

Wharf Construction
Port Bickerton East
Guysborough County, Nova Scotia
Project No. R.082082.001

PART 1 – GENERAL

- 1.1 Related Work
- .1 Refer to other specifications sections for related work.
 - .2 Refer to Section 01 33 00 for Shop Drawings/Submission requirements.
- 1.2 Codes and Standards
- .1 Do complete installation to CSA C22.1-2015 except where specified otherwise.
 - .2 CSA Electrical Bulletins in force at time of tender submission, while not identified and specified by number in this Division, are to be considered as forming part of related CSA Part II standard and must be complied with.
- 1.3 Permits, Fees
- .1 Submit to Electrical Inspection Department and Supply Authority the necessary number of drawings and specifications for examination and approval prior to commencement of work.
 - .2 Coordinate and meet requirements of power supply authority. Ensure availability of power when required.
- 1.4 Record Drawings
- .1 During progress of the work keep a record of all variations from the working drawings. At completion of the project submit a set of prints showing variations neatly marked in red to the Departmental Representative. Refer to Section 01 33 00 for more specific requirements.
- 1.5 Work Included
- .1 Provide all labour and materials and everything that is required for a complete electrical installation, all in accordance with but not necessarily restricted to the specification and the accompanying drawings.
 - .2 Provide shall mean to supply and install all material, equipment and devices to provide reliable structures and operating system as required by the contract documents. This shall include, and is not limited to, start up, commissioning, testing and written certification for all operating systems and equipment.

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- .3 Supply of electrical distribution equipment and associated support systems to provide a fully operable electrical system as required by the contract documents.

1.6 Minimum Standards

- .1 The standard established by the drawings and specifications shall not be reduced by any of the codes referred to in Section 2, Codes and Standards, and in no instance, will a standard be accepted lower than that established by the Canadian Electrical Code.
- .2 As a “standard of quality” “acceptable manufacturers” catalogue designations are included in portions of this specification and on plans. These catalogue designations and descriptions are not necessarily listed in order of preference and all manufacturers meeting this “standard of quality” may not be listed.

1.7 Supervision

- .1 The Contractor shall provide supervision and a sufficiently qualified foreman to ensure that the job proceeds in a proper and efficient manner. If in the opinion of the Departmental Representative, such personnel are not competent to carry out their work, the Contractor shall replace these men immediately upon written request of the Departmental Representative.

1.8 Materials and Equipment

- .1 All material shall be new unless designated existing to be reused, of the best available quality and CSA/ULC approved for their respective use.
- .2 Where there is no alternative to supplying equipment which is not CSA certified, obtain and pay for special approval from an authorized and approved testing and certification agency.

1.9 Tests

- .1 Test all wiring, included in the contract, to ensure there are no shorts or grounded conductors and that insulation values are as required by the Canadian Electrical Code.
- .2 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .3 Submit test results for Departmental Representatives review.

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.4 Megger line voltage circuits, feeders and equipment up to 350 V with 500 V instrument: feeders and equipment to 600 V with 1000 V instruments.

.5 Replace conductors that fail insulation test.

1.10 Protective Devices

.1 Ensure circuit protective devices such as over-current trips, relays and fuses are installed to values and settings as indicated, or required by the Canadian Electrical Code, Part I.

1.11 Nameplates

.1 Lamacoid nameplates shall be permanently fixed to load centre, junction and pull boxes, enclosures and receptacles.

.2 Nameplates:

.1 Lamacoid 2 mm thick plastic engraving sheet, white face, black core, mechanically attached.

.3 Identification to be English and French. Provide one nameplate for each language.

.4 Size 2 nameplates for pull boxes and junction boxes to indicate circuit numbers contained within.

.5 Affix Size 2 nameplates to enclosures to identify pole and circuit numbers.

.6 Affix Size 5 nameplates to backboards adjacent to receptacles according to receptacle designation and circuit number as indicated on drawing.

.7 Affix Size 5 nameplate, red face, white core, to junction boxes over receptacles to read "Receptacles for Ship to Shore Power Use Only. Improper use is extremely hazardous".

Nameplate Sizes

Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters

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Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

1.12 Removals and Relocations

- .1 As designated on Drawing E-1, Existing poles, lighting, wiring and distribution equipment designated for removal other than equipment belonging to the local utility, will become the property of the Harbor Authority. Contractor will be advised of a location on site to store the items.
- .2 Coordinate removals and relocations of utility owned equipment with local authority.
- .3 Pay all associated utility fees for removal, relocation and/or temporary storage.
- .4 Relocate and/or install guy wires as required to meet utility standards.

1.13 Cutting, Patching and Painting

- .1 The Contractor shall perform all cutting, patching and painting necessary for the proper installation of the work and shall repair any damage done, employing only the services of skilled workmen.

1.14 Wiring Identification

- .1 Maintain phase sequence and colour coding throughout.
- .2 Colour code to CSA C22.1 2009.

1.15 Wiring Terminations

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

1.16 Manufacturers and CSA Labels

- .1 Manufacturers nameplates and CSA labels to be visible and legible after equipment is installed.

1.17 Completion of Work

- .1 On completion of the project, the Contractor shall remove all debris and equipment made redundant by new work, and leave

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the site neat and tidy. Equipment shall be checked for proper fitting and alignment, adjusted as required, cleaned and repainted where necessary.

- .2 Furnish a Certificate of Acceptance from the local inspection authority on completion of work and submit it to the Departmental Representative.

END OF SECTION

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Wire, Cable and Connectors

PART 1 – GENERAL

- 1.1 Related Work
- .1 General Instructions: Division 1
 - .2 Common Work Results – Section 26 05 01 Electrical

PART 2 - PRODUCTS

- 2.1 Wire and Cable
- .1 Wire and cable shall conform fully to the latest specifications of the Canadian Standards Association (CSA), the Electrical and Electronic Manufacturers Association of Canada (EEMAC), the Insulated Power Cable Engineers Association (IPCEA) and the American Society of Testing Materials (ASTM).
 - .2 Wiring on circuits exceeding 50 V to ground shall be of solid copper of 98% conductivity and of full size AWG gauge, minimum #12. Insulation shall be cross linked polyethylene rated 600 V on conductors smaller than # 8 and 1000 V larger than #10. Wiring shall be colour coded as follows:
 - Phase A – Black
 - Phase B – Red
 - Neutral – White
 - Ground – Green
 - .3 Copper conductors sized as indicated with 1000 V insulation of chemically cross-linked thermosetting polyethylene material rated RW 90: to CSA C22.2 No. 75-M1983.
 - .4 Teck Cable; Rated 90°C:
 - .1 Conductor: Class B stranded soft copper.
 - .2 Insulation: Cross-linked polyethylene or ethylene propylene rubber, as approved by CSA on Types RW90, X-LINK, Minus 40°C per CSA C22.2, No. 131 (and IPCEA).
 - .3 Identification: Surface colour coding for sizes up to and including #2 AWG. For sizes larger than #2 AWG; number coding.

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Wire, Cable and Connectors

- .4 Grounding Conductor: Grounding conductor included in the cable assembly.
- .5 Type SOOW Service Cord:
 - .1 Designed for outdoor/indoor use with marine dockside power and mining applications.
Completely water submersible.
 - .2 Multiconductor cables of bare annealed copper ASTM B-3 flexible bunch strands with colour coded synthetic rubber insulation.
 - .3 Temperature Range: -40C to +90C.
 - .4 Voltage rating: 600 V.
 - .5 Approvals: CSA C22.2 No.49 FT1/FT2, UL-62.
 - .6 Bond wire listed as a **conductor**, used for grounding purposes only.
- .6 Multiple conductor cables assembled with suitable fillers and binder tape.
- .7 Inner Jacket: Polyvinyl Chloride (PVC) heat, flame and moisture resistant jacket, suitable for installation in temperatures down to Minus 40°C.
- .8 Armour: Aluminum interlocking armour.
- .9 Outer Jacket: Polyvinyl Chloride (PVC) heat, flame and moisture resistant jacket, black, suitable for installation in temperatures down to Minus 40°C.
- .10 Size and number of conductors as indicated on the drawings.

2.2 Wire Connections

- .1 Splices and joints in circuit wiring shall be made using: Mechanical split bolt connectors. Acceptable manufacturers – Thomas & Betts; IlSCO.
- .2 Strain Relief Grips; galvanized steel wire mesh; high strength, corrosion resistant, sized to suit cable diameter. Hubbell – Kellems grips.
- .3 Nickel Plated Brass, liquid tight cable glands (connectors) c/w threaded lock nuts for entrance to junction boxes and device boxes. Sized to suit individual cable diameters.

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Wire, Cable and Connectors

PART 3 – EXECUTION3.1 Installation of
Wire and Cable

- .1 Identify wiring with permanent indelible identifying marks, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit.
- .2 Maintain phase sequence and colour coding throughout in accordance with Item 4-036 of the Canadian Electrical Code Part I.
- .3 Install TECK cable as indicated on the drawings.
- .4 Support TECK cable as indicated on drawings and according to requirements of the Canadian Electrical Code. Use corrosion resistant cable supports.
- .5 New TECK cables to be continuous with no splices.

3.2 Wire and Cable
Connection

- .1 All connections shall be made electrically and mechanically secure. Sizes of connectors shall be according to manufacturer's recommendations for each wire size and combination of wires.
- .2 Install liquid tight cable glands (connectors) at all flexible cable termination points, i.e., junction boxes and devices boxes.
- .3 Provide galvanized steel cable guards, to protect TECK cables at all poles, to meet utility standards. Paint with two coats marine grey enamel.

END OF SECTION

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Grounding - Secondary

PART 1 – GENERAL

- 1.1 Related Sections .1 Common Work Results – Electrical 26 05 01
- 1.2 References .1 American National Standards Institute (ANSI) / Institute of Electrical and Electronics Engineers (IEEE)
- .2 Canadian Standards Association, (CSA International)

PART 2 – PRODUCTS

- 2.1 Equipment .1 System and circuit, equipment, grounding conductors, bare stranded copper, un-tinned, soft annealed, size as indicated.
- .2 Insulated grounding conductors: green, type RW90 - Section 26 05 21.
- .3 Rod electrodes: copper clad steel, 19 mm diam. by 3000 mm long.
- .4 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
- .1 Grounding and bonding bushings.
 - .2 Protective type clamps.
 - .3 Bolted type conductor connectors.
 - .4 Thermit welded type conductor connectors.
 - .5 Bonding jumpers, straps.
 - .6 Pressure wire connectors.
 - .7 Ground bar (copper) size as indicated on drawings. Glass standoff insulators.
 - .8 Copper grounding lug to ground bars. Double barrel size to accommodate various size ground wires.

PART 3 – EXECUTION

- 3.1 Installation General .1 Install complete permanent, continuous, system and circuit, equipment, grounding systems including electrodes, conductors, connectors, accessories, as indicated, to conform to requirements of Departmental Representative and local authority having jurisdiction over installation. Where EMT is used, run separate ground wire in conduit.

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Grounding - Secondary

- .2 Install rod electrode and make grounding connections.
- .3 Install connectors in accordance with manufacturer's instructions.
- .4 Protect exposed grounding conductors from mechanical injury.
- .5 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .6 Soldered joints not permitted.
- .7 Install an integral bonding wire in all flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw.
- .8 Install separate ground connector to outdoor lighting standards.
- .9 Bond metal shrouds to ground as indicated.
- .10 Make connections to ground bar(s) and to ground bus in service board as shown on drawings.

3.2 System and Circuit Grounding

- .1 Install system and circuit grounding connections to neutrals of the secondary 600/347 V, 208/120 V and 120/240 V system.

3.3 Equipment Grounding

- .1 Install grounding/bonding connections to typical equipment included in, but not necessarily limited to, the following list: service equipment, transformers, distribution panels, outdoor lighting, power pedestals and derrick.

3.4 Field Quality Control

- .1 Perform tests in accordance with Section 26 05 01.
- .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

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END OF SECTION

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and Conduit FittingsPART 1 – GENERAL1.1 References

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA C22.2 No. 18-98, Outlet Boxes, Conduit Boxes and Fittings and Associated Hardware.
 - .2 CSA C22.2 No. 83-M1985(R1999), Electrical Metallic Tubing.

PART 2 - PRODUCTS2.1 Conduits

- .1 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
- .2 Rigid PVC conduit: to CSA C22.2 No. 211.2.

2.2 Conduit Fittings

- .1 Factory “ells” where 90° bends are required for 25 mm and larger conduits.
- .2 Steel set screw connectors and couplings for EMT.

2.3 Expansion Fittings
for Rigid Conduit

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for 200 mm linear expansion.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 90 mm deflection in all directions.
- .3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.4 Fish Cord

- .1 Polypropylene.

PART 3 - EXECUTION

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Conduits, Conduit Fastenings
and Conduit Fittings

3.1 Conduit Installation

- .1 All conduits and cables shall be kept parallel or perpendicular to wharf lines. All conduits shall be securely held in place at intervals and with supports as required by the Canadian Electrical Code.
- .2 Conduit openings shall be sealed with plugs or caps to prevent entrance of foreign materials. Where conduits pass through a waterproof membrane an oversize sleeve shall be installed and caulking applied to maintain the waterproof properties of the membrane.
- .3 Conduit shall not pass through structural members without the permission of the Departmental Representative.
- .4 Sufficient number of fittings shall be used to permit easy pulling of wires. Conduits shall be continuous. To ensure the conduit is clean and dry before conductors are pulled in, the conduit shall be swabbed out by using a drag consisting of tight rubber washers.
- .5 Touch up all marked surfaces using manufacturer's recommended materials and methods.

3.2 Fastenings and
Supporting Devices

- .1 Secure all equipment in a manner so as to not distort or cause undue stress on any components.

END OF SECTION

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Underground ConduitsPART 1 – GENERAL

- 1.1 Related Work .1 Excavation and Backfilling: Section 31 23 10

PART 2 - PRODUCTS

- 2.1 PVC Ducts and Fittings .1 Rigid PVC conduits – schedule 40 for direct burial: with expanded flange ends, with minimum wall thickness at any point of 2.8 mm. Nominal length: 3 m plus or minus 12 mm.
- .2 Rigid PVC reducers, bell end fittings, plugs, caps, adaptors as required to make complete installation.
- .3 Rigid PVC 90° and 45° bends as required.
- .4 Rigid PVC 5° angle couplings as required.
- .5 Expansion joints as required.
- 2.2 Solvent Weld Compound .1 Solvent weld compound for PVC joints.
- 2.3 Cable Pulling Equipment .1 6 mm stranded nylon pull rope tensile strength 5 kN.
- 2.4 Markers .1 Over all underground conduit install as shown on DWG E-2 “Duct Bank Section”. 75 mm wide electrical underground polyethylene marking tape with warning “Caution, Caution, Power Lines Below”.

PART 3 – EXECUTION

- 3.1 Installation .1 Install markers as required.
- .2 Install underground duct (conduit) bank.
- .3 Build duct (conduit) bank on undisturbed soil or well compacted granular fill (sand) not less than 150 mm thick, compacted to 95° of maximum proctor dry density.

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Underground Conduits

- .4 Open trench completely and ensure that no obstructions will necessitate change in grade of conduits.
- .5 Prior to laying conduits, construct a "mud slab" not less than 75 mm thick extended the entire width of the trench.
- .6 Install conduits at elevations and with slope as indicated and minimum slope of 1 to 400.
- .7 Install base spacers at maximum intervals of 1.5 m levelled to grades indicated for bottom layer of ducts.
- .8 Lay conduits with the configuration and reinforcing as indicated with preformed interlocking, rigid plastic spacers to maintain spacing between ducts at not less than the dimensions indicated on the Bench Section Details. Stagger joints in adjacent layers at least 150 mm and make joints watertight.
- .9 Use anchors, ties and trench jacks as required to secure conduits and prevent moving while backfilling and tamping.
- .10 Cover conduits with compacted granular fill (sand) not less than 150 mm above top tier of conduits. Fill voids and spaces between conduits by hand tamping with a plank. Fill to extend the full width of the trench.
- .11 Provide 50 mm thick, treated planks on top of the compacted fill, centered over the conduits. Planks, pavers to extend 50 mm (minimum) past the conduit array on both sides.
- .12 Clean conduits before laying. Cap ends of conduits during construction and after installation to prevent entrance of foreign material.
- .13 Pull through each conduit a steel mandrel not less than 300 mm long and of a diameter 6 mm less than the internal diameter of the conduit, followed by a stiff bristle brush to remove sand, earth and other foreign matter. Pull stiff bristle brush through each conduit immediately before pulling cables.
- .14 In each conduit install pull rope, continuous throughout each conduit run with 3 m spare rope at each end.

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Direct Buried
Underground Conduits

- .15 Install expansion joints in conduit systems in all rises above grade and in all connections to fixed equipment and as required by code.
- .16 Install markers as required.
- .17 After installing and backfilling, restore surface to original condition as directed by Departmental Representative.
- .18 Advise Departmental Representative so that he may inspect conduits prior to backfilling. Allow 10 days' advance notice.

END OF SECTION

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Installation of Cables in Conduits

PART 1 – GENERALPART 2 – PRODUCTSPART 3 - EXECUTION3.1 Cable Installation
in Ducts

- .1 Install cables as indicated in ducts.
- .2 Do not pull spliced cables inside ducts.
- .3 Install multiple cables in duct simultaneously.
- .4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.
- .5 Before pulling cable into ducts and until cables properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.
- .6 After installation of cables, seal duct ends with dust sealing compound.

3.2 Field Quality Control

- .1 Perform tests in accordance with Section 26 05 01 Common Work Results – Electrical.
- .2 Perform tests using qualified personnel. Provide necessary instruments and equipment.
- .3 Check phase rotation and identify each phase conductor of each feeder.
- .4 Check each feeder for continuity, short circuits and grounds. Ensure resistance to ground of circuits is not less than 50 megohms.
- .5 Pre-acceptance tests:
 - .1 After installing cable but before splicing and terminating, perform insulation resistance test with 500 V megger on each phase conductor of the 120/208 volt and 120/240

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Installation of Cables in Conduits

volt system and with a 1000 V megger on each phase conductor of the 600/347 volt system.

- .2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.

- .6 Provide Departmental Representative with list of test results showing location at which each test was made, circuit tested and result of each test.

- .7 Remove and replace entire length of cable if cable fails to meet any of test criteria.

END OF SECTION

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Dry Type Transformers

Up to 600 V, Primary

PART 1 – GENERAL

- 1.1 Product Data .1 Submit product data in accordance with Section 01 33 00 – Shop Drawings and Other Submittal procedures.

PART 2 - PRODUCTS

- 2.1 Transformers .1 Design to meet CSA C802.2-06 efficiency.
- .1 Type: ANN.
 - .2 Three phase, 45 KVA, 75 V, 3 PH, 3 wire input, 60 Hz; 120/208 V, 3 PH, 4 wire output.
 - .3 Single Phase 75 KVA, 1 PH, 3 wire. 60 Hz 120/240 V, 1 PH, 3 wire Output.
 - .4 Voltage taps: Standard.
 - .5 Insulation: Class, 220, 150° C temperature rise.
 - .6 Basic Impulse Level (BIL): Standard.
 - .7 Hipot: Standard.
 - .8 Average sound level: 40 db.
 - .9 Impedance at 170° C: Standard.
 - .10 Enclosure: EEMAC 1, removable metal front panel.
 - .11 Mounting: Floor.
 - .12 Finish: In accordance with Section 26 05 01 – Common Work Results – Electrical.
 - .13 Core and coils isolated from the enclosure by anti-vibration pads.

- 2.2 Equipment Identification .1 Provide equipment identification in accordance with Section 26 05 01 – Common Work Results - Electrical.

- .2 Label size: 7.

PART 3 - EXECUTION

- 3.1 Installation .1 Ensure adequate clearance around transformer for ventilation.
- .2 The floor under the transformer and the wall immediately behind the transformer shall be fire rated material acceptable to the authority having jurisdiction.

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Dry Type Transformers
Up to 600 V, Primary

- .3 Install transformers in level upright position.
- .4 Remove shipping supports only after transformer is installed and just before putting into service.
- .5 Loosen isolation pad bolts until no compression is visible.
- .6 Make primary and secondary connections in accordance with wiring diagram.
- .7 Energize transformers after installation is complete.

END OF SECTION

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Distribution Equipment

PART 1 – GENERAL

- 1.1 Related Standards .1 Complete service entrance to conform to Nova Scotia Power Inc. – Service Entrance Standards.

PART 2 - PRODUCTS

- 2.1 Supply Data .1 Distribution equipment suitable for incoming supply: 600 V, 100 A, 60 Hz, three phase, 4 wire, grounded neutral.
- 2.2 Equipment .1 3 pole, 3 phase breaker switch:
.1 25 Ka I.C.
.2 With neutral and ground kit.
.3 Copper terminals.
.4 EEMAC 1 – General purpose enclosure – surface mounted.
- .2 Wall Mounted Copper Ground Bus:
.1 38.1 mm high x 3.2 mm thick x 450 mm long copper ground.
.2 Predrilled to accept lugs.
.3 Lugs to be copper. Size of lugs as required.
.4 Bus to be mounted 300 mm AFF on 25 mm glass insulators.
- .3 Distribution Panels:
.1 225 A, 600/347 V, 3 phase, 4 wire, 18 ka I.C.
.2 225 A, 120/208 V, 3 phase, 4 wire, 10 ka 1.C.
.3 125 A, 600/347 V, 3 phase, 4 wire, 18 ka 1.C.
.4 225 A, 120/208 V, 3 phase, 4 wire, 10 ka 1.C.
.5 225 A, 120/240 V, 3 phase, 4 wire, 10 ka 1.C.
.6 Copper bussing.
.7 Standard bolted copper.
.8 42 circuit.
.9 Surface mounted; EEMAC 1 enclosure.
.10 C/W breakers shown on panel schedule.

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Distribution Equipment

PART 3 - EXECUTION

3.1 Installation

- .1 Install service and distribution equipment as indicated.
- .2 Connect to incoming service.
- .3 Ensure all circuit breakers are properly torqued.
- .4 Make grounding connections.
- .5 Megger all circuits as required by Section 26 05 01 – Common Work Results – Electrical.

END OF SECTION

Wharf Construction**Port Bickerton East****Guysborough County, Nova Scotia****Project No. R.082082.001**Receptacles, Junction and
Pull Boxes on WharfPART 1 – GENERAL

- 1.1 Related Work
- .1 Common Work Results – Electrical: Section 26 05 01.
 - .2 Division 1.

PART 2 – PRODUCTS

- 2.1 Receptacles
- .1 Hubbell Catalogue #HBL2660; watertight, industrial grade, yellow, 30 A, 125 V, locking single receptacle, 3 pole, 4 wire, grounding, CSA L5-30. Cover/lid – Hubbell #HBL74CM25 WOA – Backbox Hubbell #HBL60CM83A.
 - .2 15/20 A, 120 V, marine grade, duplex, ground fault protected, CSA configuration '5-20R', c/w hinged and gasketed cover plate. Equivalent to Hubbell Cat. #HBL53CM62. Cover plate – Hubbell Cat. #HBL 52CM21. All mounted in a standard type FD Hubbell #HBL60CM83A non-metallic device box. Ground fault Hubbell Cat. #GFM20/HBL5226.
 - .3 20 A, 125 V, 3 pole, 4 wire grounding, single locking receptacle, CSA configuration 'L5-20', chemical/marine rated. Yellow nylon housing, IP20 rated, Hubbell Cat. #HBL2410 or equivalent c/w hinged and gasketed, IP44 rated, yellow cover plate, stainless steel screws and spring and neoprene gasket, Hubbell Cat. #HBL52CM21. Above mounted in a standard non-metallic FD device box Hubbell #HBL60CM83A.
 - .4 150 A, 250 V, 3 POLE, 4 WIRE, PIN and SLEEVE
- 2.2 Junction/Pull Boxes
- .1 Cast PVC junction box, EEMAC 4 x rated, c/w conduit hubs, mounting feet, gasketed screw down cover with stainless steel screws. Minimum size 101.6 mm (4") square junction box. For junction box locations reference power centre feeder wiring diagrams on Drawing E-4.
 - .2 Cast PVC junction box, EEMAC 4 x rated, c/w conduit hubs, mounting feet, gasketed screw down cover with stainless steel screws. Minimum size 152.4 mm (6") square junction box. For junction box locations reference power centre feeder wiring diagrams on Drawing.

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Receptacles, Junction and
Pull Boxes on Wharf

- .3 Cast PVC junction box, EEMAC 4 x rated, c/w conduit hubs, mounting feet, gasketed screw down cover with stainless steel screws. Minimum size 203.2 mm (8") square junction box. For junction box locations reference power centre feeder wiring diagrams on Drawing E-4.

PART 3 – EXECUTION

- .1 Mount Junction/pull boxes on shroud.
- .2 Install conduit and wiring from pull boxes to receptacle and light fixtures on the wood poles.
- .3 Mount receptacles on shroud as indicated.
- .4 Make connections – use heat shrink boots inside JB/PB.
- .5 Bond shroud with #6 AWG.
- .6 Ensure proper operation.

END OF SECTION

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Moulded Case Circuit Breakers

PART 1 – GENERAL

- 1.1 Product Data
- .1 Submit product data in accordance with Section 01 33 00 – Shop Drawings and Other Submittal Procedures.
 - .2 Include time-current characteristic curves for breakers with ampacity as indicated in drawing with interrupting capacity of 22,000 A symmetrical (rms) and over at system voltage.

PART 2 - PRODUCTS

- 2.1 Breakers General
- .1 Bolt-on moulded case circuit breaker: quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.
 - .2 Common-trip breakers: with single handle for multi-pole applications.
 - .3 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting. Trip settings on breakers with adjustable trips to range from 3-8 times current rating.
 - .4 Circuit breakers with interchangeable trips as indicated.
- 2.2 Thermal Magnetic Breakers
- .1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

PART 3 – EXECUTION

- 3.1 Installation
- .1 Install as indicated on panel schedules.

END OF SECTION

Wharf Construction**Port Bickerton East****Guysborough County, Nova Scotia****Project No. R.082082.001**

Poles and Luminaires

PART 1 – GENERAL1.1 Shop Drawings and
Product Data

- .1 Submit shop drawings and product data in accordance with Section 01 33 00 – Shop Drawings.

PART 2 – PRODUCTS2.1 Deck Lighting

- .1 FIXTURE TYPE A – EATON
Eaton LED flood light, 5000 K CCT, 26240 Lumens, AH auto sensing voltage, grey colour, 3 x 3 distribution, clear coat:
Cat. #PFM25LCY UNVI33.

.2 Luminaires to be MTD. Tilt Angle Up.

.3 All bolts to be stainless steel.

.4 Standard of Acceptance: Eaton PFM Series.

- .1 FIXTURE TYPE B – EATON
Eaton LED flood light, 5000 K CCT, 11,107 Lumens. AH auto sensing voltage, grey colour, 7 x 6 distribution, clear coat:
Cat. # PFM25LCY UNVI76.

.2 Luminaires to be MTD. Tilt Angle Up.

.3 All bolts to be stainless steel.

.4 Standard of Acceptance: Eaton PFM Series.

- .1 FIXTURE TYPE C – EATON
Eaton LED flood light, 5000 K CCT, 11,107 Lumens. AH auto sensing voltage, grey colour, 7 x 6 distribution, clear coat:
Cat. # DFL11LCY/UNV1-76, 120 V.

.2 Luminaires to be MTD. Tilt Angle Up.

.3 All bolts to be stainless steel.

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Poles and Luminaires

- .4 Standard of Acceptance: Eaton DFL Series.

- .1 FIXTURE TYPE D – IPEX
IPEX LED light, 5000 K CCT, 11,107 Lumens. AH auto sensing
voltage, grey colour, NEMA 4X/IP66, clear coat. Cat.# LUPE LED.
- .2 Luminaires to be Ceiling MTD.
- .3 All screws to be stainless steel.
- .4 Standard of Acceptance: IPEX LLED-15 Series.

PART 3 – EXECUTION

3.1 Installation

- .1 Luminaires: Install luminaires as indicated and connect to lighting
circuits and controls.
- .2 Ensure proper operation.
- .3 Pole mounted luminaires and mounting brackets to be products of
one manufacturer.

END OF SECTION