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**Bid Receiving Public Works and Government  
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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> South Substation Switchgear Replace	
<b>Solicitation No. - N° de l'invitation</b> EZ108-162126/A	<b>Amendment No. - N° modif.</b> 004
<b>Client Reference No. - N° de référence du client</b>	<b>Date</b> 2016-03-11
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$PWY-026-7753	
<b>File No. - N° de dossier</b> PWY-5-38400 (026)	<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 2016-03-29</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> Liu (PWY), Patty	<b>Buyer Id - Id de l'acheteur</b> pwy026
<b>Telephone No. - N° de téléphone</b> (604) 775-6227 ( )	<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> PWGSC - Esquimalt Graving Dock - Victoria, 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>

Solicitation No. - N° de l'invitation

EZ108-162126/A

Client Ref. No. - N° de réf. du client

Amd. No. - N° de la modif.

004

File No. - N° du dossier

PWY-5-38400

Buyer ID - Id de l'acheteur

pwy026

CCC No./N° CCC - FMS No./N° VME

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## **AMENDMENT 004**

Amendment 004 has been raised to incorporate Addendum No. 1.

All other terms and conditions remain unchanged.

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

### **Special Instructions to Bidders**

#### **1.0 SPECIFICATIONS**

1. Replace Specification Section 08 71 00, Door Hardware dated Jan. 28, 2016 with revised Specification Section 08 71 00, Door Hardware dated Feb. 29, 2016.

#### **2.0 QUESTIONS**

1. With regards to the Aluminum windows:

a. Please provide a window schedule.

**Answer: Refer to attached Drawings SK-1 and SK-2 showing Window Schedule.**

b. Drawing 5704 indicates 1 only W102 window, 1 only W103 window, and 2 only W104 windows. Drawing 5705 indicates 1 window at gridline B/2, but has not been labeled. Note that only the South Elevation indicates windows, 1 on each floor near gridline B/2. The Elevation drawings indicate louvres where some of the windows are shown on Plans. Please review and provide clarification.

**Answer: Refer to attached Drawings SK-1, SK-2 & SK-3.**

c. Window designation W101 appears to have been excluded. Please confirm that there isn't a W101.

**Answer: Refer to attached Drawing SK-1 showing Window Schedule.**

2. Where are the Cat Ladders detailed in details 5&6/5715 going? I see 2 Cat ladders in the new Service Pit on the exterior side of gridline 2, but the details do not reflect the condition, in my view.

**Answer: Cat Ladders in Detail 5 & 6/5715 is reference from Drawing 5702 at the Dry Dock Area. It is an alternative acceptable detail to Keynote 35 in Drawing 5116. All steel components in Detail 5 & 6/5715 to be stainless steel.**

3. The detail reference for the exterior window indicated on drawing 5705 at gridline B/2, should be 9/5720, not 9/5718.

**Answer: 9/5720 is the correct reference.**

4. With regards to Specification Section 07 19 00 Water Repellent Coating, the Finish Schedule does not indicate where the product is to be applied. Please advise.

**Answer: applied to all exposed exterior architectural concrete walls**

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5. Drawing 5110 indicates that "Electronic Door lock with keypad, card reader and request to exit sensor built-in" are typical, however the Division 08 specification section 3.6 (Finish Hardware Schedule) calls for Electric Strikes for all the access controlled doors. Please clarify what method of locking is desired. (Electric Strike or Electrified Lock). If electrified locks are to be supplied by Div 28, I would suggest that rather than having surface raceway on the surface of the doors and an exposed armored transfer cable as indicated on Drawing 5110, that Div 08 provide conduit inside the doors and a transfer hinge.

**Answer: They should be keypads. Refer to Revised Door Hardware Schedule.**

**REFER TO:**

Mechanical Addendum No. M1 dated 2016-02-26 (8 pages).

Electrical Addendum No. 1 dated 2016-01-16 (3 pages).

Civil Addendum No. 1 dated 2016-02-29 (10 pages).

End of Addendum #1

1.0 GENERAL

1.1 RELATED REQUIREMENTS

- |    |                                |                  |
|----|--------------------------------|------------------|
| .1 | Finish Carpentry               | Section 06 20 00 |
| .2 | Metal Doors & Frames           | Section 08 11 00 |
| .3 | Electrical                     | Division 26      |
| .4 | Electronic Safety and Security | Division 28      |

1.2 REFERENCES

- .1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
- .1 ANSI/BHMA A156.1- 2000, American National Standard for Butts and Hinges.
  - .2 ANSI/BHMA A156.2- 2003, Bored and Preassembled Locks and Latches.
  - .3 ANSI/BHMA A156.3- 2001, Exit Devices.
  - .4 ANSI/BHMA A156.4- 2000, Door Controls - Closers.
  - .5 ANSI/BHMA A156.5- 2001, Auxiliary Locks and Associated Products.
  - .6 ANSI/BHMA A156.6- 2005, Architectural Door Trim.
  - .7 ANSI/BHMA A156.8- 2005, Door Controls - Overhead Stops and Holders.
  - .8 ANSI/BHMA A156.12- 2005, Interconnected Locks and Latches.
  - .9 ANSI/BHMA A156.13- 2002, Mortise Locks and Latches Series 1000.
  - .10 ANSI/BHMA A156.15- 2006, Release Devices - Closer Holder, Electromagnetic and Electromechanical.
  - .11 ANSI/BHMA A156.16- 2002, Auxiliary Hardware.
  - .12 ANSI/BHMA A156.17- 2004, Self-closing Hinges and Pivots.
  - .13 ANSI/BHMA A156.18- 2006, Materials and Finishes.
  - .14 ANSI/BHMA A156.20- 2006, Strap and Tee Hinges and Hasps.
- .2 Canadian Steel Door and Frame Manufacturers' Association (CSDMA)
- .1 CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames - 2009.

1.3 HARDWARE/SECURITY COORDINATION

- .1 Prior to preparation and submittal of hardware list, door hardware supplier's hardware consultant shall arrange a coordination meeting with the following attendees:
- .1 Hardware supplier's hardware consultant.
  - .2 Facility's Building Maintenance Manager.
  - .3 Departmental Representative.
  - .4 General Contractor.
- .2 The final door hardware lists shall reflect all decisions made at said coordination meeting.

1.4 ACTION & INFORMAL 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 door hardware and include product characteristics, performance criteria, physical size, finish and limitations.

- .3 Samples:
  - .1 Submit for review and acceptance of each unit.
  - .2 Samples will be returned for inclusion into work.
  - .3 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
  - .4 After approval samples will be returned for incorporation in Work.
- .4 Hardware List:
  - .1 Submit contract hardware list.
  - .2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
- .5 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .6 Manufacturer's Instructions: submit manufacturer's installation instructions.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for door hardware for incorporation into manual.

1.6 MAINTENANCE MATERIALS SUBMITTALS

- .1 Extra Stock Materials:
  - .1 Supply maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
  - .2 Tools:
    - .1 Supply 2 sets of wrenches for door closers, locksets, and fire exit hardware.

1.7 QUALITY ASSURANCE

- .1 Regulatory Requirements:
  - .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.8 DELIVERY, STORAGE & 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 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .4 Storage and Handling Requirements:
  - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect door hardware from nicks, scratches, and blemishes.

- .3 Protect prefinished surfaces with wrapping strippable coating.
- .4 Replace defective or damaged materials with new.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal

### 1.9 REDUNDANT LOCKSETS

- .1 Where existing and other lock-bearing devices are to be removed and disposed of: turn-over to Departmental Representative and obtain receipt. In order to maintain building keying security, no existing locksets are to be removed from building.

### 2.0 PRODUCTS

#### 2.1 HARDWARE ITEMS

- .1 Use one manufacturer's products only for similar items.

#### 2.2 DOOR HARDWARE

- .1 Locks and latches:
  - .1 Mortise locks and latches: to ANSI/BHMA A156.13, series 1000 mortise lock, grade 1, designed for function and keyed as stated in Hardware Schedule.
  - .2 Lever handles: plain 64mm x 114mm x 51mm design.
  - .3 Roses: round
  - .4 Normal strikes: box type, lip projection not beyond jamb.
  - .5 Cylinders: key into keying system as noted as directed.
  - .6 Finished to 652, 626 & 630.
  - .7 6 pin ( or7) tumbler keying to Maintenance's Master System.
- .2 Butts and hinges:
  - .1 Butts and hinges: to ANSI/BHMA A156.1, designated by letter A and numeral identifiers, followed by size and finish, listed in Hardware Schedule.
- .3 Exit devices: to ANSI/BHMA A156.3, type & function as listed, grade (1)
  - .1 Auxiliary items: door coordinator.
- .4 Door Closers and Accessories:
  - .1 Door controls (closers): to ANSI/BHMA A156.4, listed in Hardware Schedule, multi-sized sized 1 to though 6 in accordance with ANSI/BHMA A156.4, table A1, finished to 689.
  - .2 Door controls - overhead holders: to ANSI/BHMA A156.8, designated by letter C and numeral identifiers listed in Hardware Schedule, finished to 626.
  - .3 Closer/holder release devices: to ANSI/BHMA listed in hardware schedule, finished to 689.
  - .4 Door co-ordinator: surface for pairs of doors with overlapping astragal.
  - .5 Magnetic holder floor or wall mounted release on fire alarm: finished to 689.
- .5 Auxiliary locks and associated products: to ANSI/BHMA A156.5, numeral identifiers listed in Hardware Schedule, finished to 626.
  - .1 Cylinders: type as listed, finished to 626, for installation in deadlocks provided with special doors as listed in Hardware Schedule. Key into keying system [as noted] [as directed].
- .6 Architectural door trim: to ANSI/BHMA A156.6, designated by letter J and numeral identifiers listed in Hardware Schedule as listed below, finished to 626 or 630.
  - .1 Architectural door trim: to ANSI/BHMA A156.6, listed in Hardware Schedule as listed below,

**DOOR HARDWARE**

- finished to 626 or 630
- .2 Door protection plates: kick plate type as listed, 1.27 mm thick stainless steel 1 edges, finished to 630.
- .3 Push plates: type as listed, 1.27 mm thick stainless steel 1 edge, as listed, finished to 630.
- .4 Push/Pull units: type as listed, finished to 630.
  
- .7 Auxiliary hardware: to ANSI/BHMA A156.16, listed in Hardware Schedule finished to 626 or 630.
- .8 Door bottom seal: heavy duty, door seal of extruded aluminum frame and solid closed cell neoprene weather seal, recessed in door bottom surface mounted recessed in door face, closed ends, adjustable automatic retract mechanism when door is open, clear anodized finish.
- .9 Thresholds: 127mm wide x full width of door opening, extruded aluminum mill finish, serrated surface, with lip and vinyl door seal insert.
- .10 Weatherstripping:
  - .1 Head and jamb seal:
    - .1 Adhesive backed neoprene vinyl covered foam material.
  - .2 Door bottom seal:
    - .1 Extruded aluminum frame and [closed cell neoprene vinyl sweep, clear anodized finish.
- .11 Astragal: overlapping, Primed steel meeting stiles Pile.
- .12 Electric Strikes
  - .1 Weatherproof type includes all accessories, transformer and housing. Conduit by Division 26, connection by Division 28.

2.3 MISCELLANEOUS HARDWARE

- .1 Indexed key control system: to ANSI/BHMA A156.5, designated by letter E and numeral identifiers, wall mounted, type 50% expandable colour enamel paint finish.

2.4 FASTENINGS

- .1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.
- .2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .3 Exposed fastening devices to match finish of hardware.
- .4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.
- .5 Use fasteners compatible with material through which they pass.

2.5 KEYING

- .1 Doors, padlocks and cabinet locks to be keyed to grand master keyed as directed and as noted in Hardware Schedule. Prepare detailed keying schedule in conjunction with Departmental

Representative.

- .2 Supply (five) 5 master keys for each master key or grand master key group.
- .3 Supply 5 keys for each lock.
- .4 Stamp keying code numbers on keys and cylinders.
- .5 Supply construction cores.
- .6 Hand over permanent cores and keys to Departmental Representative.

## 2.6 KEYS

- .1 Use standard construction cylinders for locks for Contractor's use during the construction period.
- .2 Issue instructions to employees and sub-trades, as necessary, to ensure safe custody of the construction set of keys.
- .3 Upon completion of construction, Departmental Representative will, in conjunction with the lock manager:
  - .1 Prepare an operational keying schedule.
  - .2 Accept the operational keys and cylinders directly from the lock manufacturer.
  - .3 Arrange for removal and return of the construction cores.

## 2.7 ADDITIONAL DOOR HARDWARE SCHEDULED ELSEWHERE

- .1 Refer to Division 28- Electronic Safety and Security, for additional door items including, but not limited to the following:
  - .1 Access and intrusion control panels.
  - .2 Card readers.
  - .3 Door Contacts.
  - .4 Intrusion detection.
- .2 Refer to Division 26-Electrical for all wiring and conduit for above items.

## 3.0 EXECUTION

### 3.1 INSTALLATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Supply metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Supply manufacturers' instructions for proper installation of each hardware component.
- .4 Install hardware to standard hardware location dimensions in accordance with CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction).
- .5 Where door stop contacts door pulls, mount stop to strike bottom of pull.
- .6 Use only manufacturer's supplied fasteners.

**DOOR HARDWARE**

- .1 Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .7 Remove construction cores locks when directed by Departmental Representative.
  - .1 Install permanent cores and ensure locks operate correctly.

**3.2 ADJUSTING**

- .1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.
- .2 Lubricate hardware, operating equipment and other moving parts.
- .3 Adjust door hardware to ensure tight fit at contact points with frames.

**3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
  - .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.
  - .3 Remove protective material from hardware items where present.
  - .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

**3.4 DEMONSTRATION**

- .1 Keying System Setup and Cabinet:
  - .1 Set up key control system with file key tags, duplicate key tags, numerical index, alphabetical index and key change index, label shields, control book and key receipt cards.
  - .2 Place file keys and duplicate keys in key cabinet on their respective hooks and turn over to Departmental Representative.
- .2 Maintenance Staff Briefing:
  - .1 Brief maintenance staff regarding:
    - .1 Proper care, cleaning, and general maintenance of projects complete hardware.
    - .2 Description, use, handling, and storage of keys.
    - .3 Use, application and storage of wrenches for door closers locksets.
- .3 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

**3.5 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by door hardware installation.

**3.6 FINISH HARDWARE SCHEDULE**

- 1 Double Doors 100A:
  - .1 2 Set Pivots A1
  - .2 7 Ea Pivots A2
  - .3 1 Ea Pivots A5
  - .4 1 Ea. Spring bolt F3

**DOOR HARDWARE**

- .5 1 Ea. Cane bolt F4
  - .6 1 Ea. Lock set B3
  - .7 1 Ea. Cylinder B1
  - .8 1 Ea. Electric strike F7
  - .9 2 Ea. Floor stop F5
  - .10 1 Ea. Threshold M1
  - .11 2 Ea. Door sweep M8
  - .12 1 Set Seals M3
  - .13 1 Set Astragal M4
  - ~~.14 Notes: H1~~
- .2 Double Doors 200A:
- .1 2 Set Pivots A1
  - .2 8 Ea Pivots A2
  - .3 1 Ea. Spring bolt F3
  - .4 1 Ea. Cane bolt F4
  - .5 1 Ea. Lock set B4 (Install on inside)
  - .6 1 Ea. Cylinder B1
  - .7 1 Ea. Overhead stop F2
  - .8 1 Ea. Floor stop F5
  - .9 1 Ea. Threshold M1
  - .10 2 Ea. Door sweep M8
  - .11 1 Set Seals M3
  - .12 1 Set Astragal M4
  - ~~.13 Notes: H1~~
- .3 Single Door 100B, 101, 102B,200B,200C:
- .1 3 Ea. Hinges A3
  - .2 1 Ea. Lock Set B3
  - .3 1 Ea. Cylinder B1
  - ~~.4 1 Ea. Electric strike F7~~
  - .5 1 Ea. Closer C1
  - .6 1 Ea. Threshold M5
  - .7 1 Set Seals M3
  - .8 1 Ea. Astragal M6
  - .9 1 Ea. Kick Plate J1
- .4 Single Doors 102A:
- .1 3 Ea. Hinges A4
  - .2 1 Ea. Lock set B5
  - .3 1 Ea. Cylinder B1
  - .4 1 Ea. Closer C1
  - .5 1 Ea. Wall stop F2
  - .6 1 Ea. Door bottom M9
  - .7 1 Set Seals M10
  - .8 1 Ea. Threshold M7
  - .9 1 Ea. Kick Plate J1

3.7 DOOR HARDWARE TYPE

- .1 HINGES:  
A1 –Pivot sets Mortised into floor with top pivot, weight to 1,750 lbs., ¾” off set hung, non ferrous x 626 – C0711  
A2 –Intermediate Pivot sets full Mortised, ¾” off set hung, non ferrous x 626 – C07311  
A3 – Hinge 5 Knuckle-.134 gauge- 114mm x 101mm x Non Removable Pin x 630 – A5111  
A4 – Hinge 5 Knuckle-.134 gauge-114mm x 101mm x Non Removable Pin x 652 – A5111  
A5 –Transfer Intermediate Pivot sets full Mortised, ¾” off set hung, non ferrous with 8 wires x 630 – C07311  
Conduits & wiring in door from transfer to locking device by door supplier  
Conduits & wiring from transfer to junction box by electrical
- .2 LOCKS:  
B1 - Cylinder Type x length x cam to suit 626  
B2 - Lock set ANSI F04 626  
B3 - Lock set ANSI F07 626  
B4 - Lock set ANSI F18 626  
B5 - Lock set ANSI F01 626
- .3 CLOSERS:  
Note: Include thru-bolts and grommet nuts fasteners.  
C1 - Closer non sized, Jamb mount compression spring buffer arm x delayed action x 689 – C02031  
C2 – Closer Institutional, non sized, rigid parallel arm x delayed action x 689 – C02031  
C3 - Closer Institutional, non sized, regular arm x delayed action x 689 – C02031
- .4 AUXILIARY HARDWARE:  
F1 - Floor stop Low dome 28.57mm high x 50mm Dia solid cast x 626  
F2 - Overhead door stop  
F3 - Spring Bolt Heavy Duty  
Bolt Size: 101MM wide x 228MM long x 25mm projection With keeper for hinge side mounting, and 1524mm” steel chain with ring and clip Powder Coat finish  
F4 - Cane Bolt Heavy Duty 19mm x 610mm Long  
Bolt drops by gravity when handle is lifted out of socket x 630  
F5 - Floor stop Heavy Duty wrought Brass and Black Rubber Bumper 82mm(d) x 50mm(h)  
F6 –Lever extension Flush Bolt brass material, 19mm bolt throw, 19mm rod backset, 305mm rod length (centre of face to bolt end-retracted, 38mm adjustable bolt head x 31mm x 172mm face plate x 626 with dust proof strike  
F7 - Electric Strike Fire rated, 12 VDC, 1500Lbs holding, 19mm keeper depth, Fail secure x 630  
Power supply and all hookups by electrical
- .5 ARCHITECTURAL DOOR TRIM:  
J1 - Kick Plate 254mm x width less 38mm x 630
- .6 THRESHOLDS, SEALS, DOOR BOTTOMS, ASTRAGAL  
M1 –Threshold Barrier free Saddle 127mm x 6.4mm x width x stainless steel  
M2 –Door Sweep Similar to Pemko 345AV-width  
M3 –Seals Adjustable jamb type x silicone insert x 2/height x 1 width  
M4 –Astragal 50.08mm x 3.2mm x height welded to door by door supplier with Adhesive gasketing  
M5 –Threshold Thermal Barrier -free latching panic exit Saddle 127mm x 6.4mm x 6.4 stop strip x ThemoSeal with non skid finish set in solid mastic

**DOOR HARDWARE**

and secured with counter sunk SS screws and metal shields every  
300 mm, size door to make continuous contact with door.

M6 – Astragal Off set security bar x height welded to door by door supplier

M7 –Threshold Barrier free Saddle 127mm x 6.4mm x width

M8 –Door Sweep Similar to Pemko 56AAV-width

M9 –Door Bottom Mortise type for steel doors x silicone insert-width sound tested

M10- Seals Triple fin design adhesive backing x 2/height x 1 width sound tested

.7 — Notes:

~~H1 Door Casters by door supplier~~

END OF SECTION 08 71 00

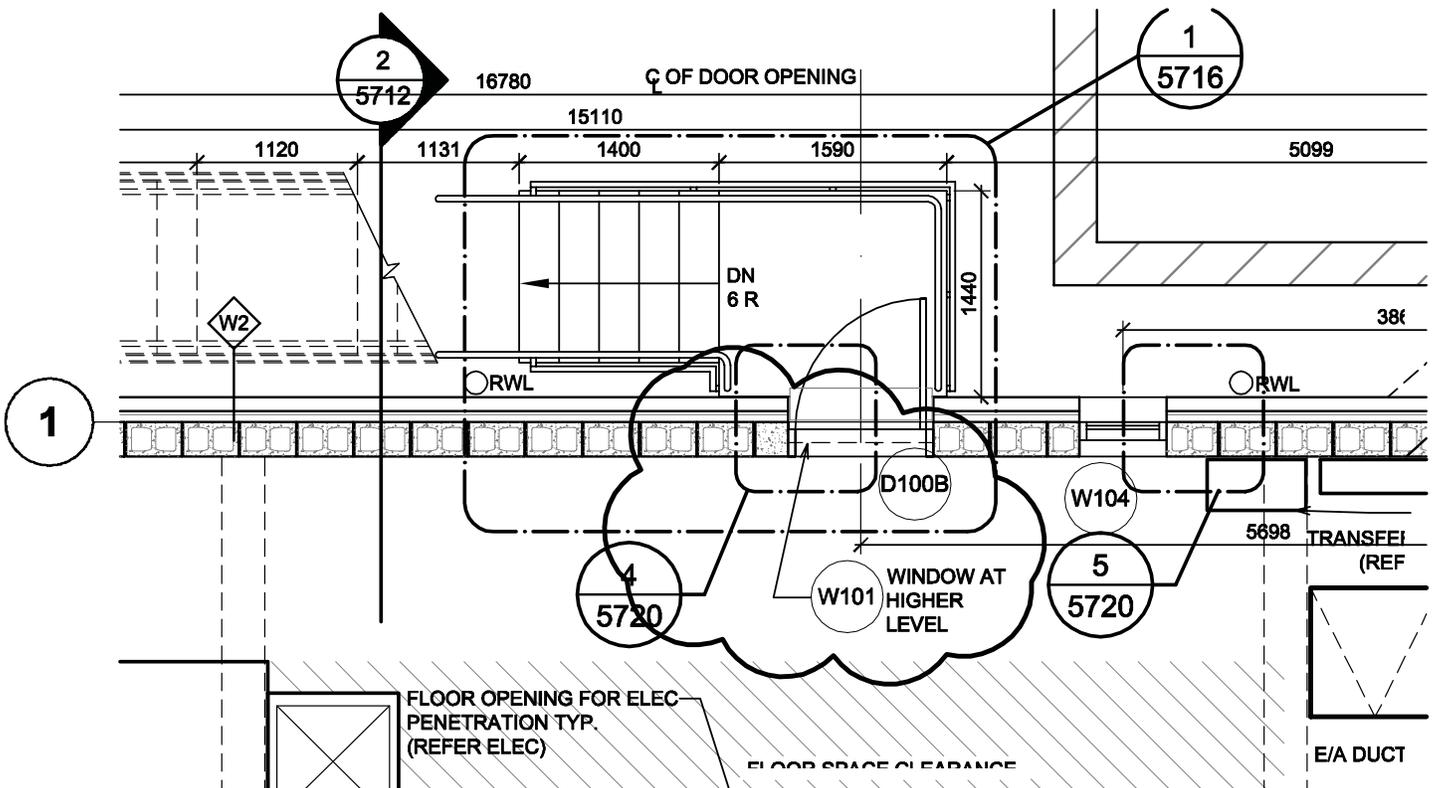
## WINDOW / LOUVRE SCHEDULE

NO.	QUANTITY	TYPE	WIDTH	HEIGHT
W101	1	MECHANICAL LOUVRE (REFER MECH)	1372	915
W102	1	ALUMINIUM WINDOW	815	600
W103	1	MECHANICAL LOUVRE (REFER MECH)	1372	915
W104	2	MECHANICAL LOUVRE (REFER MECH)	610	508

3

## WINDOW SCHEDULE

5705 1:50



2

## NEW GROUND FLOOR PLAN

5705 1:50

**CHERNOFF THOMPSON ARCHITECTS**  
 110-1281 WEST GEORGIA, VANCOUVER, B.C. V6E 3J5  
 TELEPHONE (604) 669-9460 FAX. (604) 683-7684

DRAWING: SECOND FLOOR PLAN

SCALE: 1:50

REV: 0

PROJECT: SOUTH SUBSTATION SWITCHGEAR  
 REPLACEMENT PROJECT (SSSR)

DATE: FEBRUARY 29 2016

DRAWN: SV

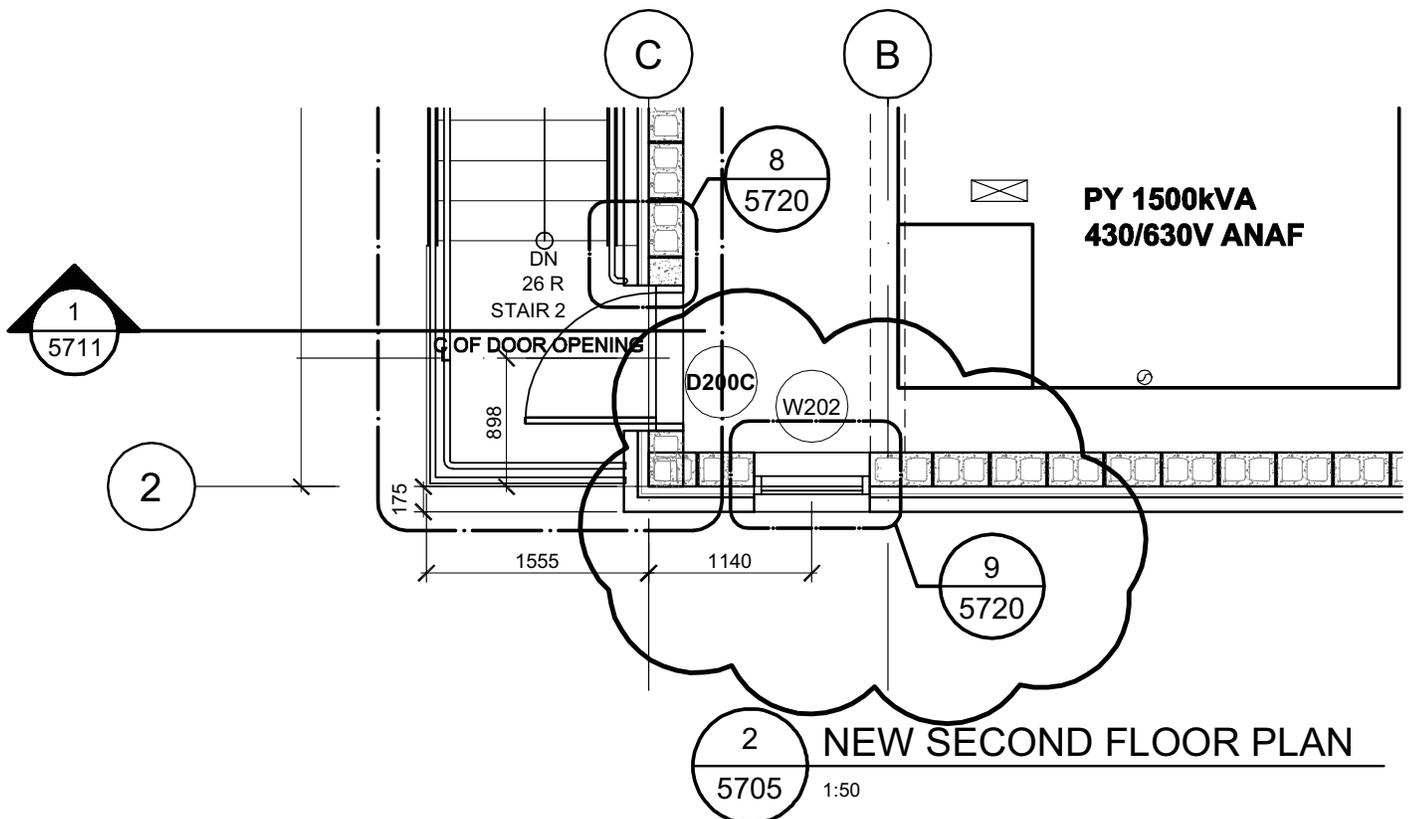
PROJECT NO: 34027

SK-1

## WINDOW / LOUVRE SCHEDULE

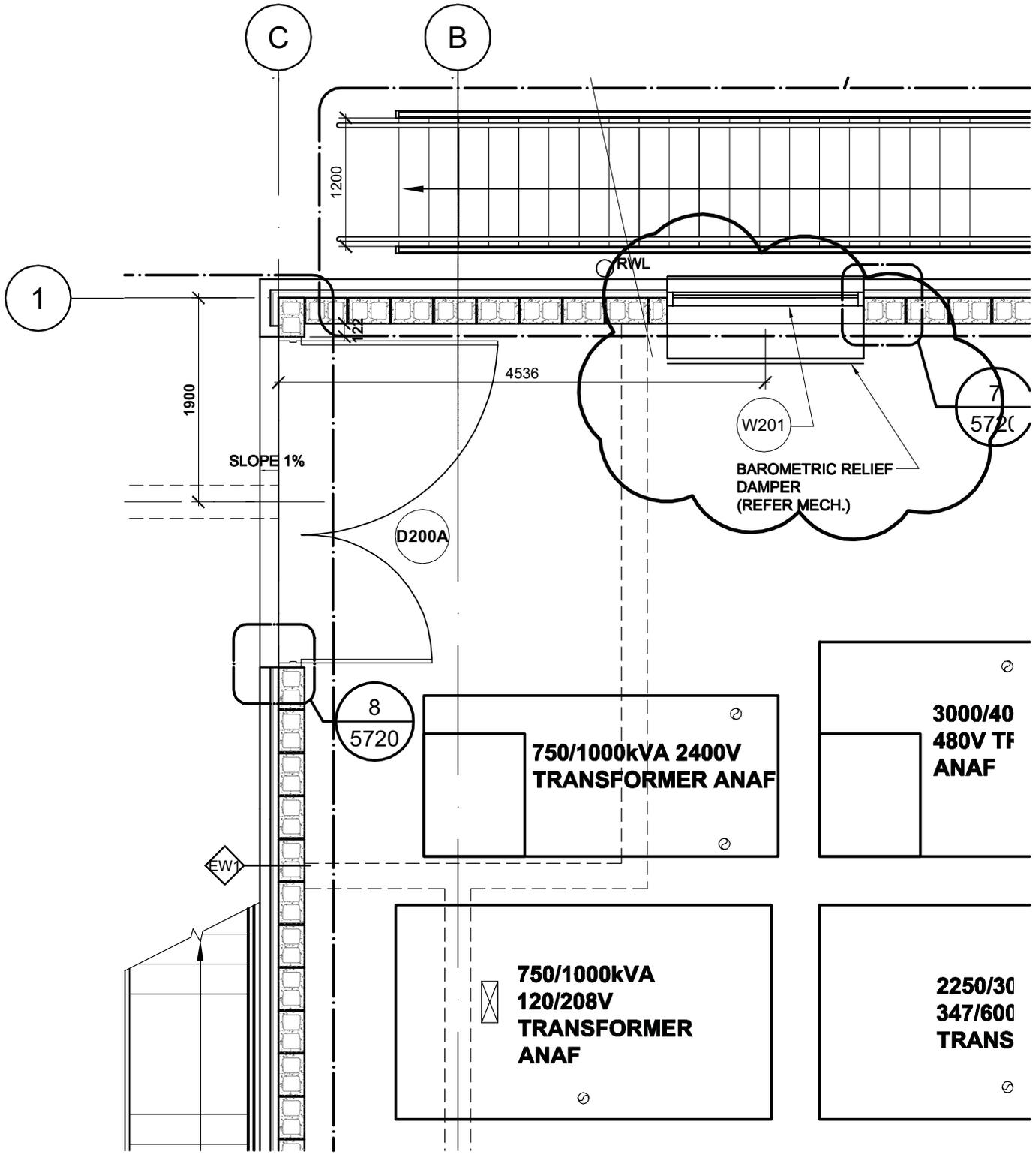
NO.	QUANTITY	TYPE	WIDTH	HEIGHT
W201	1	MECHANICAL LOUVRE (REFER MECH)	1830	2540
W202	1	ALUMINIUM WINDOW	815	600

3 **NEW SECOND FLOOR PLAN**  
5705 1:50



2 **NEW SECOND FLOOR PLAN**  
5705 1:50

<b>CHERNOFF THOMPSON ARCHITECTS</b> <small>110-1281 WEST GEORGIA, VANCOUVER, B.C. V6E 3J5                  TELEPHONE (604) 669-9460 FAX. (604) 683-7684</small>	DRAWING: SECOND FLOOR PLAN	SCALE: 1:50	REV: 0
	PROJECT: SOUTH SUBSTATION SWITCHGEAR REPLACEMENT PROJECT (SSSR)	DATE: FEBRUARY 29 2016	SK-2
		DRAWN: SV	



2 NEW SECOND FLOOR PLAN  
 5705 1:50

**CHERNOFF THOMPSON ARCHITECTS**  
 110-1281 WEST GEORGIA, VANCOUVER, B.C. V6E 3J5  
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DRAWING: SECOND FLOOR PLAN  
 PROJECT: SOUTH SUBSTATION SWITCHGEAR REPLACEMENT PROJECT (SSSR)

SCALE: 1:50  
 DATE: FEBRUARY 29 2016  
 DRAWN: SV  
 PROJECT NO: 34027

REV: 0  
**SK-3**

**PWGSC EGD SOUTH SUBSTATION  
SWITCHGEAR REPLACEMENT (SSSR)  
MECHANICAL ADDENDUM NO. M1**

**FILE: 1530.00  
February 26, 2016**

To: Chernoff Thompson Architects  
Attention: TONY YIP, P. Eng.

By E-mail

- Design Meeting Minutes
- Design Correspondence
- Addenda
- Approvals
- Shop Drawings
- Change Notices
- Change Orders
- Change Directives
- Supplemental Instructions
- Construction Meeting Minutes
- Construction Correspondence
- Progress Claims
- Construction Review Reports
- Temporary

From: Greg Pinder, P. Eng.

Total no. of pages: 8

THIS ADDENDUM FORMS PART OF THE CONTRACT DOCUMENTS AND IS TO BE READ, INTERPRETED AND COORDINATED WITH ALL OTHER PARTS. INCLUDE COST OF ALL WORK CONTAINED HEREIN IN THE CONTRACT PRICE. THE FOLLOWING REVISIONS SUPERSEDE INFORMATION CONTAINED IN THE ORIGINAL DRAWINGS AND SPECIFICATIONS ISSUED OF THE ABOVE NAMED PROJECT TO THE EXTENT REFERENCED AND BECOME PART THEREOF. PLEASE ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON THE FORM OF TENDER.

Please issue an Addendum with the following wording:

**1. REFER TO MECHANICAL DRAWING 5806:**

1. Subsoil Drain Lift Sump Pumps:

1. Delete scoriated stainless steel hatch cover.

Provide scoriated aluminum hatch cover.

2. Increase sump diameter to 1220mm.

**2. REFER TO MECHANICAL SPECIFICATIONS SECTION 22 67 14 COMPRESSED AIR:**

1. Part 1 General:

1. Add to 1.1 Related Sections

Section 01 91 13 General Commissioning (Cx) Requirements

Section 01 91 31 Commissioning (Cx) Plan

Section 01 91 33 Commissioning Forms

Section 01 91 41 Commissioning Training

2. Delete paragraph 1.2.2.2

Add to paragraph 1.2.2 as follows:

.2 ASTM A312 – Seamless and Welded Austenitic Stainless Steel Pipe.

.3 ASTM A351 – Castings, Austenitic, Austenitic-Ferritic (Duplex), for pressure Containing Parts.

.4 ASTM A743 – Castings, Iron-Chromium Nickel, Corrosion Resistant, for General Applications.

.5 ASTM A744 – Castings, Iron-Chromium Nickel, Corrosion Resistant, for Severe Applications.

**J M BEAN & CO. LTD**

Consulting Mechanical Engineers  
6468 Main Street, Vancouver, British Columbia V5W 2V4  
Phone 604-736-6724 Facsimile 604-736-6726

- 
3. Add to Quality Assurance paragraph 1.4.
    - .2 All grooved joint couplings, fittings, valves, and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
  
  2. Delete Part 2 Products.  
Add Part 2 Products as follows:
    - 2.1 Piping**
      - .1 ASTM A312, Stainless Steel Type 316 Schedule 40. Roll or Cut grooved as appropriate to the pipe material, wall thickness, pressure, size and method of joining.
    - 2.2 Mechanical Coupling for Joining Stainless Steel Pipe**
      - .1 Stainless Steel Mechanical Couplings: Manufactured in two or more segments of cast stainless steel, conforming to ASTM A-351, A-743, and A-744. Mechanical coupling bolts shall be stainless steel, type 316, meeting the physical properties of ASTM A-193, grade B8M, Class2.
        1. Rigid Type: Cast with key designed to clamp the bottom of the groove to provide an essentially rigid joint. Victaulic Series 489.
        2. Flexible Type: Use in locations where vibration attenuation and stress relief are required. Victaulic Series 77S.
      - .2 Flange Adapters: For use with grooved end pipe and fittings, for mating to ANSI Class 125 flanged components. Victaulic Style 441.
      - .3 Gaskets shall be pressure-responsive synthetic rubber, grade to suit the intended service, conforming to ASTM D-2000.
    - 2.3 Grooved End Fittings**
      - .1 Fittings shall be manufactured of stainless steel conforming to ASTM A-403, WPW, WPW/S9, or CR/S9, or shall be fabricated from stainless steel pipe conforming to ASTM A312, with factory grooved ends. Fittings shall be type 316/316L stainless steel.
  
  3. Delete Part 3 Execution.  
Add Part 3 Execution as follows:
    - 3.1 Piping Connections and Installations**
      - .1 Grade piping at 1% slope minimum.
      - .2 Provide compressed air piping system as indicated on drawings and specified herein. The drawings are schematic and do not show all structural and equipment details. Where accurate measurements are required, they shall be taken on site and reference shall be made to the Owner's equipment and detail floor arrangements for exact location of outlets and connection requirements.
-

- 
- .3 Pipe ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove.
  - .4 The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified.
  - .5 See the latest copy of the manufacturer's Field Assembly and Installation Instruction Pocket Handbook (I-100).
  - .6 Use grooved couplings and fittings on applicable systems in accordance with manufacturer's recommendations.
  - .7 Unions are not required in installations using grooved mechanical couplings. (The couplings shall serve as unions.)
  - .8 Grooved joint products may be installed in all locations as permitted by the engineer and local code.
  - .9 Use grooved end valves where possible. Install grooved joint flange adapters where flanged or lug type valves are necessary.
  - .10 The coupling manufacturer's representative shall visit the jobsite and review installation. Contractor shall remove and replace any joints deemed improperly installed.

### **3.2 Field Quality Control**

- .1 In accordance with Section 23 08 01 – Performance Verification of Mechanical Piping Systems.
- .2 A factory trained field representative (direct employee) shall provide on-site training for contractor's field personnel in the proper use of grooving tools, application of groove, and installation of grooved piping products.

### **3.3 Cleaning**

- .1 In accordance with Section 01 74 11 – Cleaning and as specified herein.
- .2 Blowout piping to clean interior thoroughly of oil and foreign matter.
- .3 Check entire installation is approved by authority having jurisdiction.
- .4 Perform cleaning operations in accordance with manufacturer's recommendations.
- .5 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

## **3. REFER TO MECHANICAL SPECIFICATIONS SECTION 22 42 01 PLUMBING SPECIALTIES AND ACCESSORIES**

1. Part 2 Products:  
Delete paragraph 2.2 Subsoil Drainage-Pump Station.

---

Add paragraph 2.2 Subsoil Drainage-Pump Station as follows:

**2.2 Subsoil Drainage - Pump Station**

- .1 Provide as indicated on drawings, Engineered Pump System, duplex subsoil drainage – pump station as specified herein or approved equal.
- .2 The assembly shall be underground, two pumps, automatic drain/seawater pump station. Each pump station shall be furnished with piping, valves, and all necessary automatic controls, two submersible pumps, float type liquid level controls and a duplex pump control panel. Provide fiberglass basin 1220mm [48 inches] diameter, depth as indicated on drawings, filament wound FRP construction, manufactured in accordance with ASTM D883-69 standard for filament wound underground fiberglass tanks. The chamber shall be furnished 1.220 meters (48”) diameter, 2.690 meters (108”) deep for subsoil drain pump station. The interior to be sanitary white with a dark green exterior, UV stabilized. The bottom shall have a reinforced anti-floatation flange. Provide a slide rail assembly (TOK4-P) with lifting chains, sealing flange, pump carrier and stainless steel rails to suit sump depth. Provide 150mm inlet, 50mm discharge, 2-50mm electrical and 100 mm vent coupling. Aluminum station cover shall be furnished with duplex pump hatch, non-slippery surface; hatch stay, recessed padlock and pad lock clip, lock hasp and upper rail support.
- .3 Pumps shall be Tsurumi 50TM2.75, non-clog type sewage, oil filled, submersible FRP/titanium pumps. Each pump shall have a capacity of 3.8 L/s [60 gpm] against a total dynamic head of 32 kPa [25 ft] operating at a maximum speed of 3,600 RPM with a semi-vortex non-clog type impeller which passes 20mm [.75”] solids. Pump motors to be 1 HP, 220V, 3PH, 3600 RPM and 60 cycle. Pumps shall be furnished in standard construction c/w 32' of power cable and adaptors for pipe size indicated.
- .4 Each pump shall be assembled complete with a lift-out slide rail system. Each rail shall include a 50mm (2”) discharge assembly, upper and lower guide rail support, pump carrier and stainless steel pump lifting chains.
- .5 Provide 4 float type, non-mercury, liquid level controls for automatic pump control of the liquid level. A stainless steel support bracket with strain relief connectors shall be supplied. A CEMA 4 junction box shall be provided for electrical connection.  
FS#4 Highwater alarm  
FS#3 Lag pump #2 on  
FS#2 Lead pump #1 on  
FS#1 Off-alternate pumps

- 
- .6 A duplex automatic 2 pump control panel shall be furnished in a CEMA 1 enclosure with the following equipment.
    - .1 Inner door mounted controls.
    - .2 Pump circuit breaker disconnects.
    - .3 Magnetic contactors with 3 leg overloads.
    - .4 H.O.A. selector switches for each pump.
    - .5 Run lights for each pump.
    - .6 Automatic alternator relay.
    - .7 Pump motor overload alarm and automatic interlock to lag pump.
    - .8 Lead-lag pump selector switch.
    - .9 High level alarm with buzzer, light and silencing switch, test switch and automatic reset.
    - .10 Provide also remote alarm panel to repeat light and buzzer signal, silencing switch and lamicoid label reading "High Water in Subsoil Drain Sump".
    - .11 Arrange with electrical contractor for wiring in accordance with manufacturer's installation instructions.
  - .7 Set inlet invert and supply cover plate frame for flush mounting in floor. Provide 50mm [2"] check valve and 50mm [2"] ball type isolation valve shall be factory installed on the discharge of each pump. Piping shall be schedule 40 PVC pipe fabricated to suit the installation. A 50mm [2"] discharge NPT coupling shall be furnished for connection to force main and field piping to complete the installation.

**4. REFER TO MECHANICAL SPECIFICATIONS SECTION 23 08 01  
PERFORMANCE VERIFICATIONS MECHANICAL PIPING SYSTEM**

- 1. Part 1-General:
  - .1 Paragraph 1.2 shall read, "Storm and Sanitary Drainage Systems".
  - .2 Add paragraph 1.3 as follows:
    - 1.3 Compressed Air Systems**
      - .1 Testing Agency: installing Contractor.
      - .2 Test pressure: 1,100 kPa
      - .3 Allowable pressure drop: not to exceed 10 kPa
      - .4 Timing: 4 hours
      - .5 Commissioning Procedures:
        - .1 Pressure test compressed air piping and check for system leaks.
        - .2 Check drain piping and confirm proper drainage.

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**5. REFER TO MECHANICAL SPECIFICATIONS SECTION 33 46 16 BUILDING  
SUB-DRAINAGE PIPING**

1. Part 3 Execution:
  - .1 Delete paragraph 3.5 Installation of French Drains.

**6. SUGGESTED MECHANICAL WORK PHASING SCHEME FOR EXISTING  
SUBSTATION.**

The existing substation shall remain fully in operation during the course of construction. All mechanical work shall be coordinated and appropriate measures shall be taken by the contractor to control dust, debris, and room temperature during construction.

The following is suggested general phasing scheme, the contractor may, at their own discretion, utilize this information to formulate a detailed phasing scheme that is acceptable to the Departmental Representative.

1. Provide temporary cooling system in existing substation and in areas affected by the mechanical system alterations.
2. Contractor to coordinate with the Departmental Representative for providing appropriate protection of equipment in the existing substation prior to starting of construction.
3. Remove existing louvre and redundant ductwork.
4. Modify existing exhaust fan and provide ductwork and roof terminal.
5. Final testing, balancing and commissioning of mechanical system.

**7. REFER TO MECHANICAL DRAWINGS 5801 AND 5807.**

Offset 305x305 supply air duct from the makeup air unit (MAU-1) at the ceiling of the Main Floor and down to the Basement to avoid electrical equipment. Confirm electrical equipment layout.

**8. REFER TO MECHANICAL SPECIFICATION SECTION 23 90 00.**

1. Roof Hood (RH-1) performance as follows: 2185mm x 1220mm size, 2600 L/S air flow, 0.56 sq. m. free area and 25 Pa. pressure drop.
2. Louvre (L-5) is serving exhaust fan (EF-1).

**9. REFER TO MECHANICAL SPECIFICATION SECTION 23 08 00,  
COMMISSIONING OF MECHANICAL SYSTEMS, PART 1 – GENERAL, 1.4  
Commissioning and Demonstration, Clause 2, Item .5:**

Delete: “Forms in Section 23 08 02 shall be used for this purpose”.

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**10. REFER TO MECHANICAL SPECIFICATION SECTION 25 30 11, EMCS: BUILDING CONTROLLERS, PART 1 – GENERAL, CLAUSE 1.3, MAINTENANCE PROCEDURES, ITEM .1:**

Revise: “Section 01 78 30 – Closeout Submittals”  
To: “Section 01 78 00 – Closeout Submittals”

**11. REFER TO MECHANICAL SPECIFICATION SECTION 23 05 13, COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT, PART 1 – GENERAL, CLAUSE 1.4, SHOP DRAWINGS, ITEM.1:**

Revise: “Section 01 33 00 - Shop Drawings, Product Data & Samples”  
To: “Section 01 33 00 - Submittal Procedures”

**12. REFER TO MECHANICAL SPECIFICATION SECTION 23 31 14, METAL DUCTS, PART 1 – GENERAL, CLAUSE 1.3 SUBMITTALS, ITEM .1:**

Revise: “Section 01 33 00 - Shop Drawings, Product Data & Samples”  
To: “Section 01 33 00 - Submittal Procedures”

**13. REFER TO MECHANICAL SPECIFICATION SECTION 23 05 29, HANGERS & SUPPORTS FOR PIPING AND EQUIPMENT, PART 3 – EXECUTION, CLAUSE 3.1 INSTALLATION, ITEM .2 VIBRATION CONTROL DEVICES:**

Delete the word “HVAC” from: .1 Install on piping systems per Section 23 05 48 – Vibration and Seismic Controls for ~~HVAC~~ Ductwork, Piping and Equipment

**14. REFER TO MECHANICAL SPECIFICATION SECTION 23 34 00, HVAC FANS, PART 1 – GENERAL, 1.1 RELATED SECTIONS, CLAUSE .13 – SECTION 23 05 48:**

Revise: “HVAC”  
To: “Ductwork”

**15. REFER TO MECHANICAL SPECIFICATION SECTION 23 74 11, OUTDOOR AIR HANDLING UNITS, PART 1 – GENERAL:**

1.1 Related Sections, Item .14 - Section 23 05 48:  
Revise: “HVAC”  
To: “Ductwork”

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**16. REFER TO MECHANICAL SPECIFICATION SECTION 23 74 11, OUTDOOR AIR HANDLING UNITS, PART 2 – PRODUCTS:**

2.1 Outdoor Air Handling Units, Item .11 Fan Base, Item .2 Fan base shall have.....

Revise: “HVAC”

To: “Ductwork”

**17. REFER TO SECTION 23 74 14 MAKE-UP AIR UNITS, PART 1 – GENERAL, 1.1 RELATED SECTIONS, ITEM .13 SECTION 23 05 48:**

Revise: “HVAC”

To: “Ductwork”

End of Mechanical Addendum #1

THE FOLLOWING ADDENDUM SUPERSEDES INFORMATION CONTAINED IN DRAWINGS AND SPECIFICATIONS ISSUED FOR THE PROJECT TO THE EXTENT REFERENCED. THIS ADDENDUM FORMS PART OF THE TENDER DOCUMENTS AND IS SUBJECT TO ALL OF THE CONDITIONS SET OUT IN THE CONTRACT CONDITIONS.

This electrical addendum contains one (1) page.

**Part 1            Specification Changes**

- 1.1            26 50 00 2.6 LUMINAIRE SCHEDULE HAS BEEN SUPERSEDED BY THAT SHOWN ON THE DRAWINGS. REFER TO SHEET 5111. NOTE WARRANTY FOR FIXTURES IS TO BE 10 YEARS.**
- 1.2            CONTRACTOR IS TO CARRY THE COSTS OF TWO POST OCCUPANCY OPERATIONAL TESTS OF THE ELECTRICAL DISTRIBUTION DURING HIGH POWER DEMAND WITHIN THE WARRANTY PERIOD. ONE IS TO BE IN AUGUST AND THE OTHER IS TO BE DETERMINED AT A LATER DATE**
- 1.3            AS PER EGD REQUEST - CARD READERS ON BOTH SECURE SIDE AND NON-SECURE SIDE OF BUILDING. TO BE INSTALLED ON SECURE SIDE IN PLACE OF REQUEST TO EXIT SENSORS.**

**Part 2            Drawing Changes - REFER TO BUBBLED AREAS IN ATTACHED DRAWINGS**

- 2.1            ADDITIONAL DETAIL ADDED TO SHEET 5100 RELATED TO BOLLARD LOCATIONS**
- 2.2            REVISED MECHANICAL EQUIPMENT SCHEDULE**

**END OF ELECTRICAL TENDER ADDENDUM NO. 01**





**DATE:** Feb 29, 2016  
**PROJECT No.** 2951.05  
**PROJECT NAME:** EGD - SSSR  
Page 1

**Civil Addendum**

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1. This Addendum shall be read in conjunction with and considered as an integral part of the Contract Documents; revisions supercede the information contained in the original drawings, specifications or previously issued Addendum.
2. Tender Price submitted shall include all items of this Addendum.
3. No consideration will be allowed for any extras due to any bidder not being familiar with the contents of this Addendum.

**1. Document Revisions:**

**1.1. Add attached Section 33 65 73 – Concrete Encased Duct Banks and Manholes.**

**1.2. Refer to Section 31 23 33.01, Excavation, Trenching and Backfilling,**

1.2.1. Revise item 3.5.2 to read

“Stockpile area is located on Maplebank Road. Access from the Esquimalt Graving Dock is via Admirals Road to Maplebank Road. Refer to attached Figure 31 23 33.01-01”

**2. Drawings:**

2.1. Figure 31 23 33.01-01 is attached to show haul route for excavated material

**CONCRETE ENCASED DUCT BANKS AND MANHOLES**

PAGE 1

1.0 GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A82/A82M- 05a , Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
  - .2 ASTM A185/A185M- 05a , Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
  - .3 ASTM C139- 05 , Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
  - .4 ASTM C 478/C478M- 06 , Standard Specification for Precast Reinforced Concrete Manhole Sections.
  - .5 ASTM D1056- 00 , Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.
- .2 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-A3000- 03(R2005) , Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
    - .1 CSA-A3001- 03 , Cementitious Materials for Use in Concrete.
  - .2 CSA A23.1/A23.2- 04 , Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .3 CAN/CSA-G30.18- M92(R2002) , Billet-Steel Bars for Concrete Reinforcement.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .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 Submit two copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials .
- .3 Shop Drawings:
  - .1 Submit shop drawings for precast manholes.
- .4 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.

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**CONCRETE ENCASED DUCT BANKS AND MANHOLES**

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PAGE 2

- .1 Test reports: submit certified test reports for specified materials from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
- .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

1.3 QUALITY ASSURANCE

- .1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section 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.

1.4 DELIVERY, STORAGE AND HANDLING

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

2.0 PRODUCTS

2.1 PVC DUCTS

- .1 PVC ducts, Rigid PVC – Schedule 40, encased in reinforced concrete.

2.2 PVC DUCT FITTINGS

- .1 Rigid PVC opaque solvent welded type couplings, bell end fittings, plugs, caps, adaptors as required to make complete installation.
- .2 Expansion joints.
- .3 Rigid PVC 5 degree angle couplings.
- .4 Factory bends.

2.3 MANHOLES

- .1 Provide type indicated.
- .2 Top, walls, and bottom: reinforced concrete.

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**CONCRETE ENCASED DUCT BANKS AND MANHOLES**

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PAGE 3

- .3 Walls and bottom: monolithic concrete construction.
- .4 Locate duct entrances and windows near corners of structures to facilitate cable racking.
- .5 Covers: fit frames without play.
- .6 Form steel and iron to shape and size with sharp lines and angles.
- .7 Castings: warp and blow hole free.
- .8 Exposed metal: smooth finish without sharp lines and arises.
- .9 Provide lugs, rabbets, and brackets.
- .10 Set pulling-in irons and other built-in items in place before depositing concrete.
- .11 Install pulling-in iron in wall opposite each duct line entrance.
- .12 Cable racks, including rack arms and insulators: sized to accommodate cable.

2.4 PRECAST CONCRETE MANHOLES

- .1 Precast concrete manholes and auxiliary sections fabricated in steel forms.
- .2 Aggregates: to CSA A23.1/A23.2.
- .3 Cement: CAN/CSA-A3001, Type GU.
- .4 Steel welded wire fabric mesh reinforcing: to ASTM A82/A82M, & ASTM A185/A185M.
- .5 Pulling inserts and bolts for racks integrally cast in concrete.
- .6 Neoprene gasket seals between manhole sections: to ASTM D1056.
- .7 Size: 762 mm clear diameter.
- .8 Precast Concrete Manholes: to ASTM C478/C478M.
  - .1 Manhole step and ladder rung spacing: 405mm.

2.5 DRAINAGE

- .1 Floor drain fittings: consisting of floor drain, back water valve, trap and pipe connection to drainage system.
- .2 Storm sewer connection: cast iron service saddle consisting of oil resistant gasket, stainless steel clamp and oil resistant O ring.
- .3 Sump pit: as indicated

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**CONCRETE ENCASED DUCT BANKS AND MANHOLES**

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2.6 MANHOLE NECKS

- .1 Precast.

2.7 MANHOLE FRAMES AND COVERS

- .1 Ductile iron frame and hatch cover, Airport Extra Heavy Duty (Proof Load Tested to 90,718.47 kg), bottom flange frame design.
- .2 Size: 914.4mm x 914.4mm clear opening.
- .3 Hardware: : Type 316 Stainless steel (bolts, nuts and Nylock nuts).
- .4 Lifting Mechanisms: Stainless steel mechanical spring strut and self-engaging safety bar.
- .5 Finishes: Slip resistant surface.
- .6 Safety Grate: Rated 300PSF. Material shall be 6061-T6 aluminium for bars and angles.
- .7 Assigned manhole numbers to be securely fastened (braised or welded) onto lid.

2.8 GROUNDING

- .1 Ground rods: in accordance with Section 26 05 27 - Grounding - Primary for cable rack grounding.

2.9 CABLE RACKS

- .1 Hot dipped galvanized cable racks and supports.
- .2 12 x 100 mm preset inserts for rack mounting.

2.10 CABLE PULLING EQUIPMENT

- .1 Pulling iron: galvanized steel rods, size and shape as indicated.
- .2 Pull rope: 6 mm stranded nylon, tensile strength 5 kN, continuous throughout each duct run with 3 m spare rope at each end.

2.11 MARKERS

- .1 Concrete type cable markers: 600 x 600 x 100 mm, with words: "Cable", "Joint", "Conduit" impressed in top surface, with arrows to indicate change in direction of duct runs.
- .2 Cedar post type markers: 89 x 89 mm square, 1.5 m long, pressure treated with clear or copper naphthenate or 5% pentachlorophenol solution, water repellent preservative, with nameplate fastened near post top, on side facing duct.

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**CONCRETE ENCASED DUCT BANKS AND MANHOLES**

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- .1 Nameplate: aluminum anodized[89 x 125 mm, 1.5 mm thick mounted on cedar post with mylar label 0.125 mm thick with words "Cable", "Joint", "Conduit" with arrows to indicate change in direction.

3.0 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 INSTALLATION GENERAL

- .1 Install underground duct banks including formwork.
- .2 Build duct banks on undisturbed soil or on well compacted granular fill not less than 150 mm thick, compacted to 95% of maximum proctor dry density.
- .3 Open trench completely between manholes before ducts are laid and ensure that no obstructions will necessitate change in grade of ducts.
- .4 Prior to laying ducts, construct "mud slab" not less than 75 mm thick.
- .5 Install ducts at elevations and with slope as indicated and minimum slope of 1 to 400.
- .6 Install base spacers at maximum intervals of 1.5 m levelled to grades indicated for bottom layer of ducts.
- .7 Lay PVC ducts with configuration and reinforcing as indicated with [preformed interlocking, rigid plastic]intermediate spacers to maintain spacing between ducts at not less than 40 mm horizontally and vertically.
  - .1 Stagger joints in adjacent layers at least 150 mm and make joints watertight.
  - .2 Encase duct bank with 75mm thick concrete cover.
  - .3 Use galvanized steel conduit for sections extending above finished grade level.
- .8 Make transpositions, offsets and changes in direction using 5 degree bend sections, do not exceed a total of 20 degree with duct offset.
- .9 Use bell ends at duct terminations in manholes or buildings.
- .10 Use conduit to duct adapters when connecting to conduits.
- .11 Terminate duct runs with duct coupling set flush with end of concrete envelope when dead ending duct bank for future extension.
- .12 Cut, ream and taper end of ducts in field in accordance with manufacturer's recommendations, so that duct ends are fully equal to factory-made ends.

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**CONCRETE ENCASED DUCT BANKS AND MANHOLES**

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PAGE 6

- .13 Allow concrete to attain 50% of its specified strength before backfilling.
- .14 Use anchors, ties and trench jacks as required to secure ducts and prevent moving during placing of concrete. Tie ducts to spacers with twine or other non-metallic material.
  - .1 Remove weights or wood braces before concrete has set and fill voids.
- .15 Clean ducts before laying:
  - .1 Cap ends of ducts during construction and after installation to prevent entrance of foreign materials.
- .16 Duct cleaning:
  - .1 Pull 300 mm long x diameter 6 mm less than internal diameter of duct steel mandrel through each duct, immediately after placing of concrete.
  - .2 Then pull stiff bristle brush through duct; avoid disturbing or damaging ducts where concrete has not set completely.
  - .3 Pull stiff bristle brush through each duct immediately before pulling-in cables.
- .17 Install four 3 m lengths of 15M reinforcing rods, one in each corner of duct bank when connecting duct to manholes or buildings.
  - .1 Wire rods to 15M dowels at manhole or building and support from duct spacers.
  - .2 Protect existing cables and equipment when breaking into existing manholes.
  - .3 Place concrete down sides of duct bank filling space under and around ducts.
  - .4 Rod concrete with flat bar between vertical rows filling voids.
- .18 Install pull rope continuous throughout each duct run with 3 m spare rope at each end.

3.3 MANHOLES

- .1 Install precast manholes.
- .2 Concrete Placement:
  - .1 Place concrete in two lifts with slab and sump in first, walls, roof and neck in second lift.
  - .2 Provide key in walls to slab.
  - .3 Place 100 x 6 mm PVC water bar vertically in key.
  - .4 Install ground rod before placing slab and place reinforcing steel, inserts for cable rack, pulling irons, drain, duct outlets, duct run dowels before casting walls. Make manhole to duct connection as indicated.
- .3 Provide 115 mm deep window to facilitate cable bends in wall at each duct connection.
  - .1 Terminate ducts in bell-end fitting flush with window face.
  - .2 Provide four 10M steel dowels at each duct run connection to anchor duct run.
  - .3 On runs of 16 ducts and over, support concrete duct encasement on a 700 mm thick concrete pier poured against manhole wall between slab and bottom of duct run, provide dowels for anchoring.

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**CONCRETE ENCASED DUCT BANKS AND MANHOLES**

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- .4 Alternately connect large duct runs by leaving square opening in wall, later pouring duct run and wall opening in one pour, and install 10M x 3m reinforcing rods in duct run at manhole connection.
- .5 Build up concrete manhole neck to bring cover flush with finished grade in paved areas and 40 mm above grade in unpaved areas.
- .6 Install manhole frames and covers for each manhole:
  - .1 Set frames in concrete grout onto manhole neck.
- .7 Drain floor towards sump with 1 to 48 slope minimum and install drainage fittings as indicated.
- .8 Install cable racks, anchor bolts and pulling irons as indicated.
- .9 Grout frames of manholes:
  - .1 Cement grout to consist of two parts sand and one part cement and sufficient water to form a plastic slurry.
- .10 Ensure filling of voids in joint being sealed.
  - .1 Plaster with cement grout, walls, ceiling and neck.
- .11 Spray paint "X" on ceiling of manhole above floor drain or sump pit.

3.4 MARKERS

- .1 Mark location of duct runs under hard surfaced areas not terminating in manhole with railway spike driven flush in edge of pavement, directly over run.
  - .1 Place concrete duct marker at ends of such duct runs.
  - .2 Construct markers and install flush with grade.
- .2 Mark ducts every 150 m along straight runs and changes in direction.
- .3 Where markers are removed to permit installation of additional duct, reinstall existing markers.
- .4 Lay concrete markers flat and centered over duct with top 25 mm above earth surface.
- .5 Provide drawings showing locations of markers.

3.5 CONDUIT DIRECTORIES

- .1 Conduit directories shall be installed above the duct bank entry point in the manhole on the corresponding wall.

3.6 FIELD QUALITY CONTROL

- .1 Site Tests/Inspections:

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- .1 Inspection of duct will be carried out by Departmental Representative prior to placing.
- .2 Placement of concrete and duct cleanout to be done when Departmental Representative present.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION 33 65 73



Legend  
Trail

**FIGURE**  
**31.23.33.01-01**  
**EXCAVATED**  
**MATERIALHAUL ROUTE**

1:5,000



**Notes**  
This map was automatically generated using  
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0.3 Kilometres  
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