

NOTIFICATION OF REVISION

Public Works and Government
Services Canada

Addendum No. 5 - R

Solicitation Name: Government of Canada, Office Facility.
Solicitation Number: 1322.003

Date: Monday, June 18, 2012

1. ARCHITECTURAL

1.1 SPECIFICATIONS

- .1 Volume 1 - Section 00 01 10 – Table of Contents:
 - .1 Add new Section 02 31 00 – Geophysical Investigations (1 page)
 - .1 Add subsection Thermal Response Test (76 pages)
 - .2 Add new section 12 12 00 – Artwork (4 pages).
- .2 Volume 2 - Section 00 01 10 – Table of Contents:
 - .1 Revise title Division 29 to read as follows: “Division 29 – Photovoltaic Systems”
- .3 Section 08 44 14 – Aluminum Curtain Wall, Windows and Skylights.
 - .1 Revise ‘insulated metal panel spandrel panel’ to read ‘insulated glass panel spandrel panel’ in Clause 2.1.1.1.
 - .2 Revise Clause 2.2.10 to read as follows:
‘Glass spandrel panel:
 - .1 Spandrel panel airseal backpan: ASTM A653/A653M; 0.9 mm thick, Z275 galvanized steel sheet.
 - .2 Spandrel panel insulation: CAN/ULC S702; Semi-rigid mineral fibre. Thickness: As required to fill void. Insulation fasteners: Type as recommended by insulation manufacturer with retaining washer.
 - .3 Spandrel glass: CAN/CGSB-12.9-M, 6 mm thick unless otherwise indicated, with water-based silicone emulsion coating applied to backside. Colour: To the later selection of the Departmental Representative. Provide samples for the approval of the Departmental Representative.
 - .4 Glazed spandrel panel to be internally reinforced, with insulation in thickness as indicated and galvanized sheet back-pan.’
- .3 Add new Clause 2.2.18.2 to read as follows and renumber remaining Clauses:
‘(Type 1A – Curtain wall): Spandrel panel glazing unit as indicated on Contract Drawings.’
- .4 Revise Clause 2.3.15 to read as follows:
‘Infill (Spandrel) Panels:
 - .1 Fabricate spandrel panels in accordance with reviewed shop drawings and manufacturer’s written instructions.
 - .2 Fabricate infill panels with metal covered edge seals around perimeter of panel assembly, enabling installation and minor movement of perimeter seal.
 - .3 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

- .4 Place insulation within panel, adhered to exterior face of interior panel sheet over entire area of sheet with impale fasteners.
 - .5 Provide integral reinforcing and stiffeners as required to reinforce panel against deflection caused by wind and suction loads.
 - .6 Provide spacers as necessary to separate dissimilar metals.
 - .7 Ventilate and pressure equalize the air space outside the exterior surface of the insulation, to the exterior.
 - .8 Arrange fasteners and attachments to ensure concealment from view.
 - .9 Glass panels: Consists of 6 mm thick spandrel glass to the exterior with insulated backpan to the inside. Insulation shall be in thickness as indicated, retained with stick clips. Seal all joints in shop with high grade butyl sealant, including perimeter seal at backpan. Colour to later selection by Departmental Representative.'
- .4 Section 12 12 00 – Artwork:
 - .1 Refer to new Section for artwork as attached (4 pages)

1.2 DRAWINGS

- .1 Refer to drawing 6/A7.07 Training Room Elevations
 - .1 Elevations B, C & D revise note #7 to note #2 "1220 x 2438mm white board. Refer to specification

2. ELECTRICAL

2.1 SPECIFICATIONS

- .1 Section 29 05 01 Photovoltaic System
 - .1 Refer to attached specification section re-issued.

2.2 DRAWINGS

- .1 No items.

3. MECHANICAL

3.1 SPECIFICATIONS

- .1 No items.

3.2 DRAWINGS

- .1 No items.

END OF ADDENDUM

1 General

1.1 **GEOPHYSICAL INVESTIGATION**

- .1 A copy of the following detailed geophysical information is appended to this document:

Thermal Response Test
Borehole Energy Exchange System
Niagara-on-the-Lake, Ontario
Prepared by: Libin Xue Engineering for Groundheat Systems International Inc.
Report No.: T-1109
Date: June 5, 2012
76 pages

- .2 This geophysical information records properties of subsurface conditions and recommendations for the design of a borehole energy exchange system as outlined in the information provided.
- .3 The geophysical information, by its nature cannot reveal all conditions that exist or can occur on the Site. Should subsurface conditions be found to vary substantially from the report, immediately notify the Departmental Representative in writing and await instructions.
- .4 Contractor shall not be entitled to extra payment or extension of the Contract Time for work which is required and which is reasonably inferable in the geophysical information as being necessary.
- .5 In case of discrepancies between recommendations contained in the geophysical information and requirements of the Contract Documents, the latter shall govern. Advise the Departmental Representative in writing of any discrepancies discovered.

END OF SECTION

- 1 General
- 1.1 **RELATED SECTIONS**
 - .1 Section 01 33 00 - Submittal Procedures.
- 1.2 **COORDINATION**
 - .1 Coordinate with other work to ensure satisfactory and expeditious completion of the Work of this Section.
 - .2 Provide templates, anchors, inserts and accessories required to be fixed to or inserted in the work of this section and set in place. Instruct applicable Subcontractors as to their locations.
 - .3 Coordinate with partition accessories, electrical, and finish components to ensure that proper provisions are made for the installation of the Work of this Section and for Work by others.
- 1.3 **SUBMITTALS**
 - .1 Submit submittals in accordance with Section 01 33 00.
 - .2 Product data: Submit duplicate copies of manufacturer's Product data and storage and installation requirements in accordance with Section 01 33 00.
 - .3 Templates: Submit templates for use by installers and fabricators as required for proper location and installation of graphic elements.
 - .4 Samples: Submit samples in accordance with Section 01 33 00 of the following:
 - .1 Two 300 x 300 mm sample of silk-screened canvas demonstrating material, colour and finish. Do not proceed to production until final proofs are signed off by Owner and the Departmental Representative as 'approved for production'.
 - .5 Production schedule: Submit production schedule and method statements, indicating dates for production submittals and review/approval stages, up to and including implementation.
- 1.4 **QUALITY ASSURANCE**
 - .1 Qualifications: Provide Work of this Section, executed by graphics fabricator with minimum 5 years experience in silk-screen printing. Provide proof of compliance to the Departmental Representative.
- 1.5 **DELIVERY, STORAGE AND HANDLING**
 - .1 Package or crate, and brace and wrap Products to prevent damage during shipment and handling. Shipping costs shall be included in the work of this section.

.2 Label packages and crates.

1.6 **EXTENDED WARRANTY**

.1 Warrant work of this section for a period of two (2) years, in accordance with the Conditions of the Contract.

2 **Products**

2.1 **MATERIALS**

.1 **General:**

.1 Provide all components and accessories as required for the production and complete and secure installation of the graphic artwork.

.2 Graphic fabricator will install graphic components at the Place of the Work, in accordance with production schedule prepared by the graphics fabricator.

.2 **Artwork:** Provide artwork with image silk-screened onto canvas medium. Images to be provided by the Departmental Representative. Provide sample of artwork demonstrating silk-screen printing onto canvas material, colours and workmanship.

2.2 **SILK SCREENING/DIRECT PRINTING**

.1 Screening to hold a minimum of 80 lines per inch. Screens shall be high quality and free of rips, tears or filled in areas with protective clear coat.

.2 Finished Work to be uniform and free of runs, smears, feathering, smudging, orange-peeling or other imperfections that detract from the finished product.

.3 Screening shall be registered properly and square on the display panel surface.

.4 Final spotting and cleaning of film positives in the responsibility of the graphics fabricators.

.5 All silk screening/direct printing within reach of building occupant to be protected with a semi-gloss clear coat.

2.3 **FABRICATION**

.1 Fabricate Work of this Section in accordance with manufacturer's written instructions. Fabricate transportable components and connections to facilitate efficient assembly at the building.

.2 Fabricate Products with materials and component sizes, metal gauges, hardware, reinforcing, anchors, and fastenings of adequate strength to ensure that Work of this Section will remain free of warping, buckling, opening of joints and seams, displacement, and distortion within limits of intended use.

3 Execution

3.1 **INSTALLATION**

- .1 Install Work of this Section in accordance with manufacturer's written instructions. Install components and connections to facilitate efficient assembly. All fastenings to be concealed but accessible to allow Owner to remove and replace in the event of future damage by building occupants.
- .2 Install artwork to give a complete installation and to be true, tightly fitted, and level or flush to adjacent surfaces, as suitable for installation.
- .3 Provide manufacturer's information and templates required for installation of work of this section, and assist or supervise, or both, the setting of anchorage devices, and construction of other work incorporated with Products specified in the work of this section in order that they function as intended.
- .4 Include reinforcing, anchorage and mounting devices required for the installation of each Product.
- .5 Fit joints and junction between components tightly and in true planes, conceal and weld joints for suspension systems.
- .6 Execute Work of this Section as indicated and conform to profiles, details and other conditions as indicated and required by site conditions.
- .7 Erect finished Work rigid, secure, square, level, plumb and frame to maintain dimensions and contours indicated. Make allowances for thermal and structural movement.
- .8 Installation subject to inspection by authorities having jurisdiction. Make adjustments or changes as instructed by authorities having jurisdiction.
- .9 Coordinate with applicable sections as required for installation of graphic materials under Work of this Section.

3.2 **ADJUSTMENT AND CLEANING**

- .1 Refinish damaged or defective work so that no variation in surface appearance is discernible.
- .2 Upon completion of Work of this Section, or at such time or times as the Contractor shall direct, remove protective coverings and clean down finished work.

- .3 Clean adjacent surfaces which have been soiled or otherwise marred, in an acceptable manner, to completely remove evidence of material causing same.

END OF SECTION

1 General

1.1 GENERAL

- .1 The supply, installation, testing, verification and commissioning of the photovoltaic system is to be undertaken by a single provider. Prior to system design, the provider shall perform study and communicate with the local utility company to ensure that local utility system has the capacity to take the additional power to be fed into the system.

1.2 REFERENCES

- .1 Comply with Section 16010 Electrical General Provision, and all documents referred to therein.

1.3 WORK INCLUDED

- .1 Provide all materials for a complete, OPA Feed-in-Tariff compliant, nominal 42.9kWp photovoltaic system, as required by the Contract Documents.

1.4 SUBMITTALS

- .1 Submit Shop Drawings of all components in accordance with Section 16011 Shop Drawing, Product Data and Samples including, but not limited to:
1. All components and devices
 2. Layout of equipment
 3. Sequence of operation
 4. The manufacturer / supplier must provide a PVSYS/RETScreen Analysis to demonstrate estimated annual output of system in Kw/hrs.

2 Products

2.1 PHOTOVOLTAIC SYSTEM

- .1 Provide a complete, OPA FIT-compliant, photovoltaic system as specified hereinafter and as outlined on the drawings. The system shall consist of photovoltaic modules, roof-mounting system, inverters, monitoring and metering systems and all other components and accessories necessary to complete the system.
- .2 The PV array shall be sized to achieve a nominal 42.9kWp DC STC output for the entire system under peak sun conditions (1000 W/m²). The nominal system size is based on a system of 165 260W panels. Due to differences in panel manufacturers, the nominal system size may vary slightly.
- .3 All components of the system shall be Underwriters' Laboratories of Canada Ltd. listed and CSA approved, and shall meet requirements of both Provincial and local regulations for the applications.
- .4 The system must comply with applicable National and/or Provincial Building code recognized at time of Specification.

- .5 The power must be provided at 60-Hertz, AC at 600V- volt, 3-phase or as required by the Local Distribution Company (LDC).
- .6 Systems must be designed and installed using components in compliance with all relevant codes (CSA, ULC, ETL, ESA, CEC, etc.).
- .7 All utility interfacing components must meet the requirements of the OPA, Feed-In-Tariff (FIT) program, and the LDC. This includes Canadian content requirements set out by the FIT program.
- .8 All module frames, mounting structures, metal enclosures, panel boards, and controls cabinets should be provided with connections for bonding to a common grounding conductor and terminating at the ground rod at the utility service entrance point.
- .9 Loss of line: The system shall not operate without the line voltage present. The system shall sense a "loss of line" utility condition and shall automatically disconnect from the line. The system shall restart automatically after restoration of line voltage and frequency for at least 5 minutes.

2.2 PHOTOVOLTAIC MODULES

- .1 Modules shall be framed flat-plate crystalline silicon. Thin film modules will not be considered for this application.
- .2 Modules shall meet or exceed the requirements of Underwriters' Laboratories Canada (ULC) standard C1703 Flat Plate Photovoltaic Modules and Panels.
- .3 Modules shall be warranted by the manufacturer for at least 90% of rated power for 10 years and 80% of its rater power for 20 years.
- .4 Modules shall have a positive-only power tolerance.
- .5 Shall demonstrate tolerance for winter operation, including snow loading, corrosion, and low-temperature operation

2.3 MOUNTING SYSTEM

- .1 The mounting system shall firmly secure the panels to the roof with no penetrations to the roof membrane, accounting for wind loading, snow drifting, etc.
- .2 The mounting system shall tilt the panels at 10 degrees towards the south.
- .3 The array platform load should not have a distributed load exceeding 5psf.
- .4 Ballast material shall be 4 inch by 8 inch by 16 inch asher stone, weighing 32.4 lbs each. Design team to assess equivalence of alternate ballast materials.
- .5 It is estimated that no more than 250 ballast stones will be required for the system, but this number may change based on more detailed wind loading analysis.

- .6 The mounting system shall aim to consist of a minimal number of parts per panel installed.
- .7 Roof penetrating rail-based or PVC plastic mounting systems will not be considered for this application.
- .8 The mounting system shall include an integrated grounding lug to facilitate ground requirements as per the Ontario Electrical Safety Code.
- .9 Mounting system and overall installation must be guaranteed free of roof leaks for a minimum of ten (10) years.

2.4 **INVERTERS**

- .1 The photovoltaic system shall use microinverters.
- .2 One microinverter shall be mounted to the back of each panel.
- .3 The microinverter selected shall be compatible with the PV module selected and shall have a maximum output no less than 82% of the module rated power.
- .4 The microinverter selected shall be specifically designed for utility grid interconnection of photovoltaic modules and be capable of automatic, continuous, and stable operation over the range of voltages, currents, and power levels of the selected module.
- .5 The microinverter shall be compliant with IEEE standard 1547 and meet or exceed the requirements of UL 1741.
- .6 Central or string inverters may not be considered for this application, depending on mechanical space.
- .7 Inverters/transformers shall provide output voltage of 600V to facilitate grid connection in parallel with the building meter as required by the OPA FIT program and LDC.

2.5 **MONITORING AND WEATHER STATION**

- .1 The system must include monitoring and verification infrastructure to allow the building operator, through the Building Automation system, to track the performance of the system over time.
- .2 Monitoring system shall include a weather station to track system performance vs. actual weather conditions. Weather station instruments shall comply with IEC 61724 International Standard for PV System Performance Monitoring.
- .3 System performance data shall be available to the building operator remotely.

2.6 **ELECTRICAL INTERCONNECTION**

- .1 The system shall include all required materials and equipment and all work necessary to facilitate the interconnection of the PV system to the local distribution system.
- .2 The system shall comply with IEEE Std. 519 (Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems)

3 Execution

3.1 INSTALLATION

- .1 The conduit and wiring, etc., are to comply with applicable building codes, electrical codes, and design requirements for exposed conduits, fittings and boxes, i.e., epoxy or PVC coated.
- .2 System controls, user interface, disconnects, and any other related electronics are to be wall mounted in the second floor mechanical room.
- .3 The controls interface must have an automatic visual indicator showing whether the system is online or not.
- .4 All outdoor junction boxes, disconnects, and electrical equipment shall be installed a lockable enclosures rated NEMA 3R or better.

END OF SECTION