Part 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results for electrical

1.2 RÉFÉRENCES

.1 CSA International

.1 CSA C22.1-F09, Canadian Electrical Code, Part 1 (21st Edition), Safety Standard for Electrical Installations.

.2 CSA C22.2 No.179-F00(C2005), Airport Series Lighting Cables.

.3 CSA C22.2 No.180-FM1983(C2008), Series Isolating Transformers for Airport Lighting.

.2 Transport Canada / Air Navigation System Requirements Branch

.1 TP 312F-1993(R2005), Aerodrome Standards and Recommended Practices.

.3 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for airfield lighting, including product characteristics, performance criteria, physical size, finish and limitations.

1.4 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data: submit operation and maintenance data for airfield lighting for incorporation into manual.

1.5 MAINTENANCE MATERIAL SUBMITTALS

.1 Submit extra stock materials in accordance with Section 01 78 00 - Closeout Submittals.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect airfield lighting from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 PRODUCTS

2.1 SYSTEMS

.1 Systems: to TP 312.

.2 Description

.1 Medium intensity edge lighting on

.1 Runway 18-36.

.2 Taxiway.

.3 Traffic area.

2.2 PRIMARY CABLES

.1 Single conductor stranded soft drawn copper, #8 AWG, 5000 volt, combined cross linked polyethylene insulation and jacket: CSA C22.2 No.179.

2.3 BREAKABLE COUPLING, TYPE 1

.1 Use DOT specification K-300 for mounting of elevated runway, taxiway and apron edge lighting fixtures as indicated.

2.4 BREAKABLE COUPLING, TYPE 2

.1 Use DOT specification K-300 for mounting of approach light fixtures installed at runway threshold as indicated.

2.5 PRIMARY CABLE KIT

.1 Use compression splice: 5 kV rated inner heat shrink sleeve, and a 600 V rated outer heat shrink sleeve for abrasion protection, and install per manufacturer's instructions.

2.6 SECONDARY PLUG AND RECEPTACLE CONNECTORS

.1 Secondary male plug connector kit; to field assemble secondary extension or terminate fixture lead, using 2 - #10 or 2 - #12 AWG type SOW secondary cable, as indicated.

.2 Secondary female receptacle connector kit; to field assemble secondary extension or repair transformer lead, using 2 - #10 or 2 - #12 AWG type SOW secondary cable, as indicated.

.3 Factory assembled secondary extension, #10, #12 AWG or 2 single conductors cable terminated with male connector on one end and female connector on other end , for long secondary runs between transformers and fixtures.

.4 Secondary male plug connector kit; to field assemble secondary extension or terminate fixture lead, using 2 - #10 or 2 - #12 AWG conductors.

.5 Secondary female receptacle connector kit; to field assemble secondary extension or repair transformer lead, using 2 - #10 or 2 - #12 AWG conductors.

2.7 ISOLATING TRANSFORMER

.1 CSA C22.2 No.180, rated 30-45 watt, and as indicated.

.1 Use for 5000 volt series circuits.

2.8 TRANSFORMER PULLPIT

.1 Construction to DOT specification K-303, galvanized metal cover with tabs to centre and prevent side movement.

.1 610 mm diameter, 450 mm depth for single transformer.

.2 610 mm diameter, 450 mm depth with cover for edge light mounting.

.3 610 mm diameter, 750 mm depth, for multiple transformers and pulling cables.

2.9 LIGHT UNIT GROUND ANCHOR

.1 Conduit anchor 50.8 mm diameter conduit, 10 m long, galvanized steel, threaded one end, with conduit coupling and ground connector.

2.10 CABLE MARKER

.1 Slab type, concrete: as indicated.

2.11 GROUND COUNTERPOISE WIRE

.1 Single conductor #8 AWG, soft drawn copper wire:

.1 Solid bare for direct burial as counterpoise for airfield lighting circuits.

.2 Stranded with green TW insulation for placing in duct or conduit, as counterpoise for airfield lighting circuits buried beneath hard surfaces, and for power circuit insulated bonding conductors.

2.12 GROUND ROD

.1 Copper clad steel 19 mm x 3000 mm long complete with ground connector.

2.13 OTHER MATERIAL

.1 Cable, secondary:

.1 Two conductor #12, copper, type SOW, Cab Tire.

.2 Three conductor #10, copper, type NMWU.

.3 Cable ties: nylon black length as indicated on plans.

.4 Conductor markers: lamacoid tags 20 mm diameter with width for 15 mm high letters.

.5 Conduit, rigid:

.1 PVC: 38 mm diameter.

.6 Splicing sleeves.

.7 Tape: PVC type.

.8 Tubing, polyethylene:

.1 517.11 kPa indicated diameter.

.2 344.74 kPa, indicated diameter.

.9 Water displacing material (protexulate).

Part 3 Part 3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions prior to airport lighting installation.

.1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 GENERAL

.1 Install Airport Lighting underground circuitry in accordance with Canadian Electrical Code, Part I, CSA C22.1.

3.3 PREPARATION

.1 Temporary Erosion and Sedimentation Control:

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to: requirements of authorities having jurisdiction, sediment and erosion control drawings, sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.4 INSTALLATION OF LIGHT UNIT ANCHORS

.1 Install 50 mm diameter, light unit anchors, at locations indicated in accordance with Erosion and Sedimentation Control Plan. Set plumb and vertical with top of conduit coupling at same elevation as adjacent ground surface:

.1 In common soil:

.1 Drive in conduit.

.2 Screw coupling on.

.2 In solid rock:

.1 Remove surface dirt.

.2 Drill hole 60 cm deep.

.3 Cut conduit to proper length.

.4 Cement grout in position.

.5 Screw coupling on.

.6 Backfill and compact to same level and density as adjacent ground.

.3 In permafrost:

.1 Drive in 750 mm long conduit.

.2 Screw coupling on.

3.5 INSTALLATION ISOLATING TRANSFORMERS

.1 Install isolating transformers adjacent to primary cable trench, at locations indicated:

- .1 In common ground:
  - .1 Excavate hole to proper depth.
  - .2 Install bedding material.
  - .3 Make connections to:
    - .1 Primary cable.
    - .2 Edge light secondary cable.
    - .3 Ground counterpoise.
  - .4 Backfill with sand and compact to same level and density as adjacent ground.
- .2 In transformer pullpits
  - .1 Place suitable transformers in pullpits.
  - .2 Make connections to:
    - .1 Primary cable.
    - .2 Edge light secondary cable.
    - .3 Ground counterpoise.
  - .3 Install water displacing protexulate powder.
  - .4 Place back cover.

3.6 INSTALLATION OF TRANSFORMER PULLPITS

.1 Install transformer pullpits at locations indicated.

- .1 Excavate to size and depth indicated.
- .2 Cover bottom of excavation with layer of bedding material.
- .3 Place pullpit so that cover is 100 mm minimum below adjacent ground surface.
- .4 Make holes in pullpit wall suitable for tubing used.
- .5 Install incoming and outgoing tubing and/or conduit.
- .6 Backfill with crushed stone around pullpit and compact to same level and density as adjacent ground as indicated.
- .7 Place cover on pullpit and lock, turning cover in clockwise rotation.

3.7 INSTALLATION OF AIRPORT LIGHTING PRIMARY U/G CABLES

.1 Install airport lighting primary underground cables, as indicated.

- .1 Bury cable directly in common soil.
- .2 Place cable in tubing.
- .3 Pull cable in ducts.
- .4 Run cable in conduits.

.2 Make connections using approved connectors as indicated.

- .1 Leave 600 mm loop of loose cable at each connection, avoid mechanical tension on connector.
- .2 Install connector in accordance with manufacturer's instructions.

.3 Install markers on cable identifying circuit numbers in each pullpit.

3.8 INSTALLATION OF GROUND COUNTERPOISE

.1 Install with runs of series lighting primary cables, in trench, duct and/or tubing at locations as indicated:

- .1 Use 1 conductor #8 SDBC wire with cables directly buried in trench or in protective tubing:
  - .1 Place counterpoise wire on top of additional 75 mm layer of bedding material above cables or tubing.
  - .2 Run counterpoise wire in straight line or in zig-zag pattern as indicated.

.2 Use 1 conductor #8 stranded with TW green insulation, with cables pulled in ducts and/or tubing under pavement.

.3 Use appropriate ground connector and connect counterpoise wire to:

- .1 Power supply system common ground.
- .2 Each light unit anchor and isolating transformer.
- .3 Each ground rod.
- .4 Other ground wires in same trench.
- .5 Pullpit cover.

3.9 INSTALLATION OF SECONDARY CABLES

.1 Install as indicated:

- .1 Bury cable directly in common soil or following the required method.
- .2 Place cable in tubing.
- .3 Run cable in conduits.
- .4 Bury cable directly in existing asphalt.

.2 Make connections using approved connectors as indicated.

- .1 In series lighting circuits, connect to isolating transformer secondary outlet.
- .2 Leave 60 cm loop of loose cable at connection to transformer.
- .3 Run loose cable end above ground to light unit location.
- .4 Backfill as indicated and compact to same level and density as adjacent ground.

3.10 FIELD QUALITY CONTROL

.1 Testing requirements:

- .1 Assign tests to qualified personnel only.
- .2 Provide necessary instruments and equipment to demonstrate that:
  - .1 Circuits are continuous, free of short circuits and unspecified grounds.
  - .2 Circuits are connected according to applicable wiring diagrams.
  - .3 Circuits perform designated functions in sequence and manner intended.
  - .4 Resistance to ground of circuits, measured with 5 kV Megger is not less than 50 megohms.
  - .5 Circuits are operable by:
    - .1 Energizing and operating each circuit at each brightness not less than 10 times.
    - .2 Energizing and operating each circuit at full load for continuous period of not less than eight hours.

.2 Provide Departmental Representative with list of test results indicating:

- .1 Location at which test was made.
- .2 Circuit number or designator of circuit tested.
- .3 Individual test results.

3.11 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.12 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by airfield lighting system installation.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 34 43 05 – Common Work Results for airfield lighting

1.2 REFERENCES

.1 Transport Canada

.1 TP 312F-1993(R2005), Aerodrome Standards and Recommended Practices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for airfield elevated edge lighting and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Québec, Canada.

.4 Samples:

.1 Submit for review and acceptance 1 sample of each sample of each type of airfield elevated edge lighting unit.

.2 Samples will be returned for inclusion into work.

1.4 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data: submit operation and maintenance data for airfield elevated edge lighting for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials of ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect airfield elevated edge lighting units from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 PRODUCTS

2.1 MEDIUM INTENSITY ELEVATED LIGHT - SERIES CIRCUIT

.1 Light unit – runway, taxiway, and apron edge:

- .1 Incandescent lamp.
- .2 Globe asymmetrical photometric distribution colour, as indicated.
- .3 SOW cord assembly with male plug.
- .4 Breakable coupling.
- .5 Suitable for mounting on 50.8 mm diameter threaded anchor stake coupling base casting.
- .6 Isolating transformer 6.6A/6.6A - 45 W.

Part 3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions prior to airfield elevated edge lighting installation.

- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 LIGHT UNIT INSTALLATION

.1 Install at locations indicated or as directed by Departmental Representative.

.2 Install in accordance with Section 34 43 05 – Common Work Results for airfield lighting and as indicated:

- .1 On conduit anchors.
- .2 On stake anchors.
- .3 On transformer pull pit.
- .4 On base casting.

.3 Assemble in accordance with manufacturer's written installation instructions.

- .1 Connect isolating transformer secondary lead to light unit cord assembly by means of disconnecting plug and receptacle.

.4 Level in accordance with manufacturer's written instructions.

.5 Install lamp of proper rating as indicated.

.6 Install coloured filters as indicated.

.7 Install lens as indicated.

.8 Install day identification cone as indicated.

3.3 FIELD QUALITY CONTROL

.1 Perform field tests in accordance with Section 34 43 05 – Common Work Results for airfield lighting.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by airfield elevated edge lighting installation.

END OF SECTION