



Boise State University

Division 26 - Electrical Design Guidelines

Updated Jan 13, 2025

Summary

The purpose of this document is to provide the design team with an easy to reference document containing Boise State University's guidelines for construction projects on campus and is intended as a resource to inform the design process. This document does not remove responsibility from the designer, preclude the use of engineering judgment, or relieve the designer from meeting all adopted code requirements. Questions, clarifications, or suggestions can be directed to the Boise State University Project Manager (PM).

These guidelines have been developed as a joint effort between the Facilities, Operations and Maintenance (FOM) team and the Architectural and Engineering Services (AES) team to help ensure the resiliency of Boise State's campus by considering maintenance needs, sustainability goals, future expansion, and responsible stewardship of our resources. These guidelines are created from both common industry standards and lessons learned. They are arranged using the Masterspec Divisions to help facilitate a common language.

Related / Supporting Documents

In addition to this document, see the following Boise State University Guidelines:

1. *Utilities and Metering Guidelines*
2. *Division 14 - Conveying Equipment* (under development)
3. *Division 28 - Electronic Safety & Security* (under development)
4. *Building Automation Systems (BAS) Guidelines*
5. *Boise State Cabling Standards*

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Section 260100 – Basic Electrical Requirements

Codes and Standards

1. The design and construction of all University work must comply with the current edition of the National Electric Code (NEC), International Energy Conservation Code (IECC), National Fire Protection Association (NFPA), Occupational Safety & Health Administration (OSHA) requirements in 129 CFR 1910, and Underwriters Laboratories (UL), as well as other applicable codes and standards.
2. All electrical work 50V or greater at Boise State University must be performed by a State of Idaho licensed electrician or qualified trade holding a limited electrical license.

Utilities

1. See Boise State's *Utilities and Metering Guidelines* for a description of the electrical service.
2. It is not acceptable to create "spurs" by feeding new transformers via looped power through existing transformers. New transformers are required to have a direct connection via sectionalizing switch to Boise State's primary power loops, or be provided with a new transformer and service from Idaho Power.
3. Coordinate tracer wire requirements with the Boise State project manager and facilities team. Tracer wire is required for some underground electrical installations. When required, a 14-gauge insulated tracer wire from the point where the line connects to the nearest public utility or other main line to the point of building entry installed for use in locating the line after being covered must be installed.

Project Record Set Documents

1. Record set drawings provided at completion of the project must include exact routing details of concealed service and feeder conduits through a given site or building. Provide dimensional ties to all underground or under slab on grade conduits regardless of conduit size. 1 inch and larger trade size.
2. All components that require maintenance must be readily accessible and labeled.
3. In mechanical rooms, locations of controls, panels and other components that require operator action must be located no more than seven feet above finished floor, or an access platform must be provided.

Section 260500 – Common Work Results for Electrical

1. Equipment Installation - Common requirements: Install equipment, piping conduit, etc., to facilitate service, maintenance, and removal and replacement. Coordinate the final location with piping, ducts and equipment of other trades to ensure proper access for all trades. Connect equipment for ease of disconnecting with minimum interference to other installations. Install equipment to allow right of way for piping installed at required slopes.

2. Verify attic stock requirements with the Boise State University PM and facilities teams for every project.
3. The design professional must review opportunities for Idaho Power incentives (including lighting) and advise the University of potential opportunities. Paperwork for incentives is typically submitted by the design professional. Discuss changes in final agreement of responsibility with the University.
4. HVAC ductwork must not be penetrated by piping, conduit, etc.
5. Underground electrical service lines from the point where the line connects to the nearest public utility connection to the point of building entry must have a 14-gauge insulated tracer wire installed for use in locating the line after being covered.
6. Provide exterior roof lighting for all rooftop mounted equipment with the light switch located in the electrical room.
7. Updated panelboard schedules must be shown on the design documents for all projects.
 - a. Exception: When a project does not make any changes to the circuiting or loads for a panel, panel schedules are not required to be shown on the drawings.
8. Updated one-lines must be shown on the drawings. At a minimum, one-lines must show the furthest upstream equipment that is part of the design and everything downstream of that equipment.

Section 260513 – Medium-Voltage Cables

1. Buried medium voltage feeders must be concrete encased with red tinted concrete. A locatable warning tape must be installed above the concrete.
2. Medium Voltage Feeder Basis of Design:
 - a. MV-105, 133% Jacketed EPR 15kV.

Section 260519 – Low-Voltage Electrical Power Conductors and Cables

Products Not Permitted:

1. Non-Metallic Cable (type NM or NM-C).
2. Metal-Clad Cable (type AC or MC) unless 6 feet or shorter for connection to motors and light fixtures.
3. Through-the-wall boxes.
4. Electrical Nonmetallic Tubing (ENT)

Wires and Cables:

1. Building wire and cable electrical power conductors must be copper, insulated to 600 volts.
2. Aluminum wire will be considered under the following conditions and allowed only by approval from the Boise State Facilities team.
 - a. Aluminum wire can be used for service feeders from building service transformers to the main distribution panel/center, and for feeders from the main distribution panel/center to panel boards.

- b. Aluminum wire must be terminated in compression lugs or compression copper pigtail adapters. A compression copper pigtail adaptor must have the barrel designed of high strength aluminum alloy and the pigtail of high conductivity copper. Compression of lugs and pigtail adapters must be with a Burndy type hydraulic compression tool or equal.
 - c. Aluminum wire must be no smaller than #1 AWG.
3. Branch circuits whose length from panel to first outlet exceeds 75 feet for 120-volt circuits must be next size larger, as recommended by the NEC for limiting voltage drop.
4. Branch circuits whose length from panel to first outlet exceeds 175 feet for 277-volt circuits must be next size larger, as recommended by the NEC for limiting voltage drop. Provide a minimum wire size for branch circuit conductors of #12 AWG wherever possible.
5. Edison Circuits are not acceptable. (Multi wire branch circuits that share a neutral conductor)

Section 260519.13 – Under Carpet Electrical Power Cables

1. Use of under carpet electrical power cables is not allowed.

Section 260523 – Control-Voltage Electrical Power Cables

1. See section the *Building Automation Systems (BAS) Guidelines* document for information on low voltage wiring in BAS systems.
2. See *Division 280000* for fire alarm cabling requirements.
3. See the *Boise State Cabling Standards* document for requirements on OIT system cabling.

Section 260526 – Grounding and Bonding for Electrical Systems

1. See Section 260553 *Identification for Electrical Systems* for labeling requirements.
2. Provide a dedicated grounding wire for all electrical systems. It is not acceptable to use raceways as a grounding or bonding function.
3. VFD driven motors must have shaft grounding systems. Coordinate with mechanical.
4. Show grounding electrode system connections by identifying the room number and room name on record drawing mark-ups. Additionally, identify what they terminate (rod, water pipe, ground bus, etc.)
5. Requirements for grounding bars:
 - a. Tag all grounding electrode conductors and associated bonding conductors at their point of attachment to the ground bus and grounding electrode.
 - b. Grounding bars must be installed inside.
 - c. Connect grounding conductors to the bus bar with compression lugs.

Section 260533 – Raceways and Boxes for Electrical Systems

Acceptable Product:

1. Wiremold Raceways System Basis of Design:

- a. Exposed wiremold in occupied spaces: Legrand DS 4000 Series. Silver colored with double channel for dual service power and data, or equivalent.
 - b. Hidden wiremold: When located below desks or other out of sight areas, a generic white wiremold system is acceptable.
2. MC cable or AC cable less than 6 feet long and used for connection to motors and lights. It is unacceptable to use this method for home runs to branch panels.
3. Conduit: No electrical non-metal tubing

Conduit

1. Horizontal conduit in full height interior walls is not acceptable.
 - a. Exception: Allowed under windows or pass-throughs.

Raceways

1. Raceways must be EMT, RMC, PVC for all concealed work and for exposed work where allowed.
2. Minimum size of power conduits must be ¾ inch to allow for future installation of additional circuits. Minimum size of lighting conduits will be ½ inch.
3. Install conduit / pipe a minimum of 4" above ceiling grid systems to facilitate easy replacement / removal of ceiling panels.
4. Install conduit within 3 feet above a drop ceiling.
 - a. Exception: Where all junction boxes are installed within 3 feet of the ceiling grid, conduit can be routed tight to structure.
5. Conductors for low voltage systems will not share the same conduit as other low voltage systems.(e.g., fire alarm systems and associated field devices will not be run in the same conduit as card access or HVAC control circuiting).
6. Obtain prior confirmation with Boise State PM before utilizing existing empty conduit for conductor pathway.
 - a. Label re-used conduit with the service.

Junction Boxes

1. Junction Boxes must be readily accessible and a minimum of 4" x 4" x 2.125" deep. Location must be less than 3 feet above a T-grid lay-in ceiling.
2. Except in specific cases, floor boxes are discouraged.
 - a. Provide an attic stock of floor box covers equal to 15% the total number of installed boxes.

Raceway Supports

1. Raceways will not be supported from or attached to ceiling support wires.
2. Raceways or equipment must not be suspended from steam, water, or other piping, or ductwork. Provide independent and secure support methods.
3. Care must be taken to avoid placing raceways where they will be subjected to excessive heat. Locate all raceways a minimum of 12 inches from flues, steam lines, hot water lines, etc.

Underground Conduits

1. Where PVC conduit is used in underground applications or concrete slab, provide the following fittings:
 - a. 1" conduit less than 100': PVC elbows and risers are acceptable.
 - b. Above 1" conduit, any length:
 - i. Rigid metal conduit (RMC) with PVC jacketing, tar coating or continuous strand epoxy fiberglass must be used for riser bends, extensions to above grade or through-slab locations, and changes in direction.
2. All underground conduit must have warning tape buried 6 inches above conduits.
3. See section 260100 Utilities Section for Tracer wire requirements.
4. Underground conduit must be installed at a minimum depth of 24 inches to grade from the top of the raceway.
5. Empty conduits must be installed with pull strings.
6. Raceway minimum size underground conduit is $\frac{3}{4}$ "; minimum size home run conduit is $\frac{3}{4}$ ".
7. All underground Medium voltage feeders must be encased in red concrete.

Electrical Devices

1. All electrical devices such as switches and outlets must be specification grade suitable for high abuse areas.
2. Duplex convenience outlets must be rated for 20 amps minimum and must be separately circuited from mechanical equipment.
3. Lighting switches must be rated 20 ampere, 120/277 volt at a minimum.
4. See section 260552 for labeling requirements.

Locations for Outlets

Provide electrical outlets of 115 volt, 20 amps at the following locations:

1. Mechanical and electrical rooms
2. Within 25 feet of rooftop mechanical equipment
3. Next to lawn sprinkler controllers
4. At approximately 75-foot intervals on exterior walls.
5. At approximately 40-foot intervals in corridors and located at stair landings to accommodate cleaning equipment.
6. Offices must have a minimum of one outlet on each wall, and no more than 12 feet between outlets. An outlet must also be located near office doors (behind the door on a door that opens inward) where they won't be covered by furniture.
7. Provide GFCI protection for all restrooms, kitchens and wet labs.
8. An exterior GFCI must be located within ten feet of all building entry doors, including service areas, and must not be protected via a GFCI breaker.

Outlets

1. Use specification grade devices with all-brass grounding systems.
2. Outlet boxes must be minimum 4-inch nominal square or octagonal, except that cut-in boxes will be allowed in masonry walls.
3. Handy boxes are not permitted.
4. Provide stainless steel outlet covers.

Light Switches

1. Use specification grade devices suitable for high abuse in all areas.
2. See Section 26 09 00 Lighting Controls for more information.

Grounding

1. Provide a separate, insulated equipment-grounding conductor in all lengths of branch circuit and feeder conduits (raceways must not be used for bonding or grounding).
2. See section 260553 for labeling requirements.

Section 260536 – Cable Trays for Electrical Systems

1. Cable tray use for power cabling requires prior approval by BSU Electrical Dept. or A&E Services.

Section 260539 – Underfloor Raceways for Electrical Systems

1. Electrical metallic tubing or PVC is required where under-floor raceways are used.
2. All underfloor raceways must be shown on as-built drawings and be dimensioned.

Section 260553 – Identification for Electrical Systems

General

1. Arc flash and shock-hazard-appropriate personal protection (PPE) requirement warning tags must be supplied for all electrical equipment as per code.
2. All electrical rooms must be identified as such at all entrance points.

Equipment Identification

See the Labeling Details and Examples section below for additional information.

1. In addition to factory equipment nameplates, provide contractor installed nameplates for all electrical equipment including but not limited to, switchgear, switchboards, panels, transfer

switches, disconnect switches, motor starters, control stations, transformers, capacitors, fixed equipment, and special devices furnished under Division 26.

2. Contractor nameplates must be etched lamacoid (black with white core) with minimum 1/4-inch high letters.
 - a. Labels for emergency equipment must be the same as above except tags must be red with white core.
3. Nameplate must indicate panel designation, upstream equipment, voltage, phase, and area served / equipment served if applicable.
 - a. Upstream equipment must begin with the words, "FED FROM [INSERT EQUIPMENT]"
 - b. Equipment that feeds power to other equipment such as transformers must have the words "FEEDS [INSERT EQUIPMENT]"

Vault Identification

1. Provide etched lamacoid nameplates mounted on the vault interior where legible from outside the vault. Nameplate to be etched as follows:
 - a. VAULT NO. ##
 - b. INSTALLED: [Year, Project Number]
 - c. Service Type
2. Provide labels above each conduit duct bank in the vault indicating the next destination (vault, equipment, building, etc.) and approximate distance in feet.
3. Provide vault lids inscribed with the vault number and utility.

Panel Schedule Identification

1. Panel schedule circuit descriptions must be provided in pdf format; a hard copy must be located in the panel door so that it cannot be removed, and must include:
 - a. Room number(s)
 - b. Type (e.g., equipment type)
 - i. Lights, Receptacles, equipment, etc
 - c. N,S,E,W designators as appropriate
 - d. e.g., 102 LTS – SOUTH
2. Note spare circuit breakers

Wiring Devices - Junction Boxes, Device Plates, Enclosures, Switches, and Receptacles

Label all wiring devices including junction, splice and terminal boxes, switches and device plates with a label maker and extra strength adhesive tape.

1. Label with panel name and circuit number.
2. Locate labels on the inside and outside of all device plates and covers.
3. Cover plates of junction and pull boxes associated with raceways for emergency ("life safety") power systems must be labeled "Life Safety."
4. Label wires in each junction box.

Raceway and Conduit Identification

1. Conduit installed for future use must be labeled and identified with the termination location and intended use.

Conductor Labeling

Power Conductors, Cable, and Buses

1. Circuit numbers must be identified on hot and neutral conductors at every termination point with Brady wire markers or equivalent.
2. Individual Conductors must be color coded as noted below.

Conductor	120/208V	277/480V
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Gray
Ground	Green	Green
Isolated Ground	Green/Yellow	Green/Yellow

- a. Where the proper color wire insulation cannot be obtained, black insulation with color coded plastic vinyl tape must be used.

Control Wiring

See *Boise State University's Building Automation System (BAS) Guidelines* for control wiring requirements.

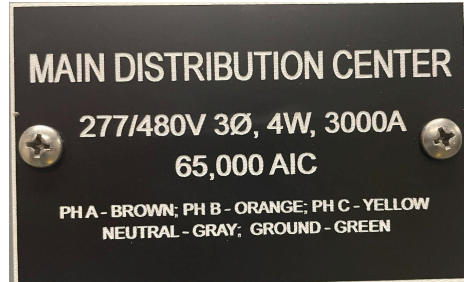
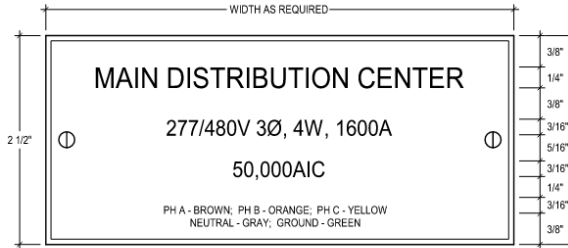
"Low-Voltage A/V" Cable and Special Systems

See *Boise State University's Cabling Standards* for AV and network requirements.

Labeling Details and Examples

Reword each nameplate for field conditions.

Main Distribution



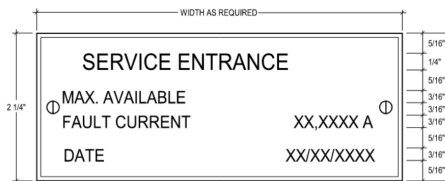
**MAIN DISTRIBUTION CENTER
NAMEPLATE DETAIL**

SCALE: FULL

NOTES

1. SEE SPECIFICATIONS FOR ADDITIONAL NAMEPLATE INFORMATION.
2. REWORD NAMEPLATE FOR FIELD CONDITIONS.
3. AMP RATING SHALL INDICATE BUS RATING.

Service Entrance Label



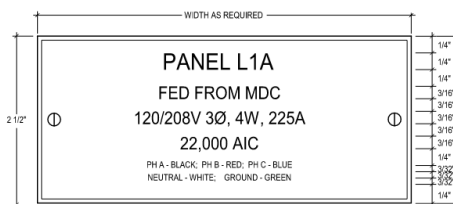
**SERVICE ENTRANCE LABEL
SECONDARY NAME PLATE DETAIL
MAX AVAILABLE FAULT CURRENT**

SCALE: FULL

NOTES

1. SEE SPECIFICATIONS FOR ADDITIONAL NAMEPLATE INFORMATION.

Panel Label



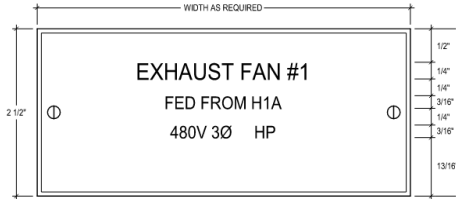
**SUB-DISTRIBUTION CENTER
AND BRANCH PANELBOARD
NAMEPLATE DETAIL**

SCALE: FULL

NOTES

1. SEE SPECIFICATIONS FOR ADDITIONAL NAMEPLATE INFORMATION.
2. REWORD NAMEPLATE FOR FIELD CONDITIONS.
3. AMP RATING SHALL INDICATE BUS RATING.

Mechanical Equipment Label



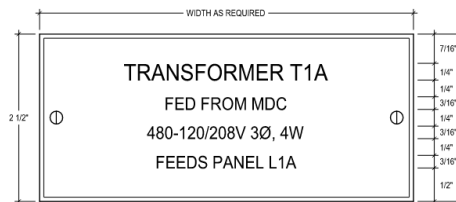
**UTILIZATION EQUIPMENT
NAMEPLATE DETAIL**

SCALE: FULL

NOTES

1. SEE SPECIFICATIONS FOR ADDITIONAL NAMEPLATE INFORMATION.
2. REWORD NAMEPLATE FOR FIELD CONDITIONS.
3. HP SHALL INDICATE HORSEPOWER.

Electrical Equipment Transformer Label



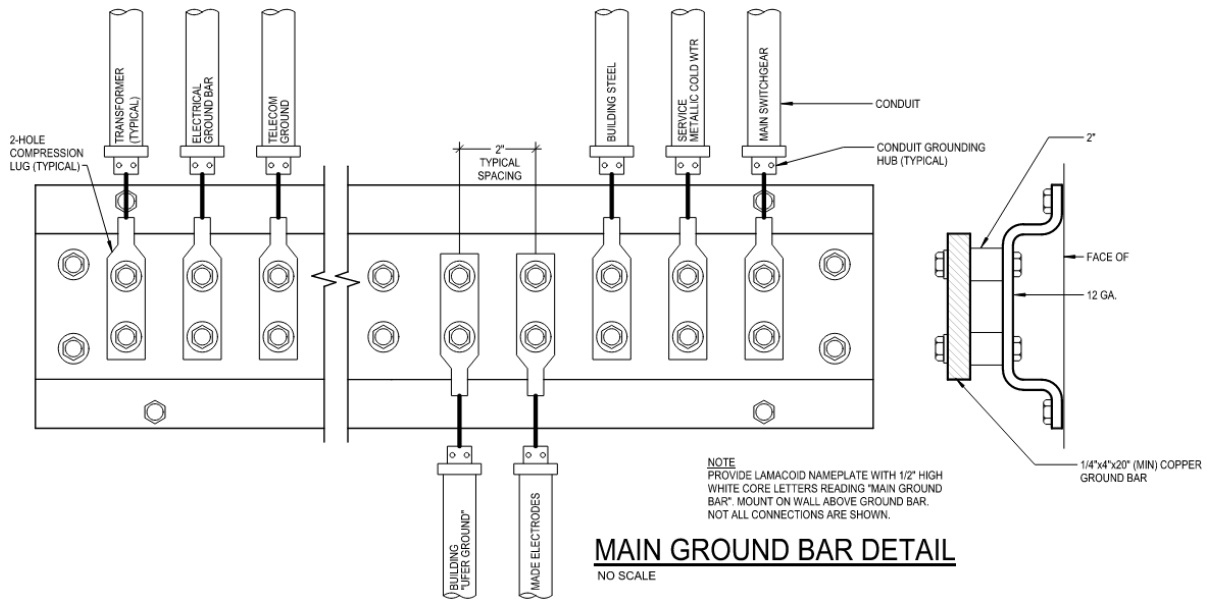
**TRANSFORMER
NAMEPLATE DETAIL**

SCALE: FULL

NOTES

1. SEE SPECIFICATIONS FOR ADDITIONAL NAMEPLATE INFORMATION.
2. REWORD NAMEPLATE FOR FIELD CONDITIONS.

Ground Bar Labeling



Section 260573 – Coordination Studies and Hazard Analysis

1. At a minimum, provide overcurrent protective device coordination studies for all new switchgear, main distribution panelboards, and sector switches.
2. Discuss updating the building Arc Flash Hazard Analysis with Facilities.

Section 260583 – Wiring Connections

1. All feeders on campus must be irreversible connections that are crimped and bolted.

Section 260800 – Commissioning of Electrical Systems

1. Discuss commissioning requirements with Boise State Project Manager and Facilities team. The following systems may require commissioning:
 - a. Emergency Power Systems: Generator, Automatic Transfer Switch, and Remote Monitoring Software.
 - b. Fire Alarm Systems
 - c. Electrical Distribution Systems: Switchgear, MCCs, breakers, etc.
 - d. Harmonic Mitigation and Surge Protection Systems
 - e. Metering Devices
 - f. Electrical Systems to Support Mechanical Commissioning: VFDs, Starters
 - g. Lighting and Lighting Control Systems
2. When commissioning is required provide a full commissioning plan and test procedure for each system to be commissioned. Include the following requirements:
 - a. Verify and document that electrical inspection, calibration, and tests have been performed as specified in other sections.
 - b. Functionally test the emergency power system. Include a power outage simulation, start-up and transfer of power to the emergency system, operation of loads connected to the emergency system, and start up and shutdown of equipment.
 - c. Lighting Systems - Check for proper lamp types, reflectors are adjusted and performing as specified, design lighting levels are met, and spot checks of ballast factors.
 - d. Lighting control systems - Check to ensure systems are programmed as designed. Provide maintenance personnel with training and manuals to reprogram as the building use changes.

Section 260913 – Electrical Power Monitoring

See the Boise State *Utilities and Metering Guidelines*.

Section 260923 – Lighting Control Devices

1. Occupancy sensors: Provide dual technology occupancy sensors utilizing a combination of passive infrared (PIR) and ultrasonic detection methods.
 - a. Provide ceiling mounted devices whenever possible.
 - b. Provide with manual override
 - c. Do not use occupancy sensors in mechanical rooms.
 - d. Consider multiple occupancy sensors for large areas and places with cubicles.
 - e. Provided dedicated occupancy sensors for separate services (lighting and HVAC)
2. Install manual lighting switches at every entrance of mechanical and electrical rooms.

3. Discuss the use of occupancy sensors in laboratories with the Boise State Project Manager and Facilities team.
4. Dimmers: Provide for conference rooms, offices, classrooms. Discuss the use of dimming controls for common areas with the project manager.
5. Consider daylight harvesting controls for new installs. Review design with FOM.

Section 260926 – Lighting Control Panelboards

1. Provide BACnet compatible lighting control panels. All new “large common area” lighting controls panels must be connected to campus BAS with updated graphics. Standalone auditorium / classroom level panels do not need to be connected to the BAS system.
 - a. Provide lighting panels to serve large common spaces such as hallways, stairways, exterior lighting, etc.
 - b. Provide standalone lighting control panels for auditoriums and large classrooms.
2. Install lighting control panels in accessible locations such as in electrical and mechanical rooms. It is not acceptable to install panels above the ceiling.

Section 260943 – Network Lighting Controls

1. Lighting controls must integrate with the building automation system.

Control Zones

1. Show the control zones for each area in the project documents and on the BAS graphics.
2. Show location of sensors and devices (panels, photocells, etc.)
 - a. Addressable devices must be labeled with a label maker and identified per the as built drawings / lighting control wiring diagram.
3. Show value of photocell on the graphics.

Section 210000 – Medium-Voltage Electrical Distribution

1. **MV-105, 133% Jacketed EPR 15kV**
2. Splices are not allowed in medium voltage feeders. Where conductors are not sufficiently long enough to reconnect to new equipment, the existing conductors must be removed and new conductors installed.
3. All projects making changes or alterations to the Boise State medium voltage power loops must provide updated loop single line drawings.
4. Provide medium voltage duct banks with spare conduits for future feeders, and to minimize downtime for future feeder replacements. Empty conduits must be installed with pull strings.
5. All underground Medium voltage feeders must be encased in red concrete, contain a tracer wire, and a warning tape.
6. Provide reinforced concrete duct banks at all road crossings.

7. Feeders and conduit installed on the primary side of all sectionalizing switches must be sized for the maximum current of the entire medium voltage power loop. There are times when the entire load may be fed from a single direction rather than two directions.

Section 261200 – Medium-Voltage Transformers

1. Transformers installed on the Boise State electrical loops must be purchased by the project.

Section 261300 – Medium-Voltage Switchgear

1. Provide Pad Mounted Sectionalizing Switches with fault indicators and viewing windows.
2. Typical medium voltage sectionalizing switches on campus are the S&C PME or PMH switch.
3. All Sectionalizing Switches must be of the dead front configuration, not live front.

Section 262200 – Low-Voltage Transformers

Identification

1. Provide each transformer with a nameplate label. See Section 260553 for details.

Section 262300 – Low-Voltage Switchgear

1. Provide new switchgear with surge protection. Discuss with the Boise State project manager
2. Provide each building fed from a medium voltage power loop with a power meter for each electrical service integrated into the main switchgear.
 - See the Boise State *Utilities and Metering Guidelines* document for all metering requirements.
3. Provide arc flash labeling.
4. Consider paralleling switchgear for laboratory and research buildings. Discuss with the Boise State project manager and facilities.

Section 262413 – Switchboards

1. Switchboards must be fully-rated and have full-length horizontal and vertical bussing.

Section 262416 – Panel boards

1. Provide door-in-door construction for panelboards rated 1200A and less.

Section 262419 – Motor-Control Centers

1. Discuss the use of MCCs with the Boise State Facilities team. The general preference is to use VFDs and standalone motor starters where needed.

Section 262713 – Electricity Metering

1. When budget allows, consider providing submetering for large loads such as HVAC, lighting, or lab equipment. Meters must integrate with the Schneider Power Monitoring Expert Software. See Boise States *Utilities and Metering Guidelines* document for more details on meter standards.

Section 262716 – Electrical Cabinets and Enclosures

1. All electrical cabinets and enclosures must be accessible. When required to be located above ceilings, enclosures must be within 2' of ceiling grid.
2. Identify and label all enclosures per section 260553.

Section 262923 – Variable Frequency Controllers

See the Boise State University Preferred Mechanical Manufacturers list for more information.

1. Provide a drive bypass on critical equipment. Coordinate with the University project manager.
2. All VFDs must be provided with 3% or 5% line side reactors.
3. Where VFDs serving inverter duty motors are mounted 100 feet or greater distance away from the motor, provide VFD with a load side reactor.
 - Provide load side reactors for all non-inverter duty rated motors with VFDs regardless of distance.
4. All VFDs must be monitored by the Building Automation System (BAS) and will generate an ALARM at the operator WorkStation whenever the drive is NOT in AUTO.

Section 263200 – Packaged Generator Assemblies

1. Discuss the need for emergency generators with the Boise State Project Manager and Facilities team on a project-by-project basis.
2. Provide a generator and ATS switch from Cummins.
 - a. Other manufacturers may be considered when those manufacturers can demonstrate successful integration of their equipment into the Cummins power command monitoring system with an equivalent level of functions and interoperability.
3. Generators must integrate with the University standard monitoring system, Cummins PowerCommand Cloud.
 - a. Generators must communicate with the central monitoring system via a local area network (LAN) connection. Compatibility must be ensured by providing a four (4) hour full-load test. Test results must be included as a submittal requirement.
4. The fuel source must be diesel or natural gas, as allowed by local code. If diesel, the tank must have the capacity to run the generator at full demand for twenty four (24) hours. The engine must be sized for an elevation of 2800' and a design temperature of 105°F (40°C).
5. Diesel generator systems must be provided with fuel monitoring capabilities.

6. Provide generators with acoustic mufflers.
7. Generator testing must be witnessed by the Boise State Facilities and Fleet Service Shop teams.
8. Provide owners training on all generator systems.
9. Results from the generator manufacturer sizing software must be submitted to ensure compatibility with the UPS and ability to meet load demands.

Emergency Systems

At a minimum, the following systems must be connected to emergency power.

1. Life Safety Systems
 - a. Egress lighting - Battery backup is not preferred for emergency lighting power.
 - b. Fire Alarm Systems - FACP, Smoke dampers, etc.
 - c. Fire Sprinkler Systems - Fire pumps, etc.
 - d. Laboratories and Equipment - Exhaust fans, hoods, freezers, receptacles, etc.
2. Card access, electrified hardware, and security devices.
3. Building Automation Systems (BAS)
4. OIT Systems - Data Closets, Racks, HVAC Equipment
5. Elevators - Minimum of one
6. Sanitary Pumps
7. Sump Pumps - (When requested by Boise State University)
8. Heating Systems for freeze protection
9. Steam Condensate Pumps
10. Other equipment as identified by design team or Boise State University

ATS Switches

1. See 263623 – *Automatic Transfer Switches* for requirements.

Section 263353 – Static Uninterruptible Power Supply

1. Coordinate with Boise State Facilities for UPS requirements.
2. Discuss network monitoring for UPS systems with Boise State Facilities.
3. When possible, do not locate UPS systems above the ceiling.

Section 263500 – Power Filters and Conditioners

1. Discuss the use of power filters and conditioners with Boise State Facilities.

Section 263526 – Harmonic Filters

1. Discuss the use of Harmonic Filters with Boise State Facilities.

Section 263623 – Automatic Transfer Switches

General

1. Automatic Transfer Switches for emergency generators must be manufactured by Cummins and must integrate with the campus standard monitoring system, Cummins PowerCommand Cloud.
 - a. Other manufacturers may be considered when those manufacturers can demonstrate successful integration of their equipment into the Cummins power command monitoring system with an equivalent level of functions and interoperability.

Section 264300 – Surge Protective Devices

1. Provide surge protection for all new switchgear on campus.

Section 265100 – Interior Lighting

1. All interior fixtures are required to be LED fixtures that are vetted by the Design Light Consortium (DLC).
2. Non-LED or custom fixtures require approval from the Boise State Project Manager and Facilities team.
3. Unless otherwise approved, all interior lights must be dimmable with either a 0-10V signal or CAT5 cable.
4. Laboratory Lighting: Provide egress lighting on emergency power near the door inside of wet and large laboratories.
5. Retrofit kits may be used in lieu of providing new fixtures provided the kit meets all requirements for a new light as listed for the basis of design.
6. Wireless controls are not acceptable.

General Lighting Specs.

1. 4000°K: General lighting applications for campus.
2. 80 CRI Minimum.

Basis of Design Lights

1. Provide the following lighting fixtures or equivalent for general lighting applications.

2'x4' and 2'x2' Troffer Style Light

Preferred for general room lighting. Discuss other design options with the Boise State PM when applicable.

1. Basis of Design: Lithonia Series BLT
 - a. 80% LED Lumen Maintenance at 60,000 Hours (L80/60,000)

- b. 5 year manufacturer warranty
- c. Dimming
 - i. Non-Configurable Lights: 0-10V Dimming Drivers to 10%
 - ii. Configurable / Addressable Lights: Use CAT5 cabling for dimming to 10%. Wireless controls are not acceptable.
- d. When integrated occupancy sensors are provided:
 - i. Dual Tech Occupancy Sensors Passive Infrared and Microphonics.



Recessed Linear Style Lights

Preferred for focus and accent lighting applications and in small rooms with hard lid ceilings such as restrooms, custodial closets, and other non-regularly occupied spaces. Discuss other design options with the Boise State PM when applicable.

1. Basis of Design: Neo-Ray Define Series or equivalent
 - a. 90% LED Lumen Maintenance at 100,00 Hours (L90/100,000)
 - b. 5 year manufacturer warranty
 - c. Dimming: 0-10V or CAT5 cabling for dimming to 10%. Wireless controls are not acceptable.

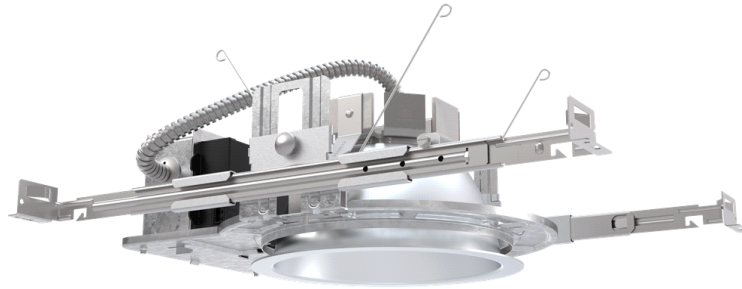


Round Recessed Style Lights

Preferred for focus and accent lighting applications and in small rooms with hard lid ceilings such as restrooms, custodial closets, and other non-regularly occupied spaces. Discuss other design options with the Boise State PM when applicable.

1. Basis of Design: Lithonia LDN Series or equivalent
 - a. 70% LED Lumen Maintenance at 60,000 Hours (L70/60,000)
 - b. 5 year manufacturer warranty

- c. Dimming
 - i. Non-Configurable Lights: 0-10V Dimming Drivers to 10%
 - ii. Configurable / Addressable Lights: Use CAT5 cabling for dimming to 10%. Wireless controls are not acceptable.



Suspended Style Light Fixtures

Limit the use of suspended fixtures. Approval required for the use of suspended light fixtures by the Boise State PM and facilities team.

Surface Mounted Style Light Fixtures

Limit the use of surface mounted fixtures. Approval required for the use of surface mounted light fixtures by the Boise State PM and facilities team.

Section 265200 – Emergency Lighting

1. When a generator is available and code allows, power emergency lighting and exit signs from the emergency generator circuits.

Section 265300 – Exit Signs

1. In existing buildings, provide exit signs to aesthetically match the existing buildings.
2. Provide exit signs that are LED.
3. Provide arrows indicating direction to exit.

Basis of Design

Provide the following exit sign fixture or equivalent.

1. Wall or Ceiling Mount: Lithonia LQC
 - a. Brushed Aluminum Housing with Red colored letters
 - b. 5 year manufacturer warranty
 - c. 5 year lamp life



Section 265600 – Exterior Lighting

1. All exterior fixtures are required to be LED fixtures that are vetted by the Design Light Consortium (DLC).
2. Non-LED or custom fixtures require approval from the Boise State Project Manager and Facilities team.
3. Bollard lighting is not acceptable without approval from the Boise State Project Manager and Facilities Department.
4. In-ground lights are not acceptable without approval from the Boise State Project Manager and Facilities Department.
5. Exterior lights and lighting panels must integrate with the Building Automation System (BAS) when possible. See section 260926 for lighting panel requirements.
6. Ground to lamp height for any light must not exceed 32' so that University equipment can be used to maintain fixtures.

Section 265613 – Lighting Poles and Standards

Pedestrian Pole Light Basis of Design

Fixture: Selux Saturn Cutoff LED

- Lamp Type: LED
- Voltage: 120V / 277V preferred
- Color Temperature: 4000K
- Finish Color: Silver



Pole Option #1: Holophane Model SLA Extruded Aluminum Pole System

- Height: +12'-0"
- Shaft Style (ST2): 5.75" SQ. Extruded Shaft - Medium Duty
- Tenon: 3x3 Tenon
- Finish: Standard Manufacturer Powder Coat matching the fixture.
- Options:



- Provide with a Base Plate and Base Cover
- Receptacle: When indicated on plans, install at 11'.

Pole Option #2: Hapco Model RSS Round Pole

- Height: +12'-0"
- Shaft Style: Round

Section 265616 – Parking Lighting

1. Provide one of the basis of design fixtures and poles for all parking lot lights. Substitutes may be considered if approved by the Boise State project managers and facilities team.
 - a. Exception - Where lighting fixtures are inaccessible by a standard bucket truck, coordinate with the Boise State project manager and facilities team to provide a lighting pole with a mid-hinged design (Ex. On top of parking garages)

Parking Basis of Design

Fixture Option #1: Lithonia Model DSX2-LED

- Lamp Type: LED
- Color Temperature: 4000K
- Voltage: 120 / 277 preferred
- Finish: Standard manufacturer powder coat color to match as close as possible to other silver fixtures on campus.
- Certification
 - DLC Listed
 - Dark Sky Approved



Fixture Option #2: McGraw Edison Model GLEON Galleon LED

- Lamp Type: LED
- Color Temperature: 4000K
- Voltage: 120 / 277 preferred
- Finish: Standard manufacturer powder coat color to match as close as possible to other silver fixtures on campus.
- Certification
 - DLC Listed
 - Dark Sky Approved



Pole Option #1: KW, Model RTSP

- Height: +30'-0"
- Shaft Style: Tapered Round
- Finish: Standard manufacturer powder coat matching the fixture.
- Base: 7.5"
- Options:
 - Receptacle: When indicated on plans, install at 11'.
 - Standard Hand Hole

- Base Cover
- Tamper Proof Hand hole Cover and Base Cover Screws.

Pole Option #2: Valmont, Model DS210

- Height: +30'-0"
- Shaft Style: Tapered Round
- Finish: Standard Manufacturer powder coat matching the fixture.
- Options:
 - Receptacle: When indicated on plans, install at 11'.
 - Standard Hand Hole
 - Base Cover
 - Tamper Proof Hand hole Cover and Base Cover Screws.