BYU INSTRUCTIONS TO ARCHITECTS AND ENGINEERS:
ELECTRICAL

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Specifications

Division 26 – Electrical

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Electrical Cost Breakdown Form:

1. The architect/engineer shall review electrical cost breakdown form with campus electrical engineer, prior to inserting into the construction documents package.
2. The engineer shall verify that all applicable Division 26 specification sections are included in the electrical cost breakdown form.
3. For single manufacturers, insert “BYU” as a Bid Alternate ‘A’ bidder. BYU reserves the right to purchase single manufacturer items.

Campus Site Visits:

1. When visiting the campus for site scoping visits, project site visits, etc., please notify the campus electrical engineer that you are on campus. The campus electrical engineer can provide insights to existing conditions and preferred method and materials for proposed projects.
2. Under no circumstances shall any off campus personnel open or operate campus electrical equipment, without the written approval of the campus electrical engineer or the BYU Physical Plant Electrical Shop manager. The campus electrical engineer can be contacted at 801-422-5437. The BYU Physical Plant Electrical Shop Manager can be contacted at 801-422-5533.

Campus Electrical System:

1. Electrical power is furnished to the Brigham Young University (BYU) campus from Provo City Power at 46 KV. The power is then transformed in the BYU owned, substations to 12470Y/7200 VAC. The campus distribution voltage is 12470Y/7200 volts. Some areas utilize a 4160Y/2400 VAC system.

Operation and Maintenance Manuals:

1. Each submittal pages shall be stamped with the current date.
2. Identify which items on submittal sheets are included in the project.
3. No final inspection by the University will be conducted without prior delivery of performance data, spare parts lists, operating instructions and equipment descriptive literature that contains complete numbered replacement parts list.

General Requirements:

1. Do not assume the University will provide, connect or otherwise perform any services without specific prior agreement.
2. The University must schedule interruptions of services when Contractor wishes to make utility connections. Notify in writing the Director of Physical Plant 48 hours prior to the time when interruption is desired. Interruption must be at the University's convenience. Overtime, if required for this work, is to be at contractor's expense.
3. Prior to placing a full load on the electric service, the University will be notified and the activation of the full load into this service will be at a time agreeable to the owner and under the supervision of University personnel.
4. All work shall be in accordance with the latest adopted edition of the National Electrical Code.
5. All new direct buried conduits shall be surveyed, prior to backfilling. The Owner’s civil engineer shall perform all surveying. Sufficient notice shall be given to civil engineer to perform their surveying responsibilities.
High Temperature Vaults:

1. For high temperature vaults with heat exchangers, provide the following items on the electrical plans:
   a. Show the location of the BYU Heating Plan control panel. Coordinate location of Heating Plant control panel with Heating Plant personnel.
   b. Provide 120V power to the control panel.

Use of Specifications on Campus Projects:

1. The electrical specification will be furnished by BYU on computer disks (or by email) for the architect/engineer to edit.

2. The architect/engineer shall use the current BYU Specification and adapt them to the current project(s) they are working on. Use of non-Owner approved specifications are not permitted.

3. The architect/engineer shall obtain a new copy of the electrical specification at the commencement of the project. Prior to the final review, verify that there have been no additional changes to the campus electrical specification.

4. The architect/engineer shall provide a redlined specification to the campus engineer, prior to the first plan review. The campus engineer will need a minimum of a week to review the specification and provide their comments at the next plan review.

5. Questions can be answered by calling 422-5437 or 422-5505.

Section 260500 - Common Work Results for Electrical

1. Fire-Rated Assemblies: Install UL approved, fire rated assemblies for penetration of fire-rated floor and wall areas, unless openings are compatible with firestop system used during fabricated and construction of floors or walls. Use of conduits through fire rated area penetrations, shall not be permitted.

2. The Electrical Contractor shall have a licensed or certified Master Electrician assigned to direct the electrical work and to coordinate work with the General Contractor and other trades. Furthermore, a licensed or certified journeyman electrician shall be assigned to supervise the actual performance of all electrical work under Division 26. All installers must be certified journeyman.
   a. All workmen doing electrical work of any nature must at all times carry their electrician's license with them and show it upon request.
   b. The licensed or certified journeyman assigned to supervise the performance of Division 26 electrical work, shall be required to be on the job site at all times, while Division 26 work is being performed.

3. Construct concrete bases of dimensions indicated, but not less than 4 inches larger, in both directions, than supported unit. Follow equipment manufacturer's current, written anchorage recommendations and setting templates for anchor-bolt and tie locations, unless otherwise indicated. Use 4000-psi, 28-day compressive-strength concrete and reinforcement.

4. Light pole bases. Coordinate installation of light pole bases with Owner's Physical Plant Electrical Shop.
5. Note: ADA requirements for entry doors—An ADA push button on each face of each required and shall be 2'-10" from floor to centerline; with a minimum of 3'-0" from edge of door in open position of pull side and 12" minimum of push side. In secure areas, operation of ADA door operators may require approval from the building security system.

Section 260513 – Medium Voltage Cables

1. See the current campus Specification Section 260513 for primary voltage cable, termination, approved manufacturers and other associated requirements.

2. Fault Indicators.
   a. Locate a fault indicator on each medium voltage cable.
   b. Alternate the vaults/switches, etc., where fault indicators are located, so that only every other vault will contain fault indicators.

3. All medium voltage cables shall be tested per specification requirements, prior to be accepted by the owner. The engineer will confirm the maximum test voltage with the cable manufacturer. The BYU Electrical Shop will observe the tests; contractor shall submit a written evaluation of same within five days to the Electrical Engineer.

Section 260519 - Low-Voltage Electrical Power Conductors and Cables

1. Feeders shall have type THHN/THWN insulation except where extreme heat or water conditions exist, thus requiring special insulation.

2. Minimum conductor size shall be No. 12 AWG, except for low voltage, signal, fire alarms, and intercom systems, then only as approved by Owner.

3. Main secondary feeders to lighting and power panel board shall be designed to include an additional 50% future electrical capacity and circuit breakers space. The feeders shall be designed for a 2% voltage drop, which will include the future electrical capacity.

4. Branch circuit conduits between outlets and also between outlets and distribution panel boards shall not have more than seven (7) conductors.

5. Corridor convenience receptacles:
   a. All convenience outlets in corridors and halls shall be circuited independent of other areas.
   b. Alternate circuits through the corridors and run #10 THHN conductors throughout the circuit.
   c. Corridor outlets are to be on separate circuits from classrooms and offices.

6. Conductor Material:
   a. All conductors shall be stranded copper, with the exception of bare copper ground conductors #10 or smaller. Copper complying with NEMA WC 5 stranded conductor.
   b. Aluminum conductors are not allowed on this project.

7. MC and NMC (Romex) cables shall not be used, unless written permission is received from the campus electrical engineer.

8. Clean conduits with a 95% mandrel, prior to installation of conductors. Mandrel shall be sized per cross-sectional area of conduit.

9. Wiring at Outlets: Install conductors at each outlet, with at least 12 inches of slack.
10. Heat Cables for Ice Melt Systems. Coordinate use of heat cabling with Owners Planning Department and campus electrical engineer, prior to including in project design. Provide heat cable systems for the following areas.
   a. Drains and downs spouts exposed to the elements.
   b. Rain gutters.

Section 260523 - Control-Voltage Electrical Power Cables

This section intentionally left blank.

Section 260526 – Grounding and Bonding for Electrical Systems

1. See the current campus Specification Section 260526 for all campus grounding requirements.

2. Grounding Bus:
   a. Provide a grounding bus in each electrical room.
   b. The main building grounding bus shall be located outside and adjacent the main switch board enclosure.
   c. Extend all building main grounding conductors to the main building grounding bus.
   d. Install in all telephone equipment rooms, under all raised floors and elsewhere as indicated.
   e. Use insulated spacer; space 1 inch from wall and support from wall 12 inches above finished floor, unless otherwise indicated.
   f. At doors, route the bus up to the top of the doorframe, across the top of the doorway, and down to the specified height above the floor.

3. Underground Grounding Conductors:
   a. Use copper conductors, No. 4/0 AWG minimum for all grounding, with the exception of ground rods.
   b. Use a #6 AWG ground conductor for all ground rods, unless noted otherwise.
   c. Bury all grounding conductors at least 24-inches below grade.
   d. Ufer Ground (Concrete-Encased Grounding Electrode):
      1) If concrete foundation is less than 20-feet long, coil excess conductor within base of foundation.
      2) Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to grounding electrode external to concrete.

4. Install properly sized, insulated equipment grounding conductors with all feeders and branch circuits.

5. Ground rods:
   a. Drive ground rods until tops are 12-inches below finished floor or final grade, unless otherwise indicated.
   b. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make connections without exposing steel or damaging copper coating.

6. Test Wells:
   a. Ground rod driven through drilled hole in bottom of hand-hole and shall be at least 12-inches deep, with cover.
   b. Install at least one test well for each service, unless otherwise indicated. Install at the ground rod closest to service entrance. Set top of test well flush with finished grade or floor.

7. Underground Distribution System Grounding. Provide grounding for the following:
a. Manholes and Hand-holes.
b. Underground concrete encased duct banks.
c. Connections to Manhole Components
d. Pad-Mounted Transformers and Switches

Section 260529 – Hanger and Supports for Electrical Systems

1. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel or aluminum, slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

2. Where trapeze-type support are utilized, minimum length shall be 24”, unless noted otherwise.

Section 260533 – Raceway and Boxes for Electrical Systems

1. Conduit raceway sizes:
   a. Interior areas: Minimum size conduit shall be 3/4".
   b. Exterior areas: Minimum size conduit shall be 1".

2. Aluminum conduit is prohibited.

3. MC and NMC cable shall not be used unless approved in writing by the campus electrical engineer and the BYU Electric Shop.

4. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

5. Raceways Embedded in Slabs are not permitted, unless approved in writing by campus electrical engineer.

6. Install no more than the equivalent of (4) four 90-degree bends in any conduit run except for communications conduits, for which no more than (2) two 90-degree bends are allowed.

Section 260536 – Cable Trays for Electrical Systems

1. Where trapeze-type support are utilized, minimum length shall be 24”, unless noted otherwise.

2. In grid and hard ceiling areas, locate bottom of the cable tray within 24" on the bottom of the ceiling.

3. Where sprinkler piping encroaches within the cable tray area, the cable tray may be reduced to a 2" or 3" high tray to pass under the piping.

Section 260539 – Under-floor Raceways for Electrical Systems

This section intentionally left blank.

Section 260543 - Underground Ducts and Raceways for Electrical Systems

1. All medium voltage and communication backbone duct banks shall be concrete encased.

2. All concrete encased duct bank shall be inspected by electrical engineer of record, campus electrical engineer and the BYU Electrical Shop personnel, prior to be covered in concrete.
3. Main line conduits to buildings shall be underground. Where electrical lines run parallel to heat tunnels, it is recommended that they be located outside of the tunnel in the ground where the heat will dissipate more readily. In some cases where the tunnels are well ventilated and it is desirable to include all utilities, the electrical lines may be located inside. Prior to installing electrical utilities in heating tunnels, first obtain permission from the campus electrical engineer.

Section 260548 – Vibration and Seismic Controls for Electrical Systems
This section intentionally left blank.

Section 260553 – Identification for Electrical Systems
1. See specification section for approved methods and materials for identification of electrical systems.
2. All above and below grade conduits, cables and conductors shall be identified with approved methods and materials.
3. All above grade conduits and boxes shall be color-coded per function of conduit and boxes.
4. All panel circuit directories are to be typewritten with specific circuit designation.
5. Provide Power Single Line Diagram, sealed in plastic, located near the main switchboard. Verify location with the owner.
6. Identify with a permanent marker, the circuit numbers in all outlets and switch boxes, on the inside of each junction box. Do not mark on the outside of the cover plate.
7. Receptacles Identification Labels: On each power receptacle, install unique designation label that states the panel and circuit breaker source.
8. Conductors for bells, clocks, intercommunication systems and alarm circuits shall be identified at all junction or terminal blocks with plastic tags attached with waxed linen cord. Lettering on the tag shall be made with a wax pencil, covered with one coat of spray lacquer. Information on the tag shall include name of circuit and area served.

Section 260573 – Overcurrent Protective Device Coordination Study
1. All projects that include adjustable trip circuit breakers, shall have an overcurrent protective device coordination study performer, prior to the Owner's acceptance of the building.

Section 260574 – Electrical System Testing
This section intentionally left blank.

Section 260913 – Electrical Power Monitoring and Control
This section intentionally left blank.

Section 260923 – Lighting Control Devices
1. Provide occupancy sensors in all office, restroom and custodial closets. Coordinate each type of sensor and type of space with campus electrical engineer.
Section 261116 – Secondary Unit Substations

This section intentionally left blank.

Section 261200 – Medium Voltage Transformers

1. Transformers for individual buildings shall be pad mounted and located near the building exterior. Location shall be as inconspicuous as possible and well-ventilated. Location and screening of transformers shall be approved by the BYU Planning Departments resident architect.

2. Transformer windings shall be copper.

3. If transformers must be located inside the building, a transformer vault must be arranged in relation to the other parts of the building such that transformers may be changed without the removal of permanently placed concrete or machinery. Access to transformer vaults through machinery spaces is acceptable. The transformer vault shall house the transformer and associated switching only. Oil containment shall be considered for area around transformer.

4. Transformers shall be oil-filled with Natural Ester Envirotemp® FR3 or HMWHR-Temp. Dry type transformers shall not be used unless specifically approved by the Owner. Three phase banks shall be three single phase transformers "Y" connected with the primary neutral properly connected to the common neutral of the distribution system. Primary and secondary neutrals shall also be adequately grounded at the transformer site with driven ground rods and wherever possible with water pipe ground. There shall be a disconnect both on the primary and secondary sides of each transformer.

5. Disposal of Liquid Filled Transformers: Any existing liquid filled transformer that is the property of the University, which is surplus to a project, remains the property of the Owner for disposal. The Contractor shall de-energize the transformer, disconnect all primary and secondary leads, physically remove the transformer from where it is located, and deliver it to the Owner at an agreed upon location at the project limit line. Responsibility for the safe handling and spill mitigation remains with the Contractor until the transformer is delivered to the Owner.

Section 261300 – Medium Voltage Switchgear

1. Switchgear bus shall be tin-plated, copper.

2. Install switchgear on 4” concrete housekeeping pad.

3. Medium voltage switches shall be pad-mounted. Installation in underground vaults shall not be permitted. Location shall be as inconspicuous as possible and well-ventilated. Location and screening of switches shall be approved by the BYU Planning Departments resident architect.

Section 262200 – Low Voltage Transformers

1. Transformer windings shall be copper.

2. Install transformer on 4” concrete housekeeping pad.

3. Provide overcurrent protection for transformers on both the primary and secondary side of the transformer. If the overcurrent protection device is not within sight of the transformer, locate the
device in a separate enclosure, near and within sight of the transformer. Overcurrent protection devices shall be circuit breakers, installed in enclosures. The devices shall be sized per the maximum allowable amperage NEC 450 recommendation.

Section 262300 - Low-Voltage Switchgear

This section intentionally left blank.

Section 262313 – Paralleling Low-Voltage Switchgear

This section intentionally left blank.

Section 262413 - Switchboards

1. Switchboard bus shall be copper.
2. Install switchgear on 4” concrete housekeeping pad.

Section 262416 – Panelboards

1. Main secondary feeders to lighting and power panelboard shall be designed to include an additional 50% future electrical capacity and circuit breakers space. The feeders shall be designed for a 2% voltage drop, which will include the future electrical capacity.
2. Minimum size panel to be 100 amps with 4 #1 THHN copper conductors as the feeder. Size conductors to each panel to the size of the bus, i.e. 100 Amps #1, 225 Amps #4/0.
3. Panel bus material shall be copper. Aluminum bus material shall not be permitted.
4. Flush-mounted panels should be provided with spare conduits stubbed into accessible areas above and/or below sufficient to wire in spare capacity of the panel. See Specification Section 262416.
5. Provide hinged, door in door construction for all branch panels.
6. All breaker panels shall have bussing complete, ready to receive breakers.
7. Directories for panel boards shall be made after the owner's permanent room numbers are installed on the doors and shall use these numbers rather than the area numbers on the construction drawings. Information is to be typewritten.
8. We are striving for consistency in identifying panels on campus. Therefore, the following method of labeling shall be adhered to:

Panel Labeling Nomenclature:

Identify the floor or level - B, 1, 2, etc.
Identify the voltage – “H” high 277/480 or “L” low 120/208, etc.
Identify the panel series - A, B, C etc.

Branch Panels:

Example: Panel “BHA” - Basement level - 277/480.
Panel “BLA” - 120/208.
Panel “A” - First panel on basement level.

All Emergency panels shall be labeled with the letter 'E', i.e. Panel 'BHE', etc.

Distribution Panels:

Example: Panel “1DPHA” - First level, distribution panel - 277/480.
Panel “1DPLA” - 120/208, First distribution panel on first level.

Example: Panel “MDP” - Main Distribution Panel.
Panel “MDPE” - Main Distribution Emergency Panel

Section 262419 – Motor-Control Centers

1. The use of motor control centers (MCC’s) shall be upon the approval of the campus electrical engineer.

Section 262500 – Enclosed Bus Assemblies

This section intentionally left blank.

Section 262600 – Power Distribution Units

This section intentionally left blank.

Section 262713 – Electricity Metering

1. BYU reserves the right to charge contractors for their use of BYU utilities during construction. If utility service is available from the owner, then these established rates will apply:
   a. ElectricityRate of current cost to BYU
   b. DemandRate of current cost to BYU

2. Electrical Meters. Each new (or remodeled, in which the electrical service is modified) building shall be wired and equipped with Square 'D' power logic metering.

Section 262726 – Wiring Devices

1. Wall switches and duplex receptacles shall be shall be rated 20 amps.

2. In occupied areas, provide stainless steel cover plates, unless architectural treatment requires special types.

3. The contractor shall install blank cover plates on all junction boxes that do not have duplex or switch cover plates, etc.

4. Tombstone type power and data receptacles shall not be permitted.

5. All floor penetrations shall use UL listed fire rated poke through assemblies. Conduit only poke-throughs may be permitted, if they are fire caulked both inside and outside the conduit after cables have been installed and must be approved by the campus electrical engineer.

Section 262813 - Fuses
1. Provide fuse types recommended by equipment manufacturer.

Section 262816 – Enclosed Switches and Circuit Breakers
1. Electric Motor Safety Switches. All fan, pump and chiller motors shall have lockable motor switches.

Section 262913 – Enclosed Controllers
1. Only NEMA type starters shall be utilized on campus projects.

Section 262923 - Variable-Frequency Motor Controllers
1. This section fall under the mechanical specification. The mechanical engineer is responsible for specifying variable frequency drives (VFD’s).

Section 263213 – Engine Generators
1. Contractor to install a Cummins I-watch generator monitoring system on all new and modified generator sets. Provide as a separate item on bid breakdown form.

Section 263323 – Central Battery Equipment
1. The use of central battery systems shall be approved by the campus electrical engineer.

Section 263353 – Static Uninterruptable Power Supply
This section intentionally left blank.

Section 263533 – Power Factor Correction Equipment
1. Power Factor Correction. The power factor shall be maintained at a minimum of 95 percent lagging for all load conditions on the primary side (12470 volt) of the building step down transformers.

Section 263600 – Transfer Switches
1. Install the battery charger in the transfer switch, unless directed otherwise.
2. Install free-standing transfer switches on a 4” concrete, housekeeping pad.

Section 264113 – Lighting Protection for Structures
1. The installation of a lightning protection system shall be discussed with the BYU Planning department’s resident architect and campus electrical engineer, during the scoping phase of each project.

Section 264200 – Cathodic Protection
This section intentionally left blank.
BYU INSTRUCTIONS TO ARCHITECTS AND ENGINEERS:
ELECTRICAL

Section 264313 – Surge Protection Devices for Low-Voltage Electrical Power Circuits

1. Provide transient voltage suppression systems for all service entrance equipment.

Section 265100 – Interior Lighting

1. Light all areas per IES Standards. Except where noted otherwise, the following light levels shall be provided:

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<th>AREAS</th>
<th>FOOT CANDLES</th>
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<td>Classrooms &amp; Laboratories</td>
<td>50-200</td>
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<tr>
<td>General Shop Areas</td>
<td>50-200</td>
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<tr>
<td>Sewing &amp; Drafting</td>
<td>50-200</td>
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<tr>
<td>Library, Reading Areas</td>
<td>50-200</td>
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<tr>
<td>Stack Areas: Active</td>
<td>20-50</td>
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<tr>
<td>Inactive</td>
<td>5-10</td>
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<tr>
<td>Storage Areas &amp; Mechanical Rooms</td>
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<td>Hallways</td>
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<tr>
<td>Foyers</td>
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<tr>
<td>Restrooms</td>
<td>15-25</td>
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<tr>
<td>Main Frame Computer Rooms</td>
<td>40-50</td>
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</tbody>
</table>

2. Fluorescent fixture lenses shall be 100% virgin acrylic and .125” thick. Do not use .097” thick lenses.

3. Fluorescent light fixtures shall have “A” sound rating, programmable start, high power factor electronic ballasts. Instant start ballasts may be used with the approval of the campus electrical engineer.

4. Instant start ballasts shall not be used with occupancy or daylight harvesting sensors.

5. Maximum length for indirect light fixtures shall be 12 feet. Design fixture lengths so that the light fixtures can be removed or replaced, without destroying the fixture.

6. Fluorescent lamps.
   a. Lamp color shall be 4100ºK, unless approved by the campus electrical engineer.
   b. Minimum lamp CRI shall be 70.

7. Light fixture schedules shall be shown on the electrical drawings.

8. All light fixtures in plumbing chases, tunnels, etc., shall to be fluorescent. Do not use incandescent lights in these spaces.

9. Use of incandescent light sources shall not be used on campus, unless approved by the campus electrical engineer.

10. Use 4’ fluorescent or HID fixtures in place of incandescent fixtures wherever possible. Compact fluorescent fixtures may also be considered in place of incandescent. Coordinate all specialty lighting with BYU campus electrical engineer.

11. Light Fixtures used in recessed T-Grid ceilings or for surface mounting of 2’ x 2’ size, use FB032 or BIAx lamps. Do not use F20 lamps.
12. Emergency fluorescent fixture battery pack units shall not be permitted unless approved by the campus electrical engineer.

13. Tritium powered or self-illuminated exit signs shall not be used on campus.

14. BYU has standardized on the Dual-lite, #SESGW (single face) and #SEDGW (double face) exit signs. Exit Signs are required at all Required Exits as described in the model building codes; all exceptions are to be discussed with University representatives.

15. All light fixtures and lamps selected by the architect and engineers shall be reasonably priced and readily available. No HQI lamps will be allowed.

16. The architect/engineers shall submit cut sheets of light fixtures to the campus electrical engineer and the Interior Design section of the Planning Department, for review during project design.

17. The architect/engineer shall provide a working sample for all unique light fixtures for proposed projects. BYU shall be permitted to install, use, test and otherwise verify the proper operation of the light fixtures. If required, BYU may purchase light fixture. The Owner reserves the right to determine if a fixture is unique.

Section 265561 – Theatrical Lighting

This section intentionally left blank.

Section 265600 – Exterior Lighting

1. BYU has a standard area light fixture for all walkway and parking area lights. Coordinate with campus electrical engineer for specific requirements.

2. Exterior lighting (yards, parking and roadways) shall be accomplished by using an LED source. Color may vary for different areas. These areas should be discussed with BYU campus electrical engineer, as well as approved exterior pole mounted lights for use on the BYU campus.

3. Light all areas per IES Standards. Except where noted otherwise, the following light levels shall be provided. All lights in entry or outdoor soffits are to be sealed against any air infiltration into the soffits.

   AREAS FOOT CANDLES
   Parking Areas & Roadways 1-2

4. Lighting installations on the Brigham Young University Campus are connected to 120 or 277 VAC sources. Use of 208, 240 or 480 VAC sources will need to be approved by the campus electrical engineer.

Section 265668 – Exterior Athletic Lighting

This section intentionally left blank.
POLE BASE DETAIL - BYU STANDARD - ALL AREAS

NOTE: AT THE CONTRACTORS OPTION, THE BASE 6" BELOW GRADE MAY BE ROUND, INSTEAD OF OVAL.

DATE APPROVED: 3/26/2010
DRAWN BY: KGP
APPROVED BY: KGP