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**800 Burrard Street, Room 219**

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**Vancouver**

**British Columbia**

**V6Z 0B9**

**Bid Fax: (604) 775-9381**

**SOLICITATION AMENDMENT**

**MODIFICATION DE L'INVITATION**

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

**Comments - Commentaires**

**Vendor/Firm Name and Address**

**Raison sociale et adresse du  
fournisseur/de l'entrepreneur**

**Issuing Office - Bureau de distribution**

Public Works and Government Services Canada -  
Pacific Region

800 Burrard Street, Room 219

800, rue Burrard, pièce 219

Vancouver

British C

V6Z 0B9

<b>Title - Sujet</b> Additional Fridge & Freezer Space	
<b>Solicitation No. - N° de l'invitation</b> EZ899-162042/A	<b>Amendment No. - N° modif.</b> 002
<b>Client Reference No. - N° de référence du client</b>	<b>Date</b> 2016-02-15
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$PWY-025-7732	
<b>File No. - N° de dossier</b> PWY-5-38359 (025)	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin</b> <b>at - à 02:00 PM</b> <b>on - le 2016-02-23</b>	
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input checked="" type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Fung, Donna(PWY)	<b>Buyer Id - Id de l'acheteur</b> pwy025
<b>Telephone No. - N° de téléphone</b> (604) 666-9835 ( )	<b>FAX No. - N° de FAX</b> (604) 775-6633
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b> CSC - Matsqui Institution - Abbotsford, BC	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

<b>Delivery Required - Livraison exigée</b>	<b>Delivery Offered - Livraison proposée</b>
<b>Vendor/Firm Name and Address</b> <b>Raison sociale et adresse du fournisseur/de l'entrepreneur</b>	
<b>Telephone No. - N° de téléphone</b> <b>Facsimile No. - N° de télécopieur</b>	
<b>Name and title of person authorized to sign on behalf of Vendor/Firm</b> <b>(type or print)</b> <b>Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)</b>	
<b>Signature</b>	<b>Date</b>

This Amendment No. 002 is raised to:  
1) extend the solicitation closing date, and  
2) incorporate Addendum #1.

## Extension of Time

**Addition of Freezer  
Matsqui Institution, Abbotsford, BC**

**Solicitation No: EZ899-162042/A**

Notice is hereby given that the time for reception of tenders previously due at  
2:00 p.m. on 19 February 2016 is hereby extended to  
**2:00 p.m. on 23 February 2016.**

Please see the attached Addendum #1.

**ALL OTHER TERMS AND CONDITIONS REMAIN UNCHANGED.**

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**NOTE TO TENDERERS:** Use the mailing label below and affix it securely to the outside of the envelope or package containing your tender. For revisions to tenders submitted by facsimile (fax # (604) 775-9381), use this sheet as the cover sheet. Always ensure your company name, return address, tender number and closing date appear legibly on the outside of your bid submission.

**REAL PROPERTY CONTRACTING  
Public Works & Government Services Canada  
Room 219 - 800 Burrard Street  
Vancouver, B.C. V6Z 0B9**

Requisition No.: EZ899-162042/A  
Tender Closing Date & Time: 23 February 2016 at 14:00  
Project Description: Addition of Freezer  
Matsqui Institution, Abbotsford, BC

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The following changes in the tender documents are effective immediately. This addendum will form part of the contract documents.

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## **SPECIFICATIONS**

- .1 Section 01 01 50 GENERAL INSTRUCTIONS
  - a) 3.1  
Delete the wording "eleven (11) weeks.  
substitute with the wording "fourteen (14) weeks".
  
- .2 Section 02 41 99 DEMOLITION FOR MINOR WORKS  
Replace entire section with the revised Section attached with this Addendum. (This revised section is noted R1 at the document header.)

## **DRAWINGS**

- .1 Add the following note to Drawing A-201 to point to the EXISTING FENCE south of and adjacent to the NEW CANOPY ADDITION AND NEW CONCRETE PAVING SLAB:  
"REMOVE EXISTING FENCING AND POSTS WHERE IN THE WAY OF GROUND WORK TO PREPARE FOR NEW STRUCTURAL FOOTINGS AND NEW CONCRETE PAVING SLAB. INSTALL TEMPORARY CONSTRUCTION FENCING. REPLACE WITH NEW POSTS AND REUSE EXISTING FENCE AND RAIL MATERIAL."

## **QUESTIONS AND ANSWERS**

- Q1 On the website, it notes the construction schedule to be (14) weeks. Specifications PDF notes (11) weeks. Please clarify.
  - A1 Refer to Specifications Addendum #1.
  
  - Q2 Is the freezer part of the general contractor's scope of work?
  - A2 The freezer is part of the scope of this project. Trade division by general contractor.
  
  - Q3 Existing chain-link fence is in the way of groundwork to prepare for structural footings and preparation for new concrete paving slab.
  - A3 Refer to Drawing Addendum .1.
-

**STRUCTURAL ADDENDUM**

.1 Refer to Structural Addendum #1 attached.

**MECHANICAL ADDENDUM**

.1 Refer to Mechanical Addendum #1 attached.

**ELECTRICAL ADDENDUM**

.1 Refer to Electrical Addendum #1 attached.

**END OF ADDENDUM #1**

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**Part 1            General**

**1.1                REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .2 References - Federal Legislation
  - .1 Canadian Environmental Assessment Act (CEAA), 2012, c. 37.
  - .2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
  - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

**1.2                SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 01 50 - General Instructions].
- .2 Before proceeding with demolition of slab on grade and excavation adjacent to existing building and where required by authority having jurisdiction submit for review by Departmental Representative shoring and underpinning drawings prepared by qualified professional engineer registered or licensed in the Province of British Columbia, showing proposed method.
- .3 Prior to beginning of Work on site submit detailed Waste Reduction Workplan in accordance with Sections 01 01 50 - General Instructions and indicate:
  - .1 Descriptions of and anticipated quantities in percentages of materials to be salvaged reused, recycled and landfilled.
  - .2 Schedule of selective demolition.
  - .3 Number and location of dumpsters.
  - .4 Anticipated frequency of tipping.
  - .5 Name and address of haulers and waste receiving organizations.

**1.3                WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 01 50 - General Instructions.

**1.4                EXISTING CONDITIONS**

- .1 Take over areas where demolition / removal work is indicated based on the condition at the time of examination prior to tendering.
- .2 Should unidentified Asbestos Containing Materials (ACM) or other hazardous substance encountered in course of removal work or cutting and boring activities, stop work, take preventive measures, and notify Departmental Representative.

immediately. Do not proceed until written instructions have been received from the Departmental Representative.

- .3 Unidentified hazardous material removal is additional work and will be paid either as an extra to the contract price in accordance with General Conditions, or removed under a separate contract by the Departmental Representative.
- .4 The existing building will be occupied and operational by the Institution during the work of this Contract. Maintain building access around protected work areas.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not used.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Prior to beginning work, inspect site, building and work areas with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage, storage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site and existing building in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.
- .4 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.
  - .1 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.
  - .2 Immediately notify the Engineer should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

### **3.2 PROTECTION**

- .1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of building to remain in place. Provide bracing and shoring required.
- .2 Keep noise, dust, and inconvenience to occupants to minimum.
- .3 Protect building systems, services and equipment.

- .4 Provide temporary dust screens, covers, railings, supports and other protection as required.
- .5 Protect adjoining floor areas from migrating dust and fumes from work areas.
- .6 At end of each day's work, leave work in safe and secure conditions. Clean up and remove debris and materials not being reinstalled.
- .7 Comply with WCB Industrial Health and Safety regulations, Canada Labour Code, Canada Occupational Safety and Health Regulations.
- .8 Do Work in accordance with Section 01 35 33 - Health and Safety Requirements.

### 3.3 SALVAGE

- .1 Refer to demolition drawings and specifications for items to be salvaged for reuse.
- .2 Remove items to be reused, store as directed by Departmental Representative, and re-install under appropriate section of specification.

### 3.4 SITE REMOVALS

- .1 Remove items as indicated.
- .2 Removal of Pavements, Curbs and Slabs:
  - .1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.
  - .2 Protect adjacent joints and load transfer devices.
  - .3 Protect underlying and adjacent granular materials.

### 3.5 DEMOLITION

- .1 Remove parts of existing building site to permit new construction. Sort materials into appropriate piles for reuse and recycling.
- .2 Trim edges of partially demolished building elements to tolerances as defined by Departmental Representative to suit future use.

### 3.6 DISPOSAL

- .1 Dispose of removed materials, to appropriate recycling facilities except where specified otherwise, in accordance with authority having jurisdiction.

**END OF SECTION**

The following changes in the tender documents are effective immediately. This addendum will form part of the contract documents.

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#### **QUESTIONS AND ANSWERS**

Q1 The knee braces called out in the roof plan on S201 (C100x19) is not a size that is available. There is a W100x19 but the biggest C100 is 11.

A1 **Use W100x19 as the alternative size for C100x19.**

**END OF STRUCTURAL ADDENDUM #1**

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The following changes in the tender documents are effective immediately. This addendum will form part of the contract documents.

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## **SPECIFICATIONS**

- .1 21 13 13 SPRINKLER SYSTEMS
  - a) Part 1 General, Clause 1.5 Submittals: **Add** Paragraph 5:
- .5 Assurance of Professional Design and Commitment for Field Review.
  - .1 Provide Assurance commitment letters (Schedules B-1 and B-2) at the commencement of the project, in accordance with the building code and for submission to the Departmental Representative and review by the Authority Having Jurisdiction.
  - .2 Provide Assurance of Professional Field Review and Compliance (Schedule C-B) at the completion of the project.
- .2 33 07 16 FACTORY PRE-INSULATED PIPING SYSTEMS FOR UTILITY APPLICATIONS:
  - a) **Add** attached section in this addendum.

## **DRAWINGS**

- .1 M-101 Floor Plan MECHANICAL (PLUMBING AND FIRE PROTECTION), REV 3
  - a) **Add** additional dry sprinkler heads and associated piping behind evaporators in Freezer 113 and Cooler 112.
- .2 M-101 Floor Plan MECHANICAL (PLUMBING AND FIRE PROTECTION), REV 3
  - a) **Add** drawing note: For heat tracing requirements refer to this drawing, electrical drawings, Specifications Section 22 42 01 Plumbing Specialties and Accessories and Section 33 07 16 Factory Pre-Insulated Piping Systems for Utility Applications in this addendum.

## **QUESTION AND ANSWERS**

- Q1: The space above the existing freezer/coolers is unheated. This sprinkler pipe should be off a dry system or heat traced to avoid freezing. There was ice noticed on one of the existing plumbing pipes.
- A1: **The ice noted on the existing piping is from refrigeration piping located above the freezer and cooler.**
-

- Q2: There are 4 overhead doors that should have new sprinklers installed under them. This may come during final sign off.  
**A2: The intention of the project is not to upgrade the existing storage space.**
- Q3: There are no sprinklers noted for the new freezer or addition.  
**A3: A sprinkler system is not required for the new freezer and canopy addition.**
- Q4: There should be sprinklers behind the cooling fans in the existing freezer/coolers, these are obstructions for the spray pattern. Not noted on the drawings.  
**A4: Provide additional sprinkler heads as required. Refer to this document [DRAWINGS Addendum Item #1].**
- Q5: Drawing K-103: What is the specification for the heat trace that is to be supplied by the electrical contractor?  
**A5: Refer to additional drawing note in this document [DRAWINGS Addendum Item #2].**
- Q6: Is there a need for heat tracing for the sprinkler lines serving the upright heads above the existing freezer and cooler.  
**A6: The heat tracing system is not required above the existing freezer and cooler.**

END OF MECHANICAL ADDENDUM #1

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## **PART 1 GENERAL**

### **1.1 Summary**

- .1 Products Supplied and Installed Under This Section:
  - .1 Piping freeze protection systems.
- .2 Related Sections:
  - .1 22 42 01 – Plumbing Specialties and Accessories

### **1.2 References**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C117-[04], Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C136-[05], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 ASTM C518-[04], Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
  - .4 ASTM D638-[03], Standard Test Method for Tensile Properties of Plastics.
  - .5 ASTM D698-[00ae1], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN- m/m<sup>3</sup>)).
  - .6 ASTM D1505-[03], Standard Test Method for Density of Plastics by the Density-Gradient Technique.
  - .7 ASTM D1621-[04a], Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
  - .8 ASTM D1622-[03], Standard Test Method for Apparent Density of Rigid Cellular Plastics.
  - .9 ASTM D2657-[03], Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings.
  - .10 ASTM D2842-[01], Standard Test Method for Water Absorption of Rigid Cellular Plastics.
  - .11 ASTM D2856-[94(1998)], Standard Test Method for Open Cell Content of Rigid Cellular Plastics by the Air Pycnometer.
  - .12 ASTM D3574-[05], Standard Method of Testing Flexible Cellular Materials - Slab, Bonded and Molded Urethane Foams.
  - .13 ASTM E96/E96M-[05], Standard Test Methods for Water Vapour Transmission of Materials.
  - .14 ASTM F714-[05], Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
  - .15 ASTM G14-[04], Standard Test Method for Impact Resistance of Pipeline Coatings (Falling Weight Test).
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-8.1-[88], Sieves, Testing, Woven Wire, Inch Series.

- .2 CAN/CGSB-8.2-[88], Sieves, Testing, Woven Wire, Metric.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA-B137 Series-[05], Thermoplastic Pressure Piping Compendium.
    - .1 CSA B137.1-[05], Polyethylene (PE) Pipe, Tubing, and Fittings for Cold-Water Pressure Services.
    - .2 CSA-C22.2 No. 130-[03], Requirements for Electrical Resistance Heating Cables and Heating Device Sets (A National Standard of Canada (2004)).
    - .3 CAN/CSA-C22.2 No. 130.2-[93(October 2000)], Heat Cable Systems for Use in Other than Industrial Establishments.
  - .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
    - .1 Material Safety Data Sheets (MSDS).

### **1.3 Submittals**

- .1 Provide submittals in accordance with Section 01 01 50 – General Instructions.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Quality assurance submittals:
    - .1 Test Reports: Submit the Megger Test Report
    - .2 Manufacturer's Instructions: Submit manufacturer's installation instructions and special handling criteria and installation sequence.
- .3 Closeout Submittals:
  - .1 Provide operation and maintenance data for piping systems for incorporation into manuals.

### **1.4 Quality Assurance**

- .1 Pre-installation Teleconference call: convene pre-installation meeting one week prior to beginning work of this section with contractor's representative, Consultant to:
  - .1 Verify project requirements.
  - .2 Review installation and substrate conditions.
  - .3 Co-ordination with other building sub-trades.
  - .4 Review manufacturer's installation instructions and warranty requirements.

### **1.5 Delivery, Storage and Handling**

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Protection:

- .1 Unload from trucks or containers by hand or by lifting apparatus with fabric slings. Do not use cables or chains.
- .2 Once removed, store on smooth surface.
  - .1 Lay pipes flat.
  - .2 Where sleepers are desired use several lengths of wide planks to provide broad bearing surface.
- .3 Lift, do not drag, insulated pipes from storage area to job site.

#### **1.6 Scheduling**

- .1 Schedule work to minimize interruptions to existing services.
- .2 Submit schedule of expected interruptions for approval by Consultant.

### **PART 2 PRODUCTS**

#### **2.1 Outer Jacket for Buried Applications**

- .1 Material: factory applied high density polyethylene jacket, black in colour (UV inhibited).
- .2 Density of HDPE jacket: to ASTM D1505, 0.940 gm/cm<sup>3</sup> minimum.
- .3 Sealant: synthetic polymers or modified rubber mastic.
- .4 Jacket thickness: 1.14 mm minimum.
- .5 Elongation: to ASTM D638, 400% maximum 6 month test.
- .6 Service temperature: minus 45 degrees C to plus 120 degrees C maximum.
- .7 Water vapour transmission rate: 3gm/m<sup>2</sup>/24 hour average.
- .8 Tensile strength: 25kg/cm width minimum.
- .9 Impact strength: to ASTM G14, 7.79N/m at minus 40 degrees C minimum.

#### **2.2 Outer Jacket for Above Ground Applications**

- .1 Material: factory applied galvanized lock seam, spiral steel outer jacket.
- .2 Spirally applied from continuous steel strip using lock seam.
- .3 Jacket thickness: 0.889 mm minimum.
- .4 Protective metal jacket for fittings: as indicated.

#### **2.3 Insulated Pipe Joints for Buried Applications**

- .1 Material: rigid polyurethane half shells with heat shrink sleeves and mastic sealant to provide moisture-proof seal.

- .2 Pre-formed rigid polyurethane halves, as indicated, with properties as described in this Section.
- .3 Heat shrink sleeves: adhesive coated cross linked polyethylene sleeve.
- .4 Sleeves: to cover entire exposed joint length plus overlap of about 76mm of pipe coating on either side.
- .5 Waterproofing mastic sealant for coating exposed ends of insulation after field cutting or trimming has been carried out: as described in this Section.

#### **2.4 Insulated Pipe Joints for Above-Ground Applications**

- .1 Material: rigid polyurethane half shells with heat shrink sleeves to provide strong, moisture-proof seal as described in this Section.
- .2 Silicone caulking: circumferentially beaded around outer jacket of pipe 50mm from pipe end as specified.
- .3 Rolled steel sheet: 0.889mm thick, wrapped around and strapped into place to complete joint.
- .4 Pre-formed rigid polyurethane halves: as indicated, with properties specified.
- .5 Heat shrink sleeves: adhesive coated cross linked polyethylene sleeve.
- .6 Sleeves: to cover entire exposed joint length plus overlap of about 76mm of pipe coating on either side.
- .7 Waterproof mastic sealant for coating exposed ends of insulation after field cutting or trimming: as specified.

#### **2.5 Insulation Kits for Fittings**

- .1 Material: rigid polyisocyanurate foam with fully bonded FRP glass reinforced polyester or polymer protective coating on exterior surfaces including ends.
  - .1 Supply kits complete with silicone caulking for seams, stainless steel attachment straps and clips, and heat shrink sleeves to seal between pipe and insulation cover.
- .2 Rigid polyisocyanurate foam insulation.
  - .1 Density: to ASTM D1622, 0.03gm/cm<sup>3</sup> minimum.
  - .2 Compressive strength: to ASTM D1621, 137kPa minimum.
  - .3 Closed cell content: 92% minimum.
  - .4 Water absorption: to ASTM D2842, 0.02 g/m<sup>2</sup>.
  - .5 K Factor: to ASTM C518, 0.02 W/m. degrees C maximum.
- .3 FRP coating.
  - .1 Glass reinforced polyester fully bonded to insulation.
  - .2 Laminating resin black in colour, UV inhibited.
  - .3 Thickness: 2.54mm minimum.
  - .4 Exterior surface: resin-rich hot coat of 0.25mm minimum thickness.

- .4 Polymer coating: to ASTM D3574.
  - .1 Two component high density polyurethane coating, black in colour.
  - .2 Density: 1170kg/m<sup>2</sup>.
  - .3 Abrasion: durometer D scale: 60.
  - .4 Tensile strength: 11,000kPa minimum.
  - .5 Tear strength: 26.5N/mm minimum.

## **2.6 Insulation Foamed in Place**

- .1 Material: two component polyurethane Class I foam, supplied in portable, disposable, pressurized container.
- .2 Density: to ASTM D1622, 0.035 to 0.039 gm/cm<sup>3</sup>.
- .3 Closed cell content: to ASTM D2856, 90% minimum.
- .4 Thermal conductivity: to ASTM C518, 0.022 to 0.024 W/m. degrees C.
- .5 Compressive strength: to ASTM D1621, 103 to 172kPa at 10% defection minimum.
- .6 Water absorption: to ASTM D2842, 4.25% maximum by volume.

## **2.7 Insulation Accessories**

- .1 Heat shrink tape for sealing insulation half shells against moisture adaptable to flexible installations.
  - .1 Crosslinked polyolefin backing with a hot melt adhesive coating.
  - .2 Backing thickness: 0.35 mm minimum.
  - .3 Adhesive thickness: 0.51 mm.
  - .4 Service temperature: minus18 to plus 20 degrees C maximum.
  - .5 Tensile strength: 16N/mm.
- .2 High density polyethylene tape for minor repair of the outer jacket or completion of straight insulation joints in field where irregular surfaces are not involved.
  - .1 Adhesive backed tape: heated to approximately 50 degrees C prior to installation.
  - .2 Backing thickness: 0.50mm average.
  - .3 adhesive thickness: 0.127mm average.
  - .4 Service temperature: minus 34 to plus 82 degrees C.
  - .5 Tensile strength: 10N/mm.
  - .6 Colour: black.
- .3 Asphalt mastic vapour barrier coating to waterproof exterior surfaces of half shells or sprayed in place foam.
  - .1 Colour: black.
  - .2 Solids by volume: 62%.
  - .3 Coverage: 14 L at 9.0m<sup>2</sup>.

- .4 Drying time to touch: 4 hours maximum.
- .5 Drying time firm: 48 hours maximum.
- .6 Service temperature: minus 29 to plus 93degrees C.
- .7 Application temperature: 4.4 degrees C minimum.
- .8 Moisture permeability: 3.2mm wet film at 37.3 degrees C.
- .9 90% relative humidity: to ASTM E96, 02 perms.
- .10 Shelf life: 12 months.
- .4 Silicone caulking for joining faces of rigid urethane insulation.
  - .1 Colour: black.
  - .2 Specific gravity: 1.07.
  - .3 Tensile strength: 25 kg/cm<sup>2</sup>.
  - .4 Tear strength: 8 kg/cm<sup>2</sup>.
  - .5 Service temperature: 205 degrees C maximum.

## **2.8 Electric Heat Tracing**

- .1 Heat tracing conduits:
  - .1 Consisting of extruded plastic molding and applied to pipe prior to application of insulation.
  - .2 Fasten securely to pipe and seal to prevent ingress of foam during insulation.
  - .3 Check conduit after insulating to ensure they are not plugged.
  - .4 Seal ends prior to shipping to prevent foreign material from entering conduit while in transit or during installation.
- .2 Electric tracing cable:
  - .1 Resistive parallel circuit type: to CSA-C22.2 No.130, [constant watt] [self-regulating with semi-conductive core heating element].
  - .2 [Fluoropolymer] [Polyolefin] inner and outer insulation jackets, and suitable for cutting to length in field.
  - .3 If pipe being traced is plastic, heat trace cable to have metallic grounding overbraid of sufficient conductivity to carry fault current and secondary [Fluoropolymer] [Polyolefin] extruded overjacket to CSA-C22.2 No.130.
  - .4 Manufacturer to ensure that specified electric tracing cable and heat tracing conduit size are compatible, so that cable may be pulled in with relative ease.
- .3 Thermostatic controller:
  - .1 Low temperature sensor control: factory preset at 5.0 degrees C.
  - .2 Attach high temperature sensor control to active zone of heat tracing cable and to serve as high temperature cut-out, factory preset at 29 degrees C.
- .4 Terminal end seal kits: certified for installation in damp conditions to CSA-C22.2 No.130 and consisting of:
  - .1 Constant watt:
    - .1 End connector.

- .2 90 cm of Teflon tape.
- .3 Adhesive-lined heat shrink end cap.
- .2 Self-regulating:
  - .1 Two heat-shrinkable tubes.
- .5 Power connection kits: connect to pipe and to CSA-C22.2 No.130 as indicated.
  - .1 Constant watt:
    - .1 Flexible conduit.
    - .2 End caps.
    - .3 12 AWG hook-up wire.
    - .4 Splices.
    - .5 Heat shrink sleeves.
  - .2 Self-regulating:
    - .1 Base.
    - .2 Top.
    - .3 Sealing gasket.
    - .4 Terminal block.
    - .5 Locknuts.

## **2.9 Warning Tape**

- .1 Polyethylene tape: 150mm wide by 0.15 mm thick as approved by Consultant.
- .2 Tape for water mains: blue in colour with factory applied markings at one metre intervals, i.e. "Caution Buried Water Line".
- .3 Tape for sanitary sewers: green in colour with factory applied markings at one metre intervals, i.e. "Caution Buried Sewer Line".

## **2.10 Buried Warning and Identification Tape**

- .1 Provide detectable aluminum foil plastic backed tape or detectable magnetic plastic tape manufactured specifically for warning and identification of buried piping.
- .2 Tape: detectable by electronic detection instrument.
- .3 Provide tape in rolls, 75 mm minimum width, colour coded for utility involved with warning and identification imprinted in bold black letters continuously and repeatedly over entire tape length.
- .4 Warning and identification: reading CAUTION BURIED PREINSULATED PIPING BELOW or similar wording
- .5 Use permanent code and letter colouring unaffected by moisture and other substances contained in trench backfill material.

## **2.11 Pipe Bedding and Surround Materials**

- .1 Granular material to following requirements:
  - .1 Crushed or screened stone or sand consisting of hard, durable, particles, free from clay lumps, cementation, organic material and other deleterious materials.
  - .2 Gradations to be within limits specified when tested to [ASTM C136] [and] [ASTM C117]. Sieve sizes to CAN/CGSB-[8.1] [8.2].

Sieve Designation	% Passing
200 mm	-
75 mm	-
50 mm	-
38.1 mm	-
25 mm	-
19 mm	-
12.5 mm	-
9.5 mm	-
4.75 mm	[100]
2.00 mm	[50-90]
0.425 mm	[10-50]
0.180 mm	-
Sieve Designation	% Passing
0.075 mm	[0-10]

**2.12 Escutcheon Plates**

- .1 Provide split hinge type metal plates for piping entering walls and floors in exposed spaces.
- .2 Provide [polished stainless steel] [chromium-plated finish on copper alloy] plates in finished spaces.
- .3 Provide paint finish on metal plates in unfinished spaces.

**2.13 Pipe Sleeves**

- .1 Provide sleeves where piping passes entirely through walls and floors.
- .2 Ensure sleeves are of sufficient length to pass through entire thickness of walls and floors.
- .3 Provide 25mm minimum clearance between exterior of piping or pipe insulation, and interior of sleeve or core-drilled hole.
- .4 Firmly pack space with mineral wool insulation.
- .5 Seal space at both ends of sleeve or core-drilled hole with plastic waterproof cement which will [dry to firm but pliable mass], [provide mechanically adjustable segmented elastomeric seal].
- .6 In fire walls and fire floors, seal both ends of sleeves or core-drilled holes with UL listed fill, void, or cavity material.
  - .1 For sleeves in masonry and concrete walls and floors provide [hot-dip galvanized steel] [ductile-iron] [cast-iron] sleeves.
  - .2 Provide core drilling of masonry and concrete in lieu of sleeves when cavities in core-drilled hole are grouted smooth.
  - .3 In other than masonry and concrete walls and floors provide sleeves made from 0.5 mm thick galvanized steel sheet.

**2.1 Backfill Materials**

- .1 [Type 1 fill] [Type 2 fill]:
  - .1 Crushed, pit run or screened stone, gravel or sand consisting of hard durable particles free from clay lumps, cementation, organic material and other deleterious materials.
  - .2 Gradations: within limits specified when tested to [ASTM C136] [and] [ASTM C117]. Sieve sizes to CAN/CGSB-[8.1][8.2].

.2 Table:

Sieve Designation	% Passing	
	Type 1 Fill	Type 2 Fill
200 mm	-	-
75 mm	-	[100]
50 mm	-	-
37.5 mm	-	-
25 mm	[100]	-
19 mm	[75-100]	-
12.5 mm	-	-
9.5mm	[50-100]	-
4.75 mm	[30-70]	[25-85]
2.00 mm	[20-45]	-
0.425 mm	[10-25]	[5-30]
0.180 mm	-	-
0.075 mm	[3-8]	[0-10]

- .3 Type 3 fill: selected material from excavation or other sources, approved by Consultant for use intended, unfrozen and free from rocks larger than 75mm, cinders, ashes, sands, refuse or other deleterious materials.

**PART 3 EXECUTION**

**3.1 Manufacturer's Instructions**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

**3.2 Repairing Damaged Pre-Insulated Pipe**

- .1 Repair damage to outer jacket by applying heat shrink sleeve as reviewed by Consultant or cover using heated HDPE UV resistant adhesive backed tape.

### **3.3 Trenching**

- .1 Do trenching work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Trench depth to provide cover over pipe of not less than 1.8m from finished grade as indicated.
- .3 Trench alignment and depth require Consultant's approval prior to placing bedding material or pipe.

### **3.4 Granular Bedding and Surround**

- .1 Place bedding and surround material in unfrozen condition.
- .2 Place materials in uniform layers not exceeding 150 mm compacted thickness up to 300 mm above top of pipe.
  - .1 Compact each layer before placing succeeding layer.
- .3 Shape bed true to grade to provide continuous uniform bearing surface for pipe exterior. Do not use blocks when bedding pipe
- .4 Shape transverse depressions in bedding as required to make joints.
- .5 Compact each layer full width of bed to at least 95% maximum density to ASTM D698.
- .6 Fill authorized excavation or unauthorized over excavation below design elevation of bottom of specified bedding with compacted bedding material.

### **3.5 Concrete Bedding and Encasement**

- .1 Not Used

### **3.6 Pipe Installation**

- .1 On dry ground, assemble shipping lengths of pipe into suitable installation lengths by heat butt-fusion.
- .2 Provide trained personnel and jointing machine approved by pipe manufacturer for butt-fusion jointing of polyethylene pipe.
  - .1 Obtain services of trained technician from pipe manufacturer to [certify] [and] [train] Contractor's personnel on jointing procedures and inspect jointing machine.
  - .2 Obtain letter from manufacturer certifying that Contractor's representative[s] who will perform jointing, is/are qualified and that jointing equipment has been inspected and is suitable for pipe supplied.
- .3 Follow manufacturer's instructions in butt-fusion of joints.

- .4 Join pipes at flanged ends in accordance with manufacturer's recommendations.
- .5 Recheck pipe joints assembled above ground after placing in trench to ensure no movement of joints has taken place.
- .6 Complete installation of rigid polyurethane halves on joints after laying pipe in trench and after successful pressure testing of pipe.
  - .1 Trim half shells to required length with handsaw to provide tight-fit in insulation gap between ends of factory insulation.
  - .2 Do not allow seam to exceed 3mm in width at joint.
    - .1 Match outer surface of shell with outer surface of installation on pipe within tolerance of plus or minus 6mm.
    - .2 Shave off any sharp edge with rasp.
  - .3 Hold half shells in place with masking tape while installing heat shrink sleeve.
- .7 Install heat shrink sleeves using large broad flame propane torch to produce 600 mm flame.
  - .1 Peel back release liner 12 cm from end, centre sleeve over joint and press firmly down.
    - .1 Wrap sleeve around pipe, removing release liner as it is wrapped.
    - .2 If corner on underlap is not precut, then cutoff about 25 mm from each corner.
  - .2 Before completing overlap wrapping, warm underlap area approximately 12 cm until adhesive starts to appear at edge.
    - .1 Smooth out wrinkles with gloved hand.
  - .3 Remove remaining release liner and complete wrapping.
  - .4 Remove release paper from closure seal, prewarm adhesive slightly, centre seal over overlap and press down until well bonded.
    - .1 Heat closure seal, and press down with gloved hand to remove bubbles and wrinkles.
  - .5 Shrink sleeve around joint with torch: start at centre of sleeve.
    - .1 Keep torch moving using broad circumferential strokes to avoid burning.
    - .2 Continue shrinking sleeve toward one end until about 50 mm is left.
    - .3 Then aim torch inward towards centre and shrink edges.
    - .4 Repeat this operation on other end of sleeve.
    - .5 Finish off by applying long horizontal strokes of torch all around sleeve.

- .6 Pay special attention to sleeve overlap area, ensuring no void remains along underlap edge.
  - .1 Use roller, or gloved hand to firmly and thoroughly press down along underlap edge.
  - .2 Start in centre and work outwards.
- .7 Joint and sleeve cool for at least 30 minutes before lowering pipe into trench.
- .8 Lay pipes on prepared bed, true to line and grade as indicated.
  - .1 No deviations without written approval of Consultant.
  - .2 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
  - .3 Take out and replace defective pipe.
  - .4 Correct pipe which is not in true alignment or grade, or pipe which shows undue settlement after installation.
  - .5 Change method or equipment for setting alignment or grade if requested by Consultant.
- .9 Do not lay pipe on frozen bedding.
- .10 Do not let rocks or other foreign material, which might damage insulation jacket, fall on pipe.
- .11 Keep jointing materials and installed pipe free of dirt and water and other foreign materials.
  - .1 Install removable watertight bulkhead at open end of pipe to prevent entry of foreign materials.

### **3.7 Insulation of Fittings**

- .1 Cut pipes as required to accommodate fittings and fitting insulation kits without damaging pipe insulation or its jacket.
  - .1 Leave smooth end at right angles to pipe axis.
- .2 Cracks larger than 6.4 mm to be filled with insulation foamed-in-place in following manner:
  - .1 Use strip of thin galvanized sheet metal wide enough to overlap both insulation kit and pipe by at least 8 cm and long enough to wrap around pipe leaving 2.5 cm opening on top
  - .2 Hold metal in place with two tension metal or nylon straps, one at either end.
  - .3 Spray foam through opening on top into cavity.
  - .4 Spray until cavity is almost half-filled on both sides of pipe.
    - .1 Foam will rise to complete filling.
  - .5 Allow to cure for 10 to 15 min.
  - .6 Trim top and apply waterproofing sealant asphalt mastic, HDPE tape or heat shrink tape.

### **3.8 Electric Tracing**

- .1 Seal heat trace channel at fittings and flanged joints, with silicone caulking.
- .2 Cable conduit: in lengths as indicated.
  - .1 Splicing of heat-trace cable is not allowed unless approved by Consultant.
- .3 Install tracer cable conduit prior to installation of half shell joints, terminal seal kits, power connector kits, thermostatic controllers, in accordance with system supplier's instructions and as indicated.

### **3.9 Thrust Blocks**

Not Used.

### **3.10 Pipe Backfilling**

- .1 Do backfilling work in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling.
- .2 Lay continuous runs of warning tape on top of surround material 300 mm directly above water and sewer mains.
- .3 Surround and cover pipes between joints when pipe laying is complete and inspected by Consultant.
- .4 Protect pipe from freezing if temperatures lower than minus 5 degrees C
- .5 Surround and cover joints and fittings with surround material placed and compacted as specified when testing results are accepted by Consultant.
- .6 Place backfill material above pipe surround, in uniform layers not exceeding 150 mm compacted thickness.
- .7 Mechanically compact each layer to at least 95% corrected maximum dry density maximum density to ASTM D698.

### **3.11 Field Quality Control**

- .1 Site Tests and Inspections
  - .1 Test water mains for leakage.
  - .2 Flush and disinfect water mains in accordance with Section 33 11 16.01 - Incoming Site Water Utility Distribution Piping.
  - .3 Test water mains for obstructions using "pig" test.
    - .1 Provide labour, tools, ropes, pigs and other equipment necessary to examine all work as required by Consultant.
    - .2 Unobstructed pipes: when wood or metal ball, having diameter 19 mm less than inside diameter of pipe can be readily pulled through pipe line.

- .3 Repair and/or replace mains which do not pass pig test.
- .4 If O-ring connections are used, provide temporary thrust blocks prior to hydrostatic pressure testing of piping system.
- .5 Place bedding and backfill around center portion of piping system, leaving thrust blocks and field joints clear for observation.
- .6 After successful completion of hydrostatic pressure test cast concrete thrust blocks.
- .4 After completion of repair Work, redo leakage tests and pig test.
- .5 Test electric heat tracing in accordance with cable suppliers instructions and as follows:
  - .1 [500] [2500] VDC insulation tester on each circuit for insulation value, and record readings before, during and after installation.
  - .2 Resistance values to not be less than [10][20] megohms, regardless of length, in accordance with Table 24 of Canadian Electrical Code, Part 1
  - .3 Testing procedure: carried out by cable supplier and witnessed by Consultant.
    - .1 Should insulation resistance be less than ten (10) megohms, installer to determine and rectify cause of resistance drop, and then re-test circuit.
    - .2 Procedure to be repeated until acceptable values are attained.
- .6 Protect piping from freezing if testing at temperatures lower than minus 5 degrees C.

### **3.12 Cleaning**

- .1 Not Used

**END OF SECTION**

Project No.: R.077707.001

Addition of Freezer at  
Matsqui Institution  
33344 King Road, Abbotsford, B.C.

The following changes in the tender documents are effective immediately. This addendum will form part of the contract documents.

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## **DRAWINGS**

.1 E-02 ELECTRICAL PLAN

**Revise** Luminaire Schedule Model text 'DLUTCM' replace with 'OLVTCM'

**END OF ELECTRICAL ADDENDUM #1**

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