ADDENDUM NO. 1

Site / Parking / Bus Loop Improvements
West Ferris Secondary School
North Bay, Ontario

The following Addendum shall be part of the Tendering Documents and shall supersede the drawings and/or Specifications and previously issued Addenda where applicable.

This Addendum consists of 1 page plus the listed attachments.

Attachments: Drawing E101
Revised Section 00 01 07 - Professional Signatures and Seals (1 page)
New Electrical Specification Sections:

- Section 16010 Electrical General Requirements (5 pages)
- Section 16106 Installation of Cables in Trenches and in Ducts (2 pages)
- Section 16111 Conduits, Conduit Fastenings and Conduit Fittings (4 pages)
- Section 16122 Wires and Cables - 0 - 1000 V (3 pages)
- Section 16132 Outlet Boxes, Conduit Boxes and Fittings (3 pages)
- Section 16151 Wire and Box Connections - 0-1000 V (2 pages)
- Section 16191 Fastenings and Supports (2 pages)
- Section 16505 Lighting Equipment (5 pages)

1. **Section 00 01 07 - Professional Signatures and Seals**
   .1 Replace Section entirely with revised Section attached to this addendum.

2. **Section 00050 List of Documents**
   .1 Update page count for Division 16 - Electrical specifications per list of attached electrical specification Sections.

3. **Division 16 Specification Sections**
   .1 Add attached, listed electrical specification Sections to the Contract Documents.

4. **Drawing A1.0**
   .1 Refer to B/A1.0 New Site Plan: refer to new light standard location ("LS") – for the purpose of clarification, Bidders are advised that a total of 7 (seven) new light standards are being installed. Refer to drawing E101 for exact locations.

5. **Drawing E101**
   .1 Add attached drawing to the Contract Documents.

End of Addendum #1.

1 Seals and Signatures

.1 The following seals and signatures are provided as required by Section 2.3.1 of the Ontario Building Code and apply to the areas of expertise for which each consultant was commissioned and further apply to those drawings and specification sections which bear their name.

ARCHITECTURAL SPECIFICATIONS

CIVIL SPECIFICATIONS

ELECTRICAL SPECIFICATIONS

END OF SECTION

PART 1 - GENERAL

1.1. GENERAL

1. Division 1, General Requirements is part of this Section and shall apply as if repeated here.

2. This Section covers items common to Sections of Division 16. This Section supplements requirements of Division 1.

3. Coordinate all requirements with general contractor.

1.2. SCOPE OF WORK

1. The scope of work for this project includes:

    1. Outdoor lighting upgrades - pole lights, wall packs and associated controls as per drawings.

1.3. CODES AND STANDARDS

1. In this document, all references to Code numbers shall mean “Latest Edition”.

2. Do complete installation in accordance with Ontario Electrical Safety Code.

3. Do complete installation in accordance with CSA C22.1-12 except where specified otherwise.

4. Comply with all CSA and inspection Authority Bulletins in force at time of Tender.

5. Do overhead and underground systems in accordance with CSA C22.3 No.1-10 except where specified otherwise.

6. Abbreviations for electrical terms: to CSA Z85-1983.

7. Where requirements of this specification exceed those of above mentioned standards, this specification shall govern.

1.4. DEFINITIONS

1. “Provide” means supply and install.

2. “Approved” means approved in writing by Consultant.

3. “Inspection Authority” means Electrical Safety Authority.

4. “Consultant” means designated qualified professional engineer acting as representative of Owner for monitoring of work.

5. "Manual" means Operations and Maintenance manual.

6. "OESC" means latest edition of Ontario Electrical Safety Code

1.5. CARE, OPERATION, START-UP AND INSTRUCTION TO OWNERS

1. Provide certified personnel to instruct Owner of operation of electrical equipment. Provide maintenance specialist personnel to instruct on maintenance and adjustment of electrical equipment and any changes or modification of equipment must be under terms of guarantee.

2. Provide instruction during regular work hours prior to acceptance and turn over to Owner's staff for regular operation.

3. Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

4. Use operation and maintenance data manual for instruction purposes. On completion of instruction, turn three manuals over to the Owner.

5. Operation and maintenance manual to be approved by and final copies deposited with Consultant before final inspection.

1.6. AS-BUILT DRAWINGS

1. Site records:

    1. One set to be kept on site and all changes to be recorded on daily basis. At the completion of the project, all changes shall be transferred to clean set, signed and passed to the Consultant.

    2. Make these drawings available for reference purposes and to inspection at all times.

2. As-built drawings must be delivered before system acceptance.

1.7. PERMITS, FEES AND INSPECTION

1. Submit to Inspection Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.

2. Consultant will provide drawings and specifications required by Inspection Authority at no cost.

3. Submit to the Building Department the necessary number of drawings and specifications for examination prior to commencement of work to obtain a building permit.

4. Submit Notice of Project to Ministry of Labour.

5. Pay associated fees and obtain all permits required for the performance of the work.

6. Notify Consultant of changes required by Inspection Authority or Building Department prior to making changes.

7. Furnish Certificates of Acceptance from Inspection Authority on completion of work to Consultant.

1.8. MATERIALS AND EQUIPMENT

1. Provide materials and equipment in accordance with Division 1.

2. Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Inspection Authority.

1.9. WIRING IDENTIFICATION

1. Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

2. Maintain phase sequence and colour coding throughout.

3. Colour code: to CSA C22.1.

1.10. CONDUIT AND CABLE IDENTIFICATION

1. Colour code conduits, boxes and metallic sheathed cables.

2. Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

3. Colours: 25 mm (1") wide prime colour and 20 mm (3/4") wide auxiliary colour.

	PRIME	AUXILIARY
up to 250 V	yellow	
up to 600 V	yellow	green
up to 5 kV	yellow	blue
up to 15 kV	yellow	red
Telephone	green	
Other communication systems	green	blue
Fire alarm	red	
Emergency Voice	red	blue
Other security systems	red	yellow

1.11. WIRING TERMINATIONS

1. Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

1.12. MANUFACTURERS AND CSA LABELS

1. Ensure that manufacturer's registration plates are properly affixed to all apparatus showing the size, name of equipment, serial number, and all information usually provided, including voltage, cycle, phase and the name and address of the manufacturer.

2. Do not paint over registration plates or approved labels. Leave openings through insulation for viewing the plates. Contractors or sub-contractors nameplate not acceptable.

1.13. WARNING SIGNS

1. As specified and to meet requirements of Inspection Authority and Consultant.

1.14. MOUNTING HEIGHTS

1. Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

2. If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

1.15. FIELD QUALITY CONTROL

1. All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks – the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.

2. Conduct and pay for following tests:

    1. Lighting and its control.

3. Furnish manufacturer's certificate or letter confirming the entire installation as it pertains to each system has been installed to manufacturer's instructions.

4. Carry out tests in presence of Consultant.

5. Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

6. Submit test results for Consultant's review.

1.16. EXCAVATION AND BACKFILLING

1. This Division shall be responsible for coordination for bedding of lines or equipment and for backfilling and compaction to 98% Standard Proctor Density.

1.17. DEMOLITION

1. Disconnect and make safe electrical equipment and services as required on site.

2. Be responsible for demolition and removal of electrical equipment designated on drawings for removal and as required by work unless specified otherwise under other divisions.

3. Electrical work being removed by other division shall be carried out under direction of this division. Do all disconnecting prior to authorizing removal.

1.18. FIREPROOFING

1. Where cables or conduits pass through floors and fire rated walls, pack space between wiring and sleeve full with firestopping system to CAN 4-S115.

1.19. CUTTING, PATCHING AND FINISHING

1. All cutting, patching and finishing for electrical work shall be by this Section. Obtain approval before cutting any structural members. Upon removal of all conduit, wiring, light fixtures, equipment, etc., patch all holes and match existing finishes.

1.20. EXISTING SYSTEMS

1. Before submitting tender price verify on job site location of all accessible existing electrical systems affecting execution of this contract. Difficulties arising during construction will not be considered as grounds for additional payment.

2. Where work involves breaking into or connecting to existing systems, carry out work at times directed by governing authorities, with minimum of disturbance to pedestrian traffic.

3. Submit schedule to and obtain approval from Consultant for any shut down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.

4. Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.

1.21. OWNER OCCUPANCY SCHEDULE

1. The existing building will remain occupied during normal occupancy hours.

2. Provide temporary protection for all finishes, appliances or equipment in the existing building.

END OF SECTION 16010

PART 1- GENERAL

1.1. RELATED SECTIONS

1. Division 1, General Requirements is part of this Section and shall apply as if repeated here.
2. Section 16010 – Electrical General Requirements.

PART 2- PRODUCTS

2.1. PVC DUCTS

1. PVC ducts, type DB2, unless otherwise noted.
2. Rigid PVC for areas traversed by vehicular traffic.

2.2. PVC DUCT FITTINGS

1. Rigid PVC opaque solvent welded type couplings, bell end fittings, plugs, caps, adaptors as required to make complete installation.
2. Expansion joints.
3. Rigid PVC 5 angle couplings.

PART 3- EXECUTION

3.1. DUCT INSTALLATION

1. Install underground duct banks.
2. Build duct bank on undisturbed soil or on well compacted granular fill not less than 150mm (6”) thick, compacted to 95% of maximum proctor dry density.
3. Open trench completely between manholes to be connected before ducts are laid and ensure that no obstructions will necessitate change in grade of ducts.
4. Install ducts at elevations and with slope as indicated and minimum slope of 1 to 400.
5. Install base spacers at maximum intervals of 1.5 m (5’) levelled to grades indicated for bottom layer of ducts.

6. Lay PVC ducts with configuration and reinforcing as indicated with preformed interlocking, rigid plastic intermediate spacers to maintain spacing between ducts at not less than 75mm (3") horizontally and vertically. Stagger joints in adjacent layers at least 150mm (6") and make joints watertight. Encase duct bank with 75mm (3") thick concrete cover.

7. Make transpositions, offsets and change in direction using 5° bend sections, do not exceed a total of 20° with duct offset.

8. Use bell ends at duct terminations in manholes or buildings.

9. Use conduit to duct adapters when connecting to conduits.

10. Terminate duct runs with duct coupling set flush with the end of concrete envelope when dead ending duct bank for future extension.

11. Cut, ream and taper end of ducts in field in accordance with manufacturer's recommendations, so that duct ends are fully equal to factory-made ends.

12. Clean ducts before laying. Cap ends of ducts during construction and after installation to prevent entrance of foreign materials.

13. After installation of ducts, pull through each duct a wooden mandrel not less than 300mm (12") long and of a diameter of 6mm (1/4") less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign matter. Pull stiff bristle brush through each duct immediately before pulling-in cables.

14. In each duct install pull rope continuous throughout each duct run with 3m (10') spare rope at each end.

3.2. MARKERS

1. Mark ducts every 50' along straight runs and changes in direction.

2. Provide drawings showing locations of markers.

3.3. AS-BUILTS

1. Provide As-Built drawings, indicating location of all underground conductor, cable or raceway installations including depth of burial and type of installation.

3.4. FIELD QUALITY CONTROL

1. Perform tests in accordance with Section 16010 - Electrical General Requirements.

2. Perform tests using qualified personnel. Provide necessary instruments and equipment.

END OF SECTION 16106

PART 1- GENERAL

1.1. GENERAL

1. Division 1, General Requirements is part of this Section and shall apply as if repeated here.

1.2. LOCATION OF CONDUIT

1. Drawings do not indicate all conduit runs. Those indicated are in diagrammatic form only.

1.3. REFERENCES

1. Canadian Standards Association (CSA)
    1. CSA C22.2 No. 18-98 (R2003), Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware.
    2. CSA C22.2 No. 45.2-08, Rigid Metal Conduit.
    3. CSA C22.2 No. 56-04 (R2009), Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
    4. CSA C22.2 No. 83-M1985(R2013), Electrical Metallic Tubing.
    5. CSA C22.2 No. 211.2-06 (R2011), Rigid PVC (Unplasticized) Conduit.
    6. CSA C22.2 No. 227.3-05 (R2010), Flexible Non-metallic Tubing.

1.4. WASTE MANAGEMENT AND DISPOSAL

1. Separate and recycle waste materials in accordance with Division 1.
2. Place materials defined as hazardous or toxic waste in designated containers.
3. Ensure emptied containers are sealed and stored safely for disposal away from children.
4. Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Division 1.

PART 2- PRODUCTS

2.1. CONDUITS

1. Electrical metallic tubing (EMT): with steel couplings, sized as indicated.

2. Rigid PVC conduit, sized as indicated.

3. Rigid metal conduit: galvanized steel threaded conduit, sized as indicated.

4. Epoxy coated conduit: with zinc coating and corrosion resistant epoxy finish inside and outside.

5. Flexible metal conduit and liquid-tight flexible metal conduit, sized as indicated.

6. Flexible PVC conduit, sized as indicated.

2.2. CONDUIT FASTENINGS

1. One hole steel straps to secure surface conduits 50 mm (2") and smaller. Two hole steel straps for conduits larger than 50 mm (2").

2. Beam clamps to secure conduits to exposed steel work.

3. Channel type supports for two or more conduits at 3 m (9') o/c.

4. 6 mm dia threaded rods to support suspended channels.

2.3. CONDUIT FITTINGS

1. Fittings: manufactured for use with conduit specified. Coating: same as conduit.

2. Fittings to be suitable sized for conduit used.

3. Fittings used for EMT to be steel, not cast.

4. Factory "ells" where 90° bends are required for 25 mm (1") and larger conduits.

2.4. EXPANSION FITTINGS FOR RIGID CONDUIT

1. Weatherproof expansion fittings with internal bonding assembly suitable for 100 or 200 mm linear expansion.

2. Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.

3. Weatherproof expansion fittings for linear expansion at entry to panel.

2.5. FISH CORD

1. Polypropylene.

PART 3- EXECUTION

3.1. INSTALLATION

1. Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

2. Conceal conduits except in mechanical and electrical service rooms and in unfinished areas.

3. Use rigid galvanized steel threaded conduit in areas subject to mechanical injury such as shops, loading docks etc.

4. Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

5. Use electrical metallic tubing (EMT) above 2.4 m not subject to mechanical injury.

6. Use rigid PVC conduit for installation underground and in slabs.

7. Use flexible metal conduit for final connection to devices in ceiling space max. length 3 m.

8. Use liquid tight flexible metal conduit for final connection to a vibrating piece of equipment.

9. Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.

10. Mechanically bend steel conduit over 21 mm diameter.

11. All unterminated conduit ends to be reamed and protected by insulating bushings.

12. Install fish cord in empty conduits and all conduits 53 mm and greater.

13. Where conduits become blocked, remove and replace blocked section. Do not use liquids to clean out conduits.

14. Dry conduits out before installing wire.

15. Use water tight fittings at connections to taps or sides of sprinkler proof equipment or seal with approved sealant.

3.2. SURFACE CONDUITS

1. Run parallel or perpendicular to building lines.

2. Locate conduits behind infrared or gas fired heaters with 1500 mm clearance.

3. Run conduits in flanged portion of structural steel.

4. Group conduits wherever possible on suspended channels.

5. Do not pass conduits through structural members except as indicated.

6. Do not locate conduits less than 75 mm (3") parallel to steam or hot water lines with minimum of 25 mm (1") at crossovers.

7. All exposed conduits in areas other than service spaces are to be painted to match existing finishes.

3.3. CONDUITS UNDERGROUND

1. Slope conduits to provide drainage and prevent moisture or gases from entering the building.

2. Waterproof joints (PVC excepted) with heavy coat of bituminous paint.

END OF SECTION 16111

PART 1- GENERAL

1.1. RELATED SECTIONS

1. Division 1, General Requirements is part of this Section and shall apply as if repeated here.
2. Section 16151 – Wire and Box Connections – 0 – 1000V.

1.2. REFERENCES

1. CSA C22.2 No. 0.3-09, Test Methods for Electrical Wires and Cables.
2. CAN/CSA-C22.2 No. 131-07 (R2012), Type TECK 90 cable.

1.3. PRODUCT DATA

1. Submit product data in accordance with Division 1.

1.4. WASTE MANAGEMENT AND DISPOSAL

1. Separate and recycle waste materials in accordance with Division 1.
2. Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Division 1.
3. Fold up metal banding, flatten and place in designated area for recycling.

PART 2- PRODUCTS

2.1. GENERAL

1. All conductors to be copper, unless otherwise noted.

2.2. BUILDING WIRES

1. All conductors to be copper, unless otherwise noted.
2. Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG for power and # 16 AWG for controls.
3. Copper conductors: size as indicated, with 600 V insulation of chemically cross-linked

thermosetting polyethylene material type RW90, or with thermoplastic insulation and nylon jacket, type T-90 nylon, rated at 600 V.

4. All outdoor circuit conductors to be type RWU90 unless otherwise noted.

5. Wire and conduit sizes shown are based on RW75 XLPE and are minimum sizes. Contractor is responsible for wire and conduit sized for other approved wires.

6. Conductors shall be colour coded. Conductors size 10 AWG and smaller shall have colour impregnated into insulation at time of manufacture.

    1. Colour code wiring for 120 / 208 Volt equipment as follows

        1. Phase conductors: Red, Black, Blue

        2. Neutral conductors: White

        3. Bonding to ground: Green

2.3. ARMOURED CABLES

1. Conductors insulated copper sizes as indicated, minimum wire size #12 AWG.

2. Type: AC90.

3. Armour: interlocking type fabricated from aluminum strip.

4. Connectors: to suit.

5. Fastenings:

    1. One hole steel straps to secure surface cables 25 mm and smaller. Two hole steel straps for cables larger than 25 mm.

    2. Channel type supports for two or more cables at 1500 mm centres.

    3. Threaded rods: 6 mm dia. To support suspended channels.

6. Approved compression type lugs accurately sized to allow bolted connections at each cable end.

7. All wiring shall be concealed in floor slabs, walls, ceiling and furred spaces. AC90 armoured cable may be used only for drops to fixtures, maximum length 3 m in concealed ceiling spaces, or drops to receptacles in GWB partitions, maximum length 4.5 m. Otherwise cables shall be in EMT conduit.

PART 3- EXECUTION

3.1. INSTALLATION OF BUILDING WIRES

1. Install wiring in conduit in accordance with Section 16111, unless otherwise noted.

2. Use type RW90 where required by Ontario Electrical Safety Code, for all panelboard feeders and for all conductors sized 250 MCM and larger.

3. Use type RW90 or T-90 for branch circuit wiring unless otherwise indicated.

4. Minimum wire size shall be No. 12 AWG. For 15A, 120V branch circuit home runs which exceed 23 m length shall be minimum No. 10 AWG, and minimum No. 8 AWG for runs which exceed 36 m. For 20A, 120V branch circuit home runs which exceed 17 m in length shall be minimum No. 10 AWG, and minimum No. 8 AWG for runs which exceed 27 m. Where existing wiring is re-used, minimum wire sizes shall apply and wiring shall be replaced when it does not meet the minimum size.

5. Existing wiring may only be re-used if permitted by Engineer.

3.2. INSTALLATION OF ARMOURED CABLES

1. Use only for drops to fixtures maximum length 3 m in concealed ceiling spaces, or drops to receptacles in GWB partitions maximum length 4.5 m.

2. Terminate cables in accordance with Section 16151.

END OF SECTION 16122

PART 1- GENERAL

1.1. GENERAL

1. Division 1, General Requirements is part of this Section and shall apply as if repeated here.

1.2. REFERENCES

1. CSA C22.1-12 Canadian Electrical Code, Part 1.

1.3. WASTE MANAGEMENT AND DISPOSAL

1. Separate and recycle waste materials in accordance with Division 1, and with the Waste Reduction Workplan.

2. Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Division 1.

PART 2- PRODUCTS

2.1. OUTLET AND CONDUIT BOXES - GENERAL

1. Size boxes in accordance with CSA C22.1.

2. 102 mm (4") square or larger outlet boxes as required for special devices.

3. Gang boxes where wiring devices are grouped.

4. Blank cover plates for boxes without wiring devices..

5. Combination boxes with barriers where outlets for more than one system are grouped.

2.2. SHEET STEEL OUTLET BOXES

1. Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm (4") square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

2. Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm

3. 102 mm (4") square or octagonal outlet boxes for lighting fixture outlets.

4. 102 mm (4") square outlet boxes with extension and plaster rings for flush mounting devices in finished tile walls.

2.3. MASONRY BOXES

1. Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.

2.4. CONDUIT BOXES

1. Cast FS or FD feraloy boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle.

2. Electro-galvanized utility tape for indoor surface wiring.

2.5. FITTINGS - GENERAL

1. Bushing and connectors with nylon insulated throats.

2. Knock-out fillers to prevent entry of debris.

3. Conduit outlet bodies for conduit up to 35 mm and pull boxes for larger conduits.

4. Double locknuts and insulated bushings on sheet metal boxes.

PART 3- EXECUTION

3.1. INSTALLATION

1. Support boxes independently of connecting conduits.

2. Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

3. For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

4. Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.

5. Provide a suitable outlet box for each light, switch, receptacle or other outlet, approved for the particular area in which it is to be installed.

6. Locate outlet boxes, mounted in hung ceiling space, so they do not obstruct or interfere with the removal of lay-in ceiling tiles.

7. Offset outlet boxes, shown back to back in partitions, horizontally to minimize noise transmission between adjacent rooms.

8. Use tile wall covers where 4" square outlet boxes are installed in exposed concrete or cinder block in finished areas.

9. Seal electrical switch and outlet boxes that penetrate vapour barrier with moulded box vapour barrier wrap boxes with film sheet providing minimum 300 mm perimeter lap flange.

10. Provide T-bar grid support brackets for installations on T-bar ceiling.

END OF SECTION 16132

PART 1 - GENERAL

1.1. GENERAL

1. Division 1, General Requirements is part of this Section and shall apply as if repeated here.

1.2. REFERENCES

1. CSA C22.2 No. 65-13 Wire Connectors.
2. EEMAC 1Y-2, 1961 Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

PART 2 - PRODUCTS

2.1. MATERIALS

1. Pressure type wire connectors: with current carrying parts of copper sized to fit copper conductors as required.
2. Fixture type splicing connectors: with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
3. Bushing stud connectors: to EEMAC 1Y-2 to consist of:
    1. Connector body and stud clamp for stranded copper conductors.
    2. Clamp for stranded copper conductors
    3. Stud clamp bolts.
    4. Bolts for copper conductors
    5. Sized for conductors as indicated.
4. Clamps or connectors for armoured cable, flexible conduit, as required.

PART 3 - EXECUTION

3.1. INSTALLATION

1. Remove insulation carefully from ends of conductors and:

1. Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.

2. Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.

3. Install fixture type connectors and tighten. Replace insulating cap.

4. Install bushing stud connectors in accordance with EEMAC 1Y-2.

END OF SECTION 16151

PART 1 - GENERAL

1.1. RELATED WORK

1. Division 1, General Requirements is part of this Section and shall apply as if repeated here.

2. Fastenings and supports: Section 01600 Material and Equipment.

PART 2 - PRODUCTS

2.1. SUPPORT CHANNELS

1. U shape, size 41 x 41 x 2.5 mm thick, surface mounted or suspended.

2. Smaller sections subject to Consultant's approval.

PART 3 - EXECUTION

3.1. INSTALLATION

1. Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.

2. Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

3. Fasten exposed conduit or cables to building construction or support system using straps.

    1. One-hole steel straps to secure surface conduits and cables 50 mm and smaller.

    2. Two-hole steel straps for conduits and cables larger than 50 mm.

    3. Beam clamps to secure conduit to exposed steel work.

4. Suspended support systems.

    1. Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.

    2. Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.

5. For surface mounting of two or more conduits use channels at 3 m oc spacing.

6. Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

7. Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

8. Do not use wire lashing or perforated strap to support or secure raceways or cables.

9. Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Consultant.

10. Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

11. All fastenings and supports to be hot dipped galvanized. All cut ends exposing base material to be completely sealed with field applied coating to give equivalent protection prior to installation. Following complete installation, all damage to protective layer to be carefully and completely touched up with same field applied coating.

END OF SECTION 16191

PART 1 - GENERAL

1.1. GENERAL

1. Division 1, General Requirements is part of this Section and shall apply as if repeated here.

1.2. REFERENCES

1. Illuminating Engineering Society (IES)
    1. IES LM-79, Electrical and Photometric Measurements of Solid State Lighting Products.
    2. IES LM-80, Measuring Lumen Maintenance of LED Light Sources.
2. American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE).
    1. ANSI/IEEE C62.41-2002, Surge Voltages in Low-Voltage AC Power Circuits.
3. American Society for Testing and Materials (ASTM)
    1. ASTM F 1137-11e1, Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
4. United States of America, Federal Communications Commission (FCC)
    1. FCC (CFR47) EM and RF Interference Suppression.

1.3. SHOP DRAWINGS AND PRODUCT DATA

1. Submit shop drawings in accordance with Division 1.
2. Submit complete data prepared by independent testing laboratory for all luminaires, for review by Consultant.
3. Photometric data to include: total input watts, candle power summary, Polar Plot candela distribution zonal lumen summary, luminaire efficiency, CIE type, coefficient of utilization, lamp type and lumen rating in accordance with IESNA testing procedures, lens and louver type and finish.
4. Indicate fixture manufacturer and model number.
5. Submit shop drawings for all luminaire types.

1.4. WASTE MANAGEMENT AND DISPOSAL

1. Separate and recycle waste materials in accordance with Division 1, and with the Waste Reduction Work Plan.

2. Place materials defined as hazardous or toxic waste in designated containers.

3. Ensure emptied containers are sealed and stored safely for disposal away from children.

4. Be responsible for the storage of all obsolete fluorescent lamps and ballasts in approved containers.

5. Include for the co-ordination and disposal with the lamp and ballast disposal company for removal of spent lamps and ballasts.

6. Identify unit costs for the destruction of PCB ballasts to be included as a separate price in tender.

PART 2 - PRODUCTS

2.1. LED Lights

1. All LED lighting fixtures to be energy star or DLC rated.

2.2. CONTROLS

1. Ensure all lighting controls are fully compatible with the specific light fixtures and drivers being controlled.

2. Dimmers controlling LED fixtures to be rated for such loads and shall meet all light fixture manufacturer’s requirements.

2.3. FINISHES

1. Baked enamel finish:

    1. Conditioning of metal before painting:

        1. For corrosion resistance conversion coating to ASTM F 1137.

        2. For paint base, conversion coating to ASTM F 1137.

    2. Metal surfaces of luminaire housing and reflectors finished with high gloss baked enamel to give smooth, uniform appearance, free from pinholes or defects.

3. Reflector and other inside surfaces finished as follows:

    1. White, minimum reflection factor 85%.

    2. Colour fastness: yellowness factor not above 0.02 and after 250h exposure in Atlas fade-ometer not to exceed 0.05.

    3. Film thickness, not less than 0.03 mm average and in no areas less than 0.025 mm.

    4. Gloss not less than 80units as measured with Gardner 60° gloss meter.

    5. Flexibility: withstand bending over [12] mm mandrel without showing signs of cracking or flaking under 10 times magnification.

    6. Adhesion: 24mm square lattice made of 3mm squares cut through film to metal with sharp razor blade. Adhesive cellulose tape applied over lattice and pulled. Adhesion satisfactory if no coating removed.

2. Alzak finish:

    1. Aluminium sheet fabricated from special aluminum alloys and chemically brightened, subsequently anodically treated to specifications established by Alcoa, to produce:

        1. Finish for mild commercial service, minimum density of coating 7.8 g/m ², minimum reflectivity 83% for specular, 80.5% for semi-specular and 75% for diffuse.

        2. Finish for regular industrial service, minimum density of coating 14.8 g/m ², minimum reflectivity 82% for specular and 73% for diffuse.

        3. Finish for heavy duty service, minimum density of coating 21.8 g/m ², minimum reflectivity 85% for specular, 65% for diffuse.

2.4. LUMINAIRE SCHEDULE

'P' Single head, LED, pole mounted fixture mounted on an **existing 4" wide by 24' long square pole**, complete with 24,252 lumen LED lamp configuration, 4000°K, 70 CRI, TFTM or T4FT distribution, 207W, 120V & CSA certified, dark bronze colour, c/w controls to dim fixture during late night and early morning hours with motion sensor override (equal to Acuity Part Night device p/n PN1BT6D3 PIRH), and a universal square pole mounting kit.

Acceptable products:	
Lithonia	DSX1 LED Series
Eaton	Galleon LED Series
	or Approved Equal

'P1' Single head, LED, pole mounted fixture with 4" wide by 24' long square pole, complete with

24,252 lumen LED lamp configuration, 4000°K, 70 CRI, TFTM or T4FT distribution, 207W, 120V & CSA certified, dark bronze colour, c/w controls to dim fixture during late night and early morning hours with motion sensor override (equal to Acuity Part Night device p/n PN1BT6D3 PIRH), and square pole mounting.

Acceptable products:

Lithonia	DSX1 LED Series c/w matching 4" square, 24FT Pole
Eaton	Galleon LED Series c/w matching 4" square, 24FT Pole
	or Approved Equal

'P2' Single head, LED, pole mounted fixture and 4" wide by 24' long square pole, complete with 21,526 lumen LED lamp configuration, 4000°K, 70 CRI, T5 Medium distribution, 183W, 120V & CSA certified, dark bronze colour, c/w controls to dim fixture during late night and early morning hours with motion sensor override (equal to Acuity Part Night device p/n PN1BT6D3 PIRH), and square pole mounting.

Acceptable products:

Lithonia	DSX1 LED Series c/w matching 4" square, 24FT Pole
Eaton	Galleon LED Series c/w matching 4" square, 24FT Pole
	or Approved Equal

'P3' Single head, LED, pole mounted fixture mounted on an **existing 4" wide by 21' long square pole**, complete with 24,252 lumen LED lamp configuration, 4000°K, 70 CRI, TFTM or T4FT distribution, 207W, 120V & CSA certified, dark bronze colour, c/w controls to dim fixture during late night and early morning hours with motion sensor override (equal to Acuity Part Night device p/n PN1BT6D3 PIRH), and a universal square pole mounting kit.

Acceptable products:

Lithonia	DSX1 LED Series
Eaton	Galleon LED Series
	or Approved Equal

'P4' Single head, LED, pole mounted fixture mounted on an **existing 4" wide by 21' long square pole**, complete with 21,526 lumen LED lamp configuration, 4000°K, 70 CRI, T5 Medium distribution, 183W, 120V & CSA certified, dark bronze colour, c/w controls to dim fixture during late night and early morning hours with motion sensor override (equal to Acuity Part Night device p/n PN1BT6D3 PIRH), and a universal square pole mounting kit.

Acceptable products:

Lithonia	DSX1 LED Series
Eaton	Galleon LED Series
	or Approved Equal

'P5' Building mounted, LED, wall-pak fixture, complete with die-cast aluminium housing, with 4000°K, 65 CRI, 4,174 lumen output, T2 Medium distribution, surge protection, 35W, 120V & CSA Certified. Dark Bronze Colour, c/w controls to dim fixture during late night and early morning hours with motion sensor override (equal to Acuity Part Night device p/n PN1BT6D3 PIR)

Acceptable products:

Lithonia	DSXW1 LED Series
Eaton	Galleon Wall LED Series

or Approved Equal

'P6' Building mounted, LED, wall-pak fixture, complete with die-cast aluminium housing, with 4000°K, 65 CRI, 11,000 lumen output, TFTM or T4FT distribution, surge protection, 71W, 120V & CSA Certified. Dark Bronze Colour, c/w controls to dim fixture during late night and early morning hours with motion sensor override (equal to Acuity Part Night device p/n PN1BT6D3 PIRH)

Acceptable products:

Lithonia	DSXW2 LED Series
Eaton	Galleon Wall LED Series

or Approved Equal

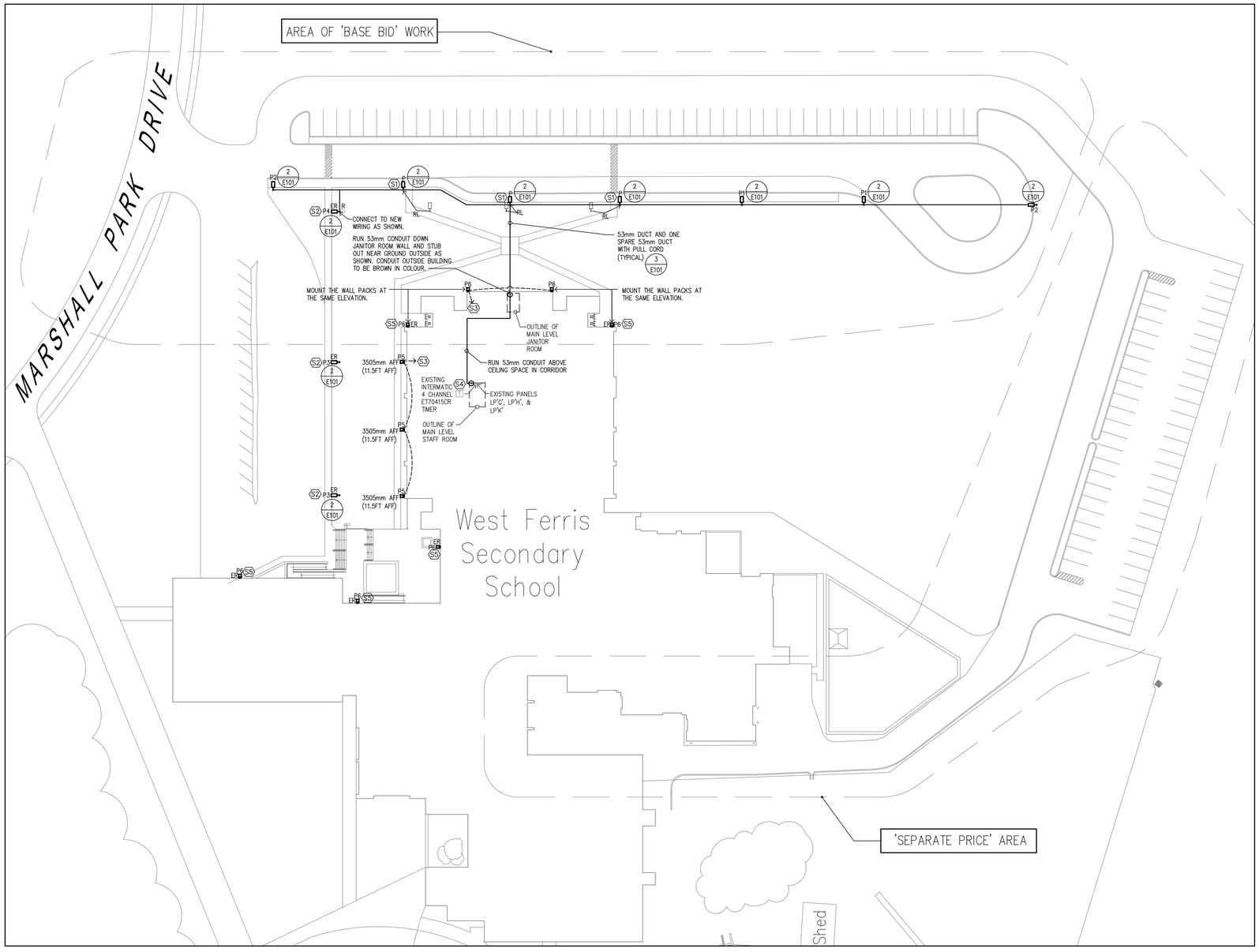
PART 3- EXECUTION

3.1. INSTALLATION

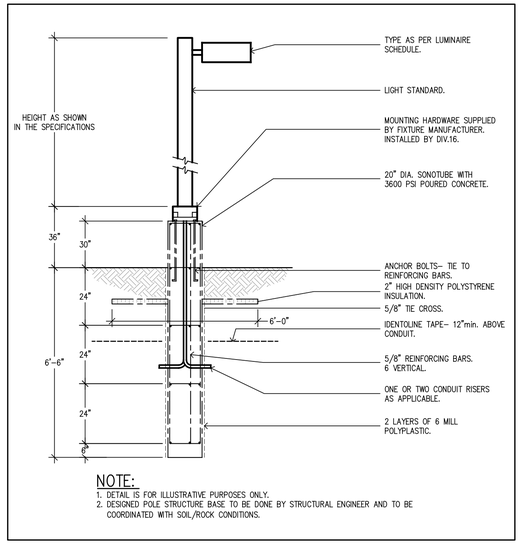
1. Locate and install luminaires as indicated.

2. Where new luminaires are specified, the Contractor shall include for all required assembly and mounting.

END OF SECTION 16505

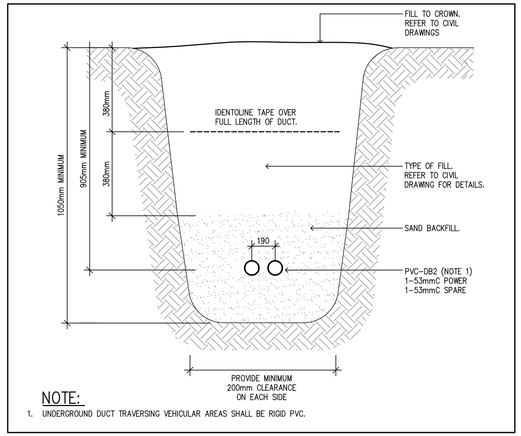


1 / E101 **Lighting - Partial Site Plan**
1:500



NOTE:
1. DETAIL IS FOR ILLUSTRATIVE PURPOSES ONLY.
2. DESIGNED POLE STRUCTURE BASE TO BE DONE BY STRUCTURAL ENGINEER AND TO BE COORDINATED WITH SOIL/ROCK CONDITIONS.

2 / E101 **Pole Mounted Fixture Installation Detail**
N.T.S.



NOTE:
1. UNDERGROUND DUCT TRAVERSING VEHICULAR AREAS SHALL BE RIGID PVC.

3 / E101 **Duct Bank Typical Detail**
N.T.S.

ELECTRICAL SITE PLAN LEGEND

	LIGHT STANDARD WITH ONE LIGHTING HEAD, TYPE AS INDICATED.
x	WALL MOUNTED LIGHT FIXTURE (TYPE AS INDICATED)
x	CEILING MOUNTED LIGHT FIXTURE
EP'X'	ELECTRICAL PANEL, SURFACE MOUNTED (DESIGNATION AS SHOWN)
	TIMER
	ELECTRICAL CONDUIT RISER
	ELECTRICAL CONDUIT DROP
AFF	CENTERLINE DEVICE MOUNTING HEIGHT ABOVE FINISHED FLOOR
E	EXISTING DEVICE TO REMAIN
ER	EXISTING DEVICE TO BE REPLACED WITH NEW

ELECTRICAL SITE PLAN GENERAL NOTES:

1. ENTIRE INSTALLATION SHALL BE IN ACCORDANCE WITH THE ONTARIO ELECTRICAL SAFETY CODE.
2. ELECTRICAL CONTRACTOR IS TO OBTAIN ALL APPROVALS FROM LOCAL ELECTRICAL SAFETY AUTHORITY PRIOR TO COMMENCING WORK.
3. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH C.C. TATHAM & ASSOCIATES LTD. AND MITCHELL JENSEN ARCHITECT DRAWINGS. ENSURE ALL REQUIREMENTS ARE COORDINATED AND CARRIED.
4. ALL DEVICES SHOWN ARE NEW, UNLESS OTHERWISE NOTED.
5. FIRE STOP ALL PENETRATIONS THRU FIRE RATED ASSEMBLIES.
6. PROVIDE PULL CORDS IN SPARE CONDUITS AS SHOWN ON THE DRAWING.
7. ELECTRICAL CONTRACTOR TO PROVIDE UPDATED – TYPE WRITTEN PANEL SCHEDULES FOR ALL CHANGES.
8. PROVIDE LABELS ON ALL WIRING DEVICES INDICATING PANEL AND CIRCUIT NUMBERING, (FOR EXAMPLE PNL#A CCT 11.) (TO MATCH EXISTING)
9. POLE LIGHTING AND LIGHTING WALLPACKS SHALL DIM TO APPROXIMATELY 30% DURING LATE NIGHT AND EARLY MORNING HOURS WITH MOTION SENSOR OVERRIDE. EQUALS SHALL BE SUBMITTED FOR APPROVAL DURING TENDER PERIOD.
10. ANY EXPOSED CONDUIT ABOVE THE GROUND SHALL BE RIGID PVC TO REDUCE MECHANICAL INJURY.
11. ALL NEW WIRING AND CONDUITS TO BE CONCEALED AND ROUTED INSIDE BUILDING, UNLESS OTHERWISE NOTED. COORDINATE EXACT ROUTING ON SITE PRIOR TO ROUGH IN.
12. ALL WIRING TO BE COPPER UNLESS OTHERWISE NOTED. ALL UNDERGROUND WIRING TO BE RWU-90.
13. UNDERGROUND DUCT TRAVERSING BENEATH VEHICULAR AREAS SHALL BE RIGID PVC.
14. PROVIDE BONDING CONDUCTOR AND CONNECTION (AS PER OESC) FOR ALL PERMANENTLY CONNECTED EQUIPMENT. COORDINATE EXACT REQUIREMENTS ON SITE.

ELECTRICAL SITE PLAN DRAWING NOTES:

(S1) RELOCATE THREE (3) EXISTING POLE LIGHTS AS SHOWN. SALVAGE AND RE-INSTALL EXISTING 24', 4" SQUARE POLES ON NEW CONCRETE BASES. REMOVE OLD CONCRETE BASES AND WIRING BACK TO PANEL.

(S2) PROVIDE NEW CONCRETE BASE AS PER DETAIL 2/E101 FOR EXISTING POLE IN THE SAME LOCATION AS EXISTING. SANDBLAST, REFINISH, AND PAINT EXISTING POLE TO MATCH NEW LIGHTING HEAD COLOUR. PROVIDE NEW LIGHTING HEAD AND RECONNECT TO EXISTING CIRCUIT.

(S3) NEW WALLPACKS SHOWN SHALL BE WIRED WITH #10AWG WIRING FROM NEAREST EXISTING WALLPACK CIRCUIT.

(S4) PROVIDE A 2#8+GND CONNECTION, FROM SPARE 20A/1P BREAKER IN PANEL 'G' TO NEW OUTDOOR POLE LIGHTING. LIGHTING TO BE CONTROLLED BY EXISTING TIMER. VERIFY EXISTING PROGRAMMED SCHEDULE AND CONFIRM WITH OWNER. MAKE ANY SCHEDULE CHANGES AS REQUESTED.

(S5) PRESSURE WASH AND CLEAN AREA TO REMOVE ALL MARKING PRIOR TO INSTALLING NEW WALLPACK. RECONNECT NEW WALLPACK TO EXISTING CIRCUIT

PROJECT NORTH:

LICENSED PROFESSIONAL ENGINEER
JUNE 4/19
R.D.MACVICAR
100128434
PROVINCE OF ONTARIO

Near North District School Board

NNDSB 2019-02 Site/Parking/Bus Loop Improvements West Ferris Secondary School

North Bay, ON.

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PROJECT NO:	6244
LIBRARY NO:	
DRAWN BY:	
SCALE:	as noted

NO.	ISSUE	DATE
1	Issued By Addendum No. 1	June 4, 2019

Electrical Lighting Site Plan

DRAWING NO: E101