| DWGGG Ontario Region         | n, Arch. Master Spec, Rev. 2011-03-21 |                   |      |    |    |
|------------------------------|---------------------------------------|-------------------|------|----|----|
| PWGSC Ontario Region Project | SPECIFICATION TITLE SHEET             | Section<br>Page 1 | 00   | 00 | 00 |
| Number R.012222.021          |                                       | 2013-06-          | -13_ |    |    |
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|                              |                                       |                   |      |    |    |
| Project Title                | FRENCH RIVER, ONTARIO PWGSC           |                   |      |    |    |
|                              | GAINS HEATERS AT PORTAGE DAM          |                   |      |    |    |
|                              | GAINS HEATERS AT PORTAGE DAM          |                   |      |    |    |
|                              |                                       |                   |      |    |    |
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| Section <u>Title</u>   | Pages  |
|--|--------|
| Division 00 - Procurement and Contracting Requirements 00 00 00 SPECIFICATION TITLE SHEET                            | 1      |
| Division 01 - General Requirements 01 11 01 GENERAL INSTRUCTIONS MINOR WORKS 01 35 29 HEALTH AND SAFETY REQUIREMENTS | 9<br>6 |
| Division 26 - Electrical<br>26 05 02 ELECTRICAL WORK   | 3      |

#### PART 1 - GENERAL

### 1.1 GENERAL DESCRIPTION OF WORK

- .1 Work generally comprises of the following:
  - .1 Supply and install gains heaters.
  - .2 Supply and install disconnect switch, power panel including breakers.
  - .3 Supply and install power cables and junction boxes.

### 1.2 MINIMUM STANDARDS

- .1 Execute work to meet or exceed:
  - .1 National Building Code of Canada 2010, National Fire Code of Canada 2010, Ontario Building Code 2012 and any other code of provincial or local application, including all amendments up to project date, provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
  - .2 Rules and regulations of authorities having jurisdiction.
  - .3 Federal Fire Commissioner, No. 301, Standard for Construction Operations, and No. 302, Standard for Welding and Cutting, June 1982.
  - .4 Observe and enforce construction safety measures required by National Building Code 2010, Part 8 Safety Measures at Construction and Demolition Sites, Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter 0.1 as amended, O. Reg. 213/91 as amended by O. Reg. 631/94, O. Reg. 143/99, O. Reg. 571/99, O. Reg. 145/00, O. Reg. 527/00, R.R.O. 1990, Reg. 834, O. Reg. 278/05 (Asbestos), Workplace Safety and Insurance Board and municipal statutes and authorities.
  - .5 Environmental Protection Act, O. Reg. 102/94 and O. Reg. 103/94.

#### 1.3 TAXES

.1 Pay applicable Federal, Provincial and Municipal taxes.

## 1.4 FEES, PERMITS, .1 CERTIFICATES AND LETTERS

Provide authorities having jurisdiction with information requested.

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| 1.4 FEES, PERMITS, .2 CERTIFICATES AND LETTERS (Cont'd)  |       | Pay fees and obtain certific<br>Electrical Safety Authority<br>and letters required.   |   |
| (conc a)   | .3    | Furnish certificates, permit requested.  | s and letters when  |
| 1.5 EXAMINATION  | .1    | Examine existing conditions conditions affecting work.   | and determine   |
| 1.6 DOCUMENTS  | .1    | Keep one copy of contract do site.   | cuments on the  |
| 1.7 ELECTRONIC SUBMITTALS  | .1    | Submit number of hard copies type and format of submittal electronic format as pdf fil NMSEdit Professional spp, MS Autocad dwg files; on USB coencryption requirements or talternate electronic file shas ftp, as directed by Depar Representative. | and also submit in es. Forward pdf, Word, MS Excel, and impatible with PWGSC hrough email or aring service such |
| 1.8 CONTRACTOR'S AS-BUILT DRAWINGS AND SPECIFICATIONS  | .1    | As work progresses, neatly r deviations from the Contract specifications using fine, r size white prints and specificate changes on the electron   | drawings and<br>ed marker on full<br>ications. Make the   |
| .2 Neatly print lettering and nummatch original. Lines may be dishall be neat and accurate. Add block note: "AS BUILT". Also contamings each title and number with "AS-BUILT" information. Contents each specification settitle of specification section "AS-BUILT" information. |       | drawn free-hand but Add at each title circle on List of er of drawing marked Circle on Table of section number and   |   |
|  | .3    | Departmental Representative electronic set of drawings, specifications for as-built specification purposes.  1 Drawings are in Autocad. 2 Specifications are in N Professional. 3 Amendments and addenda   | schedules and<br>drawing and<br>MSEdit  |

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# 1.8 CONTRACTOR'S AS-BUILT DRAWINGS AND SPECIFICATIONS (Cont'd)

- .4 Record following significant deviations:
   .1 Horizontal and vertical location of
   underground utilities and appurtenances
   referenced to permanent surface improvement.
  - .2 Field changes of dimension.
  - .3 Other significant deviations which are concealed in construction and can not be identified by visual inspection.
  - .4 Alternative materials and systems installed replacing original materials and systems specified by trade name.
- .5 Turn one set, paper copy and electronic copy, of AS-BUILT drawings and specifications over to Departmental Representative on completion of work. Submit pdf files on USB compatible with PWGSC encryption requirements, through email or alternate electronic file sharing service such as ftp.
- .6 If project is completed without significant deviations from Contract drawings and specifications submit to Departmental Representative one set of drawings and specifications marked "AS-BUILT".

## 1.9 OPERATIONS AND .1 MAINTENANCE DATA

- On completion of project submit to Departmental Representative 3 copies of Operations and Maintenance Data assembled in three 255 x 295 mm vinyl-covered, 3-ring, loose-leaf binders with title sheet labelled "Operations Data and Maintenance Manual", project title, date and list of contents. Organize content into applicable sections between hard paper dividers with labelled tabs.
- .2 Include in each binder maintenance instructions for finished surfaces, warranties and guarantees in form approved by Departmental Representative and operations and maintenance data for equipment and systems with parts list, suppliers' names and addresses, schematic diagrams for electrical hardware, complete set of final shop drawings (bound separately), names, addresses and phone numbers of sub-contractors and suppliers, list of materials with names of manufacturer and source of supply. Neatly type lists and rates. Use clear drawings, diagrams or manufacturer's literature.

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## 1.10 SHOP DRAWINGS .1 AND PRODUCT DATA SHEETS

- 1 Prior to submission check and certify as correct, shop drawings and product data sheets. Issue to Departmental Representative each submission at least 14 days before dates reviewed submission will be needed.
- .2 Submit 3 prints and 1 electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .3 Submit 3 prints and 1 electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept. This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.
- .5 Responsibility for errors, omissions or deviations from requirements of Contract Documents is not relieved by Departmental Representative's review of submittals.

### 1.11 CONSTRUCTION PHOTOGRAPHS

- .1 Submit electronic and hard copy of colour digital photography in jpg format, standard resolution.
- .2 Identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints and location of viewpoints determined by Departmental Representative.
- .4 Frequency: as directed by Departmental Representative.

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|  |   |  |  |
| 1.12 DESIGN DATA, TEST REPORTS, CERTIFICATES, MANUFACTURER'S INSTRUCTIONS, | ATA, .1 Prior to submission check and certify as correct each submission. Issue to Departmental Representative each submission at least 14 day before reviewed submission will be needed. |  |  |
| MANUFACTURER'S FIELD REPORTS   | .2  | Submit 3 white print copies of requested.  | each item                                |
|  | .3  | Responsibility for errors, omis<br>deviations from requirements of<br>Documents is not relieved by De<br>Representative's review of subm | Contract<br>epartmental                  |
| 1.13 ADDITIONAL DRAWINGS   | .1  | Departmental Representative may additional drawings to clarify   |  |
|  | . 2   | Such drawings become part of Co<br>Documents.  | ontract                                  |
| 1.14 PROTECTION  | .1  | Protect existing work from dama  | ige.                                     |
|  | .2  | Replace damaged existing work we finish to match original.   | ith material and                         |
|  | .3  | Protect existing trees and plar adjacent properties.   | nts on site and                          |
| 1.15 EXISTING SERVICES   | .1  | Establish location, protect and existing utility lines.  | l maintain                               |
|  | . 2   | Maintain existing services in o  | occupied areas.                          |
|  | .3  | Use designated existing sanitar  | ry facilities.                           |
|  | . 4   | Use existing water and electric no cost.   | al services at                           |
| 1.16 TEMPORARY FACILITIES AND SERVICES                                     | .1  | Provide and maintain temporary services required to carry out  |  |
|  | .2  | Remove temporary facilities and completion of work.  | l services on                            |
|  | .3  | Provide and maintain temperature required to prevent frost damage  |  |

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|                        |                              |                  |

### 1.17 METRIC SIZED MATERIALS

- .1 SI metric units of measurement are used exclusively on the drawings and in the specifications for this project.
  - .2 The Contractor is required to provide metric products in the sizes called for in the Contract Documents except where a valid claim can be made that a particular product is not available on the Canadian market.

## 1.18 MATERIAL AND EQUIPMENT

- .1 Use new products unless otherwise specified.
- .2 Deliver and store material and equipment to manufacturer's instructions with manufacturer's labels and seals intact.
- .3 When material or equipment is specified by standard or performance specifications, upon request of Departmental Representative, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

## 1.19 CUTTING AND REMEDIAL WORK

- .1 Co-ordinate work to keep cutting and remedial work to a minimum.
- .2 Execute cutting and remedial work required.

  Notify Departmental Representative before cutting, boring or sleeving structural members.
- .3 Prior to cutting or drilling horizontal or vertical surfaces including concrete, concrete block or other structural substrate, determine location of reinforcing, service lines, pipes, conduits or other items by appropriate method. Submit findings to Departmental Representative prior to cutting or drilling.
- .4 Match work to adjoining construction and finishes.
- .5 Make good surfaces exposed or disturbed by work with material and finish to match existing adjoining surfaces.

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|--|-----|---|--|
| 1.20 FASTENINGS  |     | Provide fastenings of type, s<br>required to assure secure and  |  |
|  | .2  | Obtain Departmental Represent<br>before using explosive actuat  | <del>-</del>   |
| 1.21 CO-ORDINATION AND CO-OPERATION                    | .1  | Site will not be occupied dur work.   | ring execution of  |
|  | .2  | Work area will not be occupie of work.  | ed during execution  |
|  |     | Execute work with minimum dis   |  |
|  | . 4 | Where security has been reduce contract, provide temporary messecurity.   |  |
| 1.22 INSPECTION AND TESTING                            | .1  | When initial tests and inspections required by Depar<br>Representative on corrected w   | pay for tests and  |
| 1.23 COST BREAKDOWN                                    | .1  | Within 48 hours of notificati of bid furnish a cost breakdo aggregating contract amount.  |  |
|  | .2  | Within 48 hours of acceptance list of subcontractors.   | e of bid submit a  |
| 1.24 SCHEDULING  | .1  | On award of contract submit a construction schedule for wor anticipated progress stages we completion. When schedule has the Departmental Representation measures to complete work with Do not change schedule without Departmental Representative. | ck, indicating vithin time of s been reviewed by two take necessary thin scheduled time. |
|  | .2  | Carry out work Monday to Frid<br>07:00 hours and on Saturdays,<br>statutory holidays.   |  |

|   | 1, Mai | GENERAL INGERIGETORS   | g+ i 01 11 01  |
|---|--------|--|--|
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| 1.25 CLEANING                           | .1     | Maintain project free of accumurubbish.  | lated waste and  |
|   | . 2    | Final cleaning: .1 Remove temporary protectio .2 Broom clean paved exterior clean other exterior surfaces.   |  |
| 1.26 DESIGNATED SUBSTANCES              | .1     | The work area has been surveyed presence of designated substant the Occupational Health and Saf Regulations for Construction Pr 213/91 as amended.   | es referred to in ety Act and  |
| 1.27 SPECIAL PROTECTION AND PRECAUTIONS | .1     | Comply with the requirements of Hazardous Materials Information regarding use, handling, storag of hazardous materials; and regard the provision of material sacceptable to HRSDC - Labour Provision of Materials Sacceptable S | System (WHMIS)  Te, and disposal  Farding labelling  Fafety data sheets      |
| 1.28 POLLUTION CONTROL                  | .1     | Spills of deleterious substance .1 Immediately contain, limit clean up in accordance with proregulatory requirements2 Report immediately to Onta Action Centre: 1-800-268-60603 Further information on dan emergency cleanup and precautio list of companies performing the obtained from the Transport Cannumber (613) 996-6666 collect.  | spread and vincial ario Spills agerous goods ons including a his work can be |

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#### PART 2 - PRODUCTS

2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not used.

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Section 01 35 29

#### PART 1 - GENERAL

#### 1.1 REFERENCES

- - .2 National Building Code 2010 (NBC):.1 NBC 2010, Division B, Part 8 SafetyMeasures at Construction and Demolition Sites.
  - .3 National Fire Code 2010 (NFC):
     .1 NFC 2010, Division B, Part 5 Hazardous
    Processes and Operations, subsection 5.6.1.3
    Fire Safety Plan.
  - .4 Province of Ontario:
    - .1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
    - .2 O. Reg. 490/09, Designated Substances.
    - .3 Workplace Safety and Insurance Act, 1997.
    - .4 Municipal statutes and authorities.
  - .5 Treasury Board of Canada Secretariat (TBS):
     .1 Treasury Board, Fire Protection Standard
     April 1, 2010 www.tbs-sct.gc.ca/pol/doc-eng.aspx
     ?id=17316&section=text.
  - .6 Fire Commissioner of Canada (FCC):
    - .1 FC-301 Standard for Construction Operations, June 1982.
    - .2 FC-302 Standard for Welding and Cutting, June 1982.

Human Resources and Social Development Canada Labour Program Fire Protection Engineering Services 4900 Yonge Street 8th Floor North York, Ontario M2N 6A8

and copies may be obtained from:

Human Resources and Social Development Canada Labour Program Fire Protection Engineering Services Ottawa, Ontario K1A 0J2 HEALTH AND SAFETY REQUIREMENTS

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#### 1.2 SUBMITTALS .1

- .1 Make submittals in accordance with Section 01 11 01.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .1 Results of site specific safety hazard assessment.
  - .2 Results of safety and health risk or hazard analysis for site tasks and operations found in work plan.
  - .3 Measures and controls to be implemented to address identified safety hazards and risks.
  - .4 Provide a Fire Safety Plan, specific to the work location, in accordance with NBC, Division B, Article 8.1.1.3 prior to commencement of work. Deliver two copies of the Fire Safety Plan to the Departmental Representative not later than 14 days before commencing work.
  - .5 Contractor's and Sub-contractors' Safety Communication Plan.
  - .6 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations. Coordinate plan with existing Emergency Response requirements and procedures provided by Departmental Representative.
- .3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 7 days after receipt of comments from Departmental Representative.
- .4 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .5 Submit names of personnel and alternates responsible for site safety and health.
- .6 Submit records of Contractor's Health and Safety meetings when requested.
- .7 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, bi-weekly.

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|  |       |  |   |
| 1.2 SUBMITTALS (Cont'd)                                | .8    | Submit copies of orders, directions or report issued by health and safety inspectors of the authorities having jurisdiction.   |   |
|  | .9    | Submit copies of incident and a  | ccident reports.  |
|  | .10   | Submit Material Safety Data She  | ets (MSDS).   |
|  | .11   | Submit Workplace Safety and Ins (WSIB) - Experience Rating Repor   |   |
| 1.3 FILING OF NOTICE                                   | .1    | File Notice of Project with Pro<br>authorities prior to commenceme   |   |
| 1.4 WORK PERMIT  | .1    | Obtain building permits related to project prior to commencement of Work.  |   |
| 1.5 SAFETY<br>ASSESSMENT                               | .1    | Perform site specific safety hazard assessment related to project.   |   |
| 1.6 MEETINGS   | .1    | Schedule and administer Health and Safety meeting with Departmental Representative pricto commencement of Work.  |   |
| 1.7 REGULATORY<br>REQUIREMENTS                         | .1    | Comply with the Acts and regula Province of Ontario.   | tions of the  |
|  | . 2   | Comply with specified standards to ensure safe operations at si  | _   |
| 1.8 GENERAL<br>REQUIREMENTS                            | .1    | Develop written site-specific H<br>Plan based on hazard assessment<br>beginning site Work and continu<br>maintain, and enforce plan unti<br>demobilization from site. Healt<br>must address project specificat | prior to<br>e to implement,<br>l final<br>h and Safety Plan |
|  | . 2   | Departmental Representative may writing, where deficiencies or noted and may request re-submis correction of deficiencies or accepting or requesting improve   | concerns are<br>sion with<br>oncerns either                 |

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|  |    |  |  |
| 1.8 GENERAL REQUIREMENTS (Cont'd)                      | .3 | Relief from or substitution for provision of minimum Health and specified herein or reviewed sit Health and Safety Plan shall be Departmental Representative in the second | Safety standards<br>te-specific<br>submitted to                                |
| 1.9 COMPLIANCE REQUIREMENTS                            | .1 | Comply with Ontario Occupational Safety Act, R.S.O. 1990 Chapter   |  |
| 1.10 RESPONSIBILITY                                    | .1 | Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.   |  |
|  | .2 | Comply with and enforce compliant with safety requirements of Confapplicable federal, provincial, local statutes, regulations, and with site-specific Health and Sa  | tract Documents,<br>territorial and<br>d ordinances, and                       |
|  | .3 | Where applicable the Contractor designated "Constructor", as desoccupational Health and Safety Province of Ontario.  | fined by   |
| 1.11 UNFORSEEN HAZARDS                                 | .1 | Should any unforeseen or peculia safety-related factor, hazard, obecome evident during performance immediately stop work and advise Representative verbally and in the second sec | or condition<br>ce of Work,<br>e Departmental                                  |
|  | .2 | Follow procedures in place for I to Refuse Work as specified in Health and Safety Act for the Property Ontario.  | the Occupational   |
| 1.12 HEALTH AND SAFETY CO-ORDINATOR                    | .1 | Employ and assign to Work, composite authorized representative as Health and Safety must: .1 Have working knowledge of safety and health regulations2 Be responsible for complete Health and Safety Training Sessithat personnel not successfully  | alth and Safety Co-ordinator  occupational  ing Contractor's ions and ensuring |

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## 1.12 HEALTH AND SAFETY CO-ORDINATOR (Cont'd)

- .1 (Cont'd)
  - .2 (Cont'd)
    required training are not permitted to enter
    site to perform Work.
  - .3 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
  - .4 Be on site during execution of Work and report directly to and be under direction of Registered Occupational Hygienist and or site supervisor.

## 1.13 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province of Ontario, and in consultation with Departmental Representative.
  - .1 Contractor's Safety Policy.
  - .2 Constructor's Name.
  - .3 Notice of Project.
  - .4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
  - .5 Ministry of Labour Orders and reports.
  - .6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
  - .7 Address and phone number of nearest Ministry of Labour office.
  - .8 Material Safety Data Sheets.
  - .9 Written Emeregency Response Plan.
  - .10 Site Specific Safety Plan.
  - .11 Valid certificate of first aider on duty.
  - .12 WSIB "In Case of Injury At Work" poster.
  - .13 Location of toilet and cleanup facilities.

### 1.14 CORRECTION OF .1 NON-COMPLIANCE

- Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

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|                                 |       |  |  |
| 1.15 BLASTING                   | .1    | Blasting or other use of explos permitted.   | sives is not   |
| 1.16 POWDER ACTUATED DEVICES    | .1    | Use powder actuated devices onl of written permission from Depa Representative.  |  |
| 1.17 PROJECT/SITE<br>CONDITIONS | .1    | Work at site will involve conta<br>.1 Silica in concrete.<br>.2 Guano.   | act with:  |
| 1.18 WORK STOPPAGE              | .1    | Give precedence to safety and h  | nealth of public   |
|                                 |       | and site personnel and protecti over cost and schedule consider  | on of environment  |
|                                 | .2    | Assign responsibility and oblig<br>Competent Supervisor to stop or<br>at Competent Supervisor's discr<br>necessary or advisable for reas<br>safety. Departmental Representa<br>stop Work for health and safety | start Work when,<br>retion, it is<br>sons of health or<br>ative may also |
| PART 2 - PRODUCTS               |       |  |  |
| 2.1 NOT USED                    | .1    | Not used.  |  |
| PART 3 - EXECUTION              |       |  |  |
| 3.1 NOT USED                    | .1    | Not used.  |  |

#### PART 1 - GENERAL

| 1.1 CODES AND STANDARDS | .1  | Do complete installation in accordance with: .1 CAN/CSA-C22.1-12, Canadian Electrical Code, Part I, except where specified otherwise2 The Ontario Electrical Safety Code 2012, and all bulletins (Ontario)3 Hydro requirements and local applicable codes and regulations. |
|-------------------------|-----|--|
|                         | .2  | Do underground systems in accordance with CSA C22.3 No.7-94(R2004), Underground Systems except where specified otherwise.  |
|                         | .3  | Obtain inspection certificate from Electrical Safety Authority.  |
| 1.2 SUBMITTALS          | .1  | Provide shop drawings of heaters for approval before manufacturing in accordance with Section 01 11 01.  |
| PART 2 - PRODUCTS       |     |  |
| 2.1 DISTRIBUTION SYSTEM | .1  | 347/600V, 3 phase, 4W, 60 Hz.  |
| 2.2 WIRING SYSTEM       | .1  | Power circuits in Teck 90 cables.  |
|                         | .2  | Copper conductors.   |
|                         | .3  | Use approved connectors for Teck cables.   |
|                         | . 4 | Provide proper cable/conductor identification tags.  |
| 2.3 GROUNDING           | .1  | Ground service entrance and equipment with approved conductors and connectors.   |
|                         | . 2 | Make tests required by code and authorities having jurisdiction.   |

Provide 2 or more ground rods to limit resistance to 10 ohms maximum.

.3

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| 2.4                     | PANELBOARD          | .1   | Provide panelboard of the circuit breaker type.   |
|-------------------------|---------------------|--|---|
|                         |                     | . 2  | Install branch circuit breakers shown on panel schedule.  |
|                         |                     | .3   | Panel to be in dead front metal cabinet with hinged door and catches.   |
|                         |                     | . 4  | Breakers: GFI, toggle type, bolt-on, quick-make, quick-break, 40°C ambient temperature compensated and trip-free of operating handles on overloads. |
|                         |                     | .5   | 3P breakers to be with single handle common trip type.  |
|                         |                     | .6   | Panel and circuit breakers to have minimum 14,000 A symmetrical rms interrupting capacity rating.   |
|                         |                     | .7   | Typed directory card showing load supplied by each circuit, mounted inside cabinet door.  |
|                         |                     | .8   | Mount panel at 1500 mm above ground with the top of panel not higher than 2000 mm.  |
|                         |                     | .9   | Copper bus with neutral of same ampere rating as mains.   |
| 2.5 DISCONNECT SWITCHES |                     | .1   | Heavy duty, quick-make, quick-break.  |
| 3,,110                  |                     | . 2  | Type 3R weatherproof for outdoors.  |
| 2.6 FUSES               | .1                  | HRC, Class J dimension, time delay.  |   |
|                         |                     | .2   | Provide 1 spare set of fuses.   |
| 2.7                     | ELECTRIC<br>HEATERS | .1   | 347 V, 1 phase.   |
| OLITIO HEATERD          | . 2                 | Two elements, rated at 750 W each, 750 W at low connection and 1500 W at high conection. |   |
|                         |                     | .3   | 76 mm (3") 150#flange.  |
|                         |                     | . 4  | B = 6,756 mm (266"). B is length of heater element.   |

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| 2.7 ELECTRIC GAINS HEATERS | .5   | 610mm (24") cold end.  |                  |
| (Cont'd)                   | .6   | Immersion type.  |                  |
|                            | .7   | Water tight, moiture resistance terminal box.  |                  |
|                            | .8   | Fit into 73 mm inner diameter tube.  |                  |
|                            | .9   | Spare gains heaters: In addition to supply and install eighteen (18) gains heaters as mentione on drawings, supply two (2) spare gains heaters Hand over spare heaters to Departmental Representative. |                  |
| 2.8 JUNCTION BOXES         | .1   | Weatherproof.  |                  |
|                            | . 2  | Construction: welded sheet stee latch and catch.   | l, hinged door,  |
|                            | .3   | Surface return flange mounting   | as indicated.    |
|                            | . 4  | Completed inside with one 14-po 600 V terminal block. Two termitotally 14 positions, is accept   | nal blocks,      |
| PART 3 - EXECUTION         |      |  |                  |
| 3.1 INSTALLATION           | .1   | Install material and equipment with referenced standards and m   |                  |

written instructions.