Manufacturers:
   1. Square D
   2. Or Approved Equal

B. Product Description: NEMA ICS 2, AC general-purpose Class A magnetic controller for induction motors rated in horsepower.

C. Control Voltage: 120, 208, 240, 277, or 480VAC

D. Overload Relay: NEMA ICS 2; bimetal

E. Product Features:
   1. Auxiliary Contacts: NEMA ICS 2, [2] each normally open contacts in addition to seal-in contact.
   3. Pilot Device Contacts: NEMA ICS 5, Form Z
   4. Pushbuttons: Recessed type.
   5. Indicating Lights: incandescent or LED type.
   7. Relays: NEMA ICS 2,

F. Combination Controllers: Combine motor controllers with disconnect in common enclosure, using thermal magnetic circuit breaker conforming to UL 489, with integral thermal and instantaneous magnetic trip in each pole.

G. Enclosure: NEMA ICS 6, to meet conditions. Fabricate enclosure from [steel finished with manufacturer's standard gray enamel.

   1. Interior Dry Locations: Type 1.
   2. Exterior Locations: Type 3R

2.5 TWO-SPEED CONTROLLERS

A. Manufacturers:
   1. Square D
   2. Or Approved Equal
B. Product Description: NEMA ICS 2, AC general-purpose Class A magnetic controller for induction motors rated in horsepower. Include integral time delay transition between FAST and SLOW speeds.

C. Control Voltage: 120, 208, 240, 277, or 480VAC

D. Overload Relay: NEMA ICS 2; bimetal

E. Product Features:
   1. Auxiliary Contacts: NEMA ICS 2, [2] each normally open contacts in addition to seal-in contact.
   3. Pilot Device Contacts: NEMA ICS 5, Form Z
   4. Pushbuttons: Recessed type.
   5. Indicating Lights: incandescent or LED type.
   7. Relays: NEMA ICS 2

F. Combination Controllers: Combine motor controllers with disconnect in common enclosure, using thermal magnetic circuit breaker conforming to UL 489, with integral thermal and instantaneous magnetic trip in each pole.

G. Enclosure: NEMA ICS 6, to meet conditions. Fabricate enclosure from [steel finished with manufacturer's standard gray enamel.
   1. Interior Dry Locations: Type 1.
   2. Exterior Locations: Type 3R

2.6 FULL-VOLTAGE REVERSING CONTROLLERS

A. Manufacturers:
   1. Square D
   2. Or Approved Equal

B. Product Description: NEMA ICS 2, AC general-purpose Class A magnetic controller for induction motors rated in horsepower. Include electrical interlock and integral time delay transition between FORWARD and REVERSE rotation.

C. Control Voltage: 120, 208, 240, 277, or 480VAC

D. Overload Relay: NEMA ICS 2; bimetal

E. Product Features:
   1. Auxiliary Contacts: NEMA ICS 2, [2] each normally open contacts in addition to seal-in contact.
   3. Pilot Device Contacts: NEMA ICS 5, Form Z
4. Pushbuttons: Recessed type.
5. Indicating Lights: incandescent or LED type.
7. Relays: NEMA ICS 2

F. Combination Controllers: Combine motor controllers with disconnect in common enclosure, using thermal magnetic circuit breaker conforming to UL 489, with integral thermal and instantaneous magnetic trip in each pole.

G. Enclosure: NEMA ICS 6, to meet conditions. Fabricate enclosure from [steel finished with manufacturer's standard gray enamel.

1. Interior Dry Locations: Type 1.
2. Exterior Locations: Type 3R

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install enclosed controllers plumb. Provide supports in accordance with Section 260529.

B. Height: 5 feet to operating handle.

C. Install fuses for fusible switches. Refer to Section 262813 for product requirements.

D. Select and install overload heater elements in motor controllers to match installed motor characteristics.

E. Install engraved plastic nameplates. Refer to Section 260553 for product requirements and location.

F. Neatly type label and place inside each motor controller door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating. Place label in clear plastic holder.

3.2 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.16.1.

END OF SECTION 262913
SECTION 262923 - VARIABLE-FREQUENCY MOTOR CONTROLLERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes variable frequency controllers.

B. Related Sections:
   1. Section 262813 - Fuses.

1.2 REFERENCES

A. Institute of Electrical and Electronics Engineers:
   1. IEEE C62.41 - Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.

B. National Electrical Manufacturers Association:
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
   2. NEMA FU 1 - Low Voltage Cartridge Fuses.
   3. NEMA ICS 7 - Industrial Control and Systems: Adjustable Speed Drives.

C. International Electrical Testing Association:

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate front and side views of enclosures with overall dimensions and weights shown; conduit entrance locations and requirements; and nameplate legends.

C. Product Data: Submit catalog sheets showing voltage, controller size, ratings and size of switching and overcurrent protective devices, short circuit ratings, dimensions, and enclosure details.

D. Test Reports: Indicate field test and inspection procedures and test results.

E. Manufacturer's Field Reports: Indicate start-up inspection findings.
1.4 CLOSETOUT SUBMITTALS
   A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.
   B. Operation and Maintenance Data: Submit instructions complying with NEMA ICS 7.1. Include procedures for starting and operating controllers, and describe operating limits possibly resulting in hazardous or unsafe conditions. Include routine preventive maintenance schedule.

1.5 QUALIFICATIONS
   A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience, and with service facilities within 100 miles of project.

1.6 DELIVERY, STORAGE, AND HANDLING
   A. Section 016000 - Product Requirements: Product storage and handling requirements.
   B. Store in clean, dry space. Maintain factory wrappin g or provide additional canvas or plastic cover to protect units from dirt, water, construction debris, and traffic.
   C. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided. Handle carefully to avoid damage to components, enclosure, and finish.

1.7 ENVIRONMENTAL REQUIREMENTS
   A. Section 016000 - Product Requirements.
   B. Conform to NEMA ICS 7 service conditions during and after installation of variable frequency controllers.

1.8 WARRANTY
   A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.
   B. Furnish five year manufacturer warranty for variable frequency controller.

1.9 MAINTENANCE SERVICE
   A. Section 017000 - Execution and Closeout Requirements: Maintenance service.
   B. Furnish service and maintenance of variable frequency controller for one year from Date of Substantial Completion.

1.10 MAINTENANCE MATERIALS
   A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.
PART 2 - PRODUCTS

2.1 VARIABLE FREQUENCY CONTROLLER

A. Manufacturers:
   1. Allen Bradley
   2. Or Approved Equal

B. Product Description: NEMA ICS 7, enclosed variable frequency controller suitable for operating indicated loads. Select unspecified features and options in accordance with NEMA ICS 7.1.

C. Ratings:
   1. Rated Input Voltage: 208 or 480 volts, three phase, 60 Hertz.
   2. Motor Nameplate Voltage: 200 or 460 volts, three phase, 60 Hertz.
   3. Displacement Power Factor: Between 1.0 and 0.95, lagging, over entire range of operating speed and load.
   4. Operating Ambient: 0 degrees C to 40 degrees C.
   5. Minimum Efficiency at Full Load: 95 percent.
   6. Time to Stop: 3 seconds.

D. Design Features:
   1. Employ microprocessor-based inverter logic isolated from power circuits.
   2. Employ pulse-width-modulated inverter system.
   3. Design for ability to operate controller with motor disconnected from output.
   4. Design to attempt five automatic restarts following fault condition before locking out and requiring manual restart.

E. Indicators and Manual Controls:
   1. Input Signal: 4 - 20 mA DC
   2. Display: Furnish integral digital display to indicate output voltage, output frequency, and output current.
   3. Status Indicators: Separate indicators for overcurrent, overvoltage, ground fault, overtemperature, and input power ON.
   4. Volts Per Hertz Adjustment: Plus or minus 10 percent.
   6. Acceleration Rate Adjustment: 0.5 – 30 seconds.
   7. Deceleration Rate Adjustment: 1 – 30 seconds.
   8. HAND-OFF-AUTOMATIC selector switch and manual speed control.
   9. Control Power Source: Integral control transformer

F. Safeties and Interlocks:

B. Furnish two of each air filter.
1. Includes undervoltage release.
2. Door Interlocks: Mechanical means to prevent opening of equipment with power connected, or to disconnect power when door is opened; include means for defeating interlock by qualified persons.
3. Safety Interlocks: Terminals for remote contact to inhibit starting under both manual and automatic mode.
4. Control Interlocks: Furnish terminals for remote contact to allow starting in automatic mode.
7. Disconnecting Means: Integral circuit breaker on line side of each controller.

G. Fabrication:
1. Wiring Terminations: Match conductor materials and sizes as indicated on Drawings.
2. Enclosure: NEMA 250, Type 1, suitable for equipment application in places accessible only to qualified personnel.
3. Finish: Manufacturer's standard enamel.

2.2 TRANSIENT VOLTAGE SUPPRESSION DEVICES

A. Manufacturers:
   1. Phoenix Contact
   2. Or Approved Equal

B. Product Description: IEEE C62.41, factory-mounted transient voltage surge suppressor, selected to meet requirements for medium exposure and to coordinate with system circuit voltage.

2.3 SOURCE QUALITY CONTROL

A. Shop inspect and perform standard productions tests for each controller.

B. Make completed controllers available for inspection at manufacturer's factory prior to packaging for shipment. Notify Owner at least seven days before inspection is allowed.

C. Allow witnessing of factory inspections and tests at manufacturer's test facility. Notify Owner at least seven days before inspections and tests are scheduled.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.
B. Verify building environment is maintained within service conditions required by manufacturer.

3.2 INSTALLATION

A. Install in accordance with NEMA ICS 7.1.
B. Tighten accessible connections and mechanical fasteners after placing controller.
C. Install fuses in fusible switches.
D. Select and install overload heater elements in motor controllers to match installed motor characteristics.
E. Install engraved plastic nameplates in accordance with Section 260553.
F. Neatly type label inside controller door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating. Place label in clear plastic holder.
G. Ground and bond controller in accordance with Section 260526.

3.3 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
B. Inspect and test in accordance with NETA ATS, except Section 4.
C. Perform inspections and tests listed in NETA ATS, Section 7.16 and NEMA ICS 7.1.

3.4 MANUFACTURER'S FIELD SERVICES

A. Section 014000 - Quality Requirements: Manufacturer's field services.
B. Prepare and startup variable frequency controller.

3.5 DEMONSTRATION AND TRAINING

A. Furnish four hours of instruction each for two persons, to be conducted at project site with manufacturer's representative.

END OF SECTION 262923
SECTION 271343 - COMMUNICATIONS SERVICES CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes termination devices, outlets, and premises wiring.

B. Related Sections:
   1. Section 099000 - Painting and Coating: Painting backboards.
   2. Section 262726 - Wiring Devices: Wall plates.
   3. Section 260526 - Grounding and Bonding
   4. Section 260533 - Conduits and Backboxes
   5. Section 260536 - Cable Trays
   6. Section 260553 - Identification

1.2 REFERENCES

A. International Electrical Testing Association:

B. National Fire Protection Association:
   1. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

C. Telecommunications Industry Association/Electronic Industries Alliance:
   1. TIA/EIA 568 - Commercial Building Telecommunications Cabling Standard.
   2. TIA/EIA 569 - Commercial Building Standard for Telecommunications Pathways and Spaces.

D. Underwriters Laboratories, Inc.:

1.3 SYSTEM DESCRIPTION

A. Service entrance from Telecommunications Utility Company.

B. Service Entrance Pathway: Refer to Scope of Work

C. Backbone Pathway: Conform to TIA/EIA 569 using conduit and cable tray.
D. Horizontal Pathway: Conform to TIA/EIA 569, using conduit and cable tray.

E. Entrance Wiring: By Telephone Utility Company.

F. Horizontal Wiring: Complete from DATA Room 114 to each outlet using shielded CAT6A (in cable tray) or unshielded CAT6A (in EMT).

1.4 SUBMITTALS
A. Section 013300 - Submittal Procedures: Submittal procedures.
B. Product Data: Submit catalog data for each termination device, cable, and outlet device.
C. Test Reports: Indicate procedures and results for specified field testing and inspection.

1.5 CLOSEOUT SUBMITTALS
A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.
B. Project Record Documents: Record actual locations and sizes of pathways and outlets.

1.6 QUALITY ASSURANCE
A. Provide wiring materials located in plenums with peak optical density not greater than 0.5, average optical density not greater than 0.15, and flame spread not greater than 5 feet (1.5 m) when tested in accordance with NFPA 262.
B. Provide combustible electrical equipment exposed within plenums with peak rate of heat release not greater than 100 kW, peak optical density not greater than 0.5, and average optical density not greater than 0.15 when tested in accordance with UL 2043.
C. Maintain one copy of each document on site.

1.7 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.
B. Installer: Company specializing in installing products specified in this section with minimum three years experience, and with service facilities within 100 miles of project.
C. Testing Agency: Company member of International Electrical Testing Association and specializing in testing products specified in this section with minimum three years experience.

1.8 PRE-INSTALLATION MEETINGS
A. Section 013000 - Administrative Requirements: Pre-installation meeting.
B. Convene minimum one week prior to commencing work of this section.

1.9 EXTRA MATERIALS
A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.
B. Furnish two data outlet jacks.

1.10 COORDINATION
A. Coordinate with utility company, relocation of overhead of underground lines interfering with construction. Where power lines are to be relocated, bill utility costs directly to Owner.
B. Contact utility company regarding charges related to service installation. Include utility charges in this contract.
C. Utility charges for service installation paid by Owner and are not part of this contract.

PART 2 - PRODUCTS

2.1 TELEPHONE TERMINATION BACKBOARDS
A. Material: Fire retardant Plywood.
B. Size: as per SOW.

2.2 TELEPHONE TERMINATION CABINETS
A. Manufacturers:
   1. Eaton
   2. Or Approved Equal
B. Product Description: Galvanized steel box with removable end walls, 24 inches wide, 24 inches high, 6 inches deep. Furnish plywood backboard inside cabinet for mounting telephone termination devices.
C. Cabinet Fronts: Steel, concealed hinge, and flush lock keyed to match branch circuit panelboard.
D. Finish: Gray baked enamel

2.3 CROSS-CONNECT
A. Manufacturers:
1. Siemon
2. Or Approved Equal

B. Product Description: TIA/EIA 568, wall-mounted assembly of terminals with adequate capacity for active and spare circuits.

2.4 PATCH PANEL

A. Manufacturers:
   1. Siemon
   2. Or Approved Equal

B. Product Description: TIA/EIA 568, wall-mounted assembly of terminals and accessory patch cords, with adequate capacity for active and spare circuits.

2.5 TELEPHONE OUTLET JACKS

A. Manufacturers:
   1. Belden
   2. Or approved Equal

B. Product Description: Conform to TIA/EIA 568 requirements for cable connectors for specific cable types.

2.6 UNSHIELDED BACKBONE CABLE

A. Manufacturers:
   1. Belden
   2. Or Approved Equal

B. Product Description: TIA/EIA 568, 100-ohm, unshielded twisted pair plenum rated (when in air space) noncombustible cable with 100 pairs, 22 AWG copper conductor.

2.7 UNSHIELDED HORIZONTAL CABLE

A. Manufacturers:
   1. Belden
   2. Or Approved Equal

B. Product Description: TIA/EIA 568, 100-ohm, unshielded twisted pair plenum rated (when in air space) noncombustible cable with 4 pairs, 22 AWG copper conductor.
2.8 SHIELDED HORIZONTAL CABLE

A. Manufacturers:
   1. Belden
   2. Or Approved Equal

B. Product Description: TIA/EIA 568, 100-ohm, shielded twisted pair plenum rated (when in air space) noncombustible cable with 4 pairs, 22 AWG copper conductor.

2.9 COAXIAL HORIZONTAL CABLE

A. Manufacturers:
   1. Belden
   2. Or Approved Equal

B. Product Description: TIA/EIA 568, 50-ohm coaxial plenum rated (when in air space) noncombustible cable.

2.10 OPTICAL FIBER HORIZONTAL CABLE

A. Manufacturers:
   1. Belden
   2. Or Approved Equal

B. Product Description: TIA/EIA 568, 62.5/125 um optical fiber plenum rated (when in air space) noncombustible cable.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install pathways in accordance with TIA/EIA 569.

B. Install wire and cable in accordance with TIA/EIA 568.

C. Finish paint termination backboards with durable white enamel in accordance with Section 099000 prior to installation of telephone equipment.

D. Install termination backboards cabinets plumb, and attach securely to building wall at each corner. Install cabinet trim plumb.

E. Install recessed cabinets flush with wall finishes, and stub 5 empty 1 inch conduits to accessible location above ceiling at each location.

F. Install pull wire in each empty telephone conduit over 10 feet in length or containing bends.
G. Install engraved plastic nameplates. Mark backboards and cabinets with legend "TELEPHONE."

H. Ground and bond pathways, cable shields, and equipment in accordance with Section 260526

3.2 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect and test optical fiber cables in accordance with NETA ATS, except Section 4. Perform inspections and tests listed in NETA ATS, Section 7.25.

C. Inspect and test copper cables and terminations in accordance with TIA/EIA 568.

END OF SECTION 271343
SECTION 284600 - FIRE DETECTION AND ALARM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fire-alarm control panels.
   3. Automatic smoke and heat detectors.
   5. Auxiliary fire-alarm equipment.
   6. Power and signal wire and cable.

B. Related Requirements:
   1. Section 087100 - Door Hardware: Door closers, electric locks, electric releases.
   6. Section 233300 - Air Duct Accessories: Smoke dampers: HVAC duct dampers and instrumentation.
   7. Section 255000 - Integrated Automation Facility Controls: Central building management system to supervise fire and smoke alarms, as well as other building systems.
   9. Section 260526 - Grounding and Bonding for Electrical Systems: Grounding and bonding of fire-alarm equipment and circuits.
  10. Section 260553 - Identification

1.2 REFERENCE STANDARDS

A. National Fire Protection Association:
   2. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

B. UL:
   1. UL 268 - Smoke Detectors for Fire Protective Signaling Systems.

C. Other:
   1. IBC
2. IFC
3. City of Lakewood Amendments

1.3 COORDINATION
A. Section 013000 - Administrative Requirements: Requirements for coordination.
B. Coordinate Work of this Section with Work of other Sections.

1.4 PREINSTALLATION MEETINGS
A. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.
B. Convene minimum one week prior to commencing Work of this Section.

1.5 SUBMITTALS
A. Section 013300 - Submittal Procedures: Requirements for submittals.
B. Product Data: Submit manufacturer's catalog information showing electrical characteristics and connection requirements.
C. Shop Drawings:
   1. Indicate system wiring diagram showing each device and wiring connections.
   2. Indicate annunciator layout.
D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
E. Delegated Design Submittals: Submit signed and sealed Shop Drawings with design calculations and assumptions for fire-alarm system.
F. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
H. Manufacturer Reports:
   1. Certify that equipment has been installed according to manufacturer instructions.
   2. Indicate activities on Site, adverse findings, and recommendations.
I. Qualifications Statements:
   1. Submit qualifications for manufacturer, installer, and licensed professional.
   2. Submit manufacturer's approval of installer.
1.6  CLOSEOUT SUBMITTALS
   A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.
   B. Project Record Documents: Record actual locations of fire-alarm equipment.

1.7  MAINTENANCE MATERIAL SUBMITTALS
   A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.
   B. Spare Parts:
      1. Furnish three automatic smoke detectors, without base, of each type provided.
   C. Extra Stock Materials:
      1. Furnish 10 manual-station, break-glass rods.
      2. Furnish 6 keys of each type provided.

1.8  QUALITY ASSURANCE
   A. Wiring Materials Located in Plenums:
      1. Peak Optical Density: Not greater than 0.5.
      2. Average Optical Density: Not greater than 0.15.
      3. Flame Spread: Not greater than 5 feet when tested according to NFPA 262.
   B. Perform Work according to IBC, IFC, NFPA 70, NFPA 72, State of Washington, Pierce County requirements, and City of Lakewood amendments.
   C. Maintain one copy of each standard affecting Work of this Section on Site.

1.9  QUALIFICATIONS
   A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' experience.
   B. Installer: Company specializing in performing Work of this Section with minimum three years' experience.
   C. Licensed Professional: Professional engineer or NICET certified individual experienced in design of specified Work and licensed in State of Washington.

1.10 DELIVERY, STORAGE, AND HANDLING
   A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:
   1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
   2. Provide additional protection according to manufacturer instructions.

1.11 EXISTING CONDITIONS

A. Field Measurements:
   1. Verify field measurements prior to fabrication.
   2. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 SCOPE

A. Modular Fabricator to provide design, engineering, materials, equipment, raceway, cabling, termination, installation, commissioning, accessories, permitting, and all effort required for a fully functional system, acceptable to the AHJ.

B. Provide Fire Alarm Control Panel with cell communicator in DATA Room 114 and Remote Annunciator in Entry Room 100.

2.2 SYSTEM DESCRIPTION

A. Fire-Alarm System:
   1. Manual and automatic local fire-alarm system, with connections to Peirce County BAS system.
   2. Comply with NFPA 72.

B. Alarm Sequence of Operation:
   1. Actuation of initiating device causes following system operations:
      a. Local fire-alarm signaling devices sound and display, with march time signal.
      b. Zone-coded signal transmits to municipal connection
      c. Location of alarm zone indicates on fire-alarm control panel and on remote annunciator panel.
      d. Signal transmits to building smoke-removal system.
e. Signal transmits to building elevator control panel, initiating return to main floor or alternative floor, and lockout for fire service.

f. Signal transmits to building mechanical controls, shutting down fans and operating dampers.

g. Signal transmits to release door hold-open devices.

h. Signal releases magnetic door hold-open devices.

i. Signal releases electric door locks.

C. Drill Sequence of Operation: Manual drill function causes alarm mode sequence of operation.

D. Trouble Sequence of Operation:

1. System or circuit trouble causes following system operations:

   a. Visual and audible trouble alarm annunciates by zone at fire-alarm control panel.

   b. Visual and audible trouble alarm annunciates at remote annunciator panel.

   c. Trouble signal transmits to remote station

E. Zoning: As determined by Modular Fabricator

2.3 CONTROL PANELS

A. Manufacturers:

1. Silent Knight
2. Or approved Equal

B. Description: Modular fire-alarm control panel, with a cell communicator, in wall-mounted enclosure(s).

C. Power Supply:

1. Adequate to serve control panel modules, remote detectors, remote annunciators, smoke dampers, relays and alarm signaling devices.
2. Furnish battery-operated emergency power supply with capacity for operating system in standby mode for 24 hours, followed by alarm mode for 10 minutes.

D. System Supervision: Failure of component or power supply places system in trouble mode.

E. Initiating Device Circuits:

1. Furnish supervised zone module with alarm and trouble indication.
2. Occurrence of single ground or open condition places circuit in trouble mode but does not disable circuit from initiating alarm.

F. Indicating Appliance Circuits:

1. Furnish supervised march time signal module, sufficient for signal devices connected to system.
2. Occurrence of single ground or open condition places circuit in trouble mode but does not disable circuit from signaling alarm.

G. Municipal Trip Circuit:
   1. Description: Output connections for future use.

H. Remote Station Signal Transmitter: Electrically supervised digital alarm communicator transmitter, capable of transmitting alarm and trouble signals over telephone lines to central station receiver.

I. Auxiliary Relays: Sufficient SPDT auxiliary relay contacts for each detection zone to provide accessory functions specified.

2.4 MANUAL FIRE-ALARM STATIONS

A. Manufacturers:
   1. Match Control panel.

B. Description: Manual double-action station with break-glass rod.

C. Mounting: Semiflush or Surface.

D. Type: Coded or Non-coded.

E. Backbox: Manufacturer's standard.

2.5 SPOT HEAT DETECTORS

A. Manufacturers:
   1. Match Control panel.

B. Description: Combination rate-of-rise and fixed temperature spot heat detector.

C. Temperature Rating: as determined by Modular Fabricator

D. Rate of Rise: as determined by Modular Fabricator

2.6 CEILING SMOKE DETECTORS

A. Manufacturers:
   1. Match Control panel.

B. Description:
   1. Type: Ionization or Photoelectric
   2. Comply with NFPA 72 and UL 268.
5. Furnish auxiliary relay contact.
6. Integral Thermal Element Rating: 135 degrees F.
7. Furnish visual indication of detector actuation.

C. Mounting: 4-inch outlet box.

D. Furnish two-wire detector with common or four-wire detector with separate power supply and signal circuits, as engineered by Modular Fabricator.

2.7 DUCT-MOUNTED SMOKE DETECTORS

A. Manufacturers:
   1. Match Control panel.

B. Description:
   1. Type: Ionization or Photoelectric
   2. Comply with NFPA 72 and UL 268A.
   3. Furnish auxiliary SPDT relay contact.
   4. NORMAL-RESET-TEST Switch: Key operated.
   5. Duct Sampling Tubes: Extend width of duct.
   6. Furnish visual indication of detector actuation.
   7. Housing: Duct mounted.

C. Furnish two-wire detector with common or four-wire detector with separate power supply and signal circuits, as engineered by Modular Fabricator.

2.8 FLAME DETECTORS

A. Manufacturers:
   1. Match Control panel.

B. Description:
   1. Type: Ultraviolet or Infrared radiation.
   2. Comply with NFPA 72.

2.9 ALARM BELLS

A. Manufacturers:
   1. Match Control panel.

B. Description:
   1. Type: Vibrating or Single-stroke electric bell.
   2. Comply with NFPA 72.
   3. Locate operating mechanism behind dome.
4. Furnish integral strobe lamp and flasher, with red lettered designation FIRE on white lens.
5. Size: 10 inch.

2.10 ALARM LIGHTS

A. Manufacturers:
   1. Match Control panel.

B. Description:
   1. Furnish strobe lamp and flasher with red lettered designation FIRE on white lens.
   2. Comply with NFPA 72.

2.11 ALARM HORNS

A. Manufacturers:
   1. Match Control panel.

B. Description:
   1. Type: Surface, Flush, or Projector.
   2. Comply with NFPA 72.
   4. Furnish integral strobe lamp and flasher with red lettered FIRE on white lens.

C. Siren or Horn:
   1. Sound Rating: as engineered by Modular Fabricator

2.12 REMOTE ANNUNCIATORS

A. Manufacturers:
   1. Match Control panel.

B. Description: Supervised remote annunciator, including audible and visual indication of fire alarm by zone, and audible and visual indication of system trouble.

C. Mounting: Factory mounted in flush wall-mounted enclosure.

2.13 DOOR RELEASES

A. Manufacturers:
   1. Match Control panel.

B. Description: Magnetic door holder with integral diodes to reduce buzzing.
2.14 WIRE AND CABLE

A. Manufacturers:
   1. As recommended by Control Panel Manufacturer.

B. Description:
   1. Non-power-limited, fire-protective signaling cable.
   2. Conductor: Copper.
   3. Insulation Rating: 150 V at 60 degrees C.

C. Cable Located Exposed in Plenums:
   1. Power-limited, fire-protective signaling cable classified for fire and smoke characteristics.
   2. Conductor: Copper.
   3. Insulation Rating: 300 V at 105 degrees C.
   4. Suitable for use in air handling ducts, hollow spaces used as ducts, and plenums.

D. Fire-Alarm Circuit Conductors Insulation Color:
   1. Power Branch Circuit Conductors: Black, red, white
   2. Initiating Device Circuit: Black, red
   3. Detector Power Supply: Violet, brown
   4. Signal Device Circuit: Blue (positive), white (negative)
   5. Door Release: Gray, gray
   6. Municipal Trip Circuit: Orange, orange
   7. Municipal Fire-Alarm Loop: Black, white

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify that products and systems receiving devices are ready for installation.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

3.3 INSTALLATION

A. Install manual station with operating handle 4-1/2 feet above operating floor.
B. Install audible and visual signal devices 7-1/2 feet above operating floor.
C. Install 14 AWG minimum size conductors for fire-alarm detection and signal circuit conductors in conduit.
D. Mount end-of-line devices in control panel.
E. Mount outlet box for electric door holder in a manner to withstand 80 lb of pulling force.
F. Connect conduit and wire to door release devices, sprinkler flow switches, sprinkler valve tamper switches, fire suppression system control panels, and duct smoke detectors.
G. Automatic Detector Installation: Comply with NFPA 72.
H. Install engraved plastic nameplates as specified in Section 280553 - Identification for Electronic Safety and Security.
I. Ground and bond fire-alarm equipment and circuits as specified in Section 260526 - Grounding and Bonding for Electrical Systems.

3.4 FIELD QUALITY CONTROL
A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.
B. Test fire detection and alarm devices and systems according to local fire department requirements.
C. Manufacturer Services: Furnish services of certified manufacturer's representative experienced in installation of products furnished under this Section for not less than 4 hours on Site for installation, inspection, startup, field testing, adjustments, and instructing Owner's personnel in maintenance of equipment.
D. Equipment Acceptance:
   1. Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.
   2. Make final adjustments to equipment under direction of manufacturer's representative.
E. Furnish installation certificate from equipment manufacturer's representative attesting that equipment has been properly installed and is ready for startup and testing.

3.5 DEMONSTRATION AND TRAINING
A. Section 017000 - Execution and Closeout Requirements: Requirements for demonstration and training.
B. Demonstrate equipment startup, shutdown, routine maintenance, and emergency repair procedures to Owner's personnel.
3.6 MAINTENANCE

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance service.

B. Provide service and maintenance of fire-alarm equipment for one year from date of Substantial Completion.

END OF SECTION 284600