

## PART 1 GENERAL

### 1.1 PRECEDENCE

- .1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

### 1.2 MINIMUM STANDARDS

- .1 Materials shall be new and work shall conform to the minimum applicable standards of the Canadian General Standards Board, the Canadian Standards Association, the National Building Code of Canada 2010 (NBC) and all applicable Provincial and Municipal codes. In the case of conflict or discrepancy the most stringent requirement shall apply.

### 1.3 SHOP DRAWINGS

- .1 Submit for the Departmental Representative review, one (1) pdf copy of each shop drawing. Refer to Section 01 33 00 - Submittal Procedures.
- .2 The review is for the sole purpose of ascertaining conformance with the general design concept, and does not mean approval of the design details inherent in the shop drawings, responsibility for which shall remain with the Contractor. Such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract Documents.
- .3 Do not commence manufacture or order materials before shop drawings are reviewed.

### 1.4 SAMPLES

- .1 Samples: examples of materials, equipment, quality, finishes, workmanship.
- .2 Where colour, pattern or texture is criterion, submit full range of samples.
- .3 Reviewed and accepted samples will become standard of workmanship and material against which installed work will be verified.

### 1.5 PRODUCT DATA

- .1 Product data: manufacturer's catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products.

- .2 Submit one (1) copy of product data to Departmental Representative.
- .3 Delete information not applicable to project.
- .4 Cross-reference product data information to applicable portions of Contract Documents.

#### 1.6 TAXES

- .1 Pay all taxes properly levied by law (including Federal, Provincial and Municipal).

#### 1.7 FEES, PERMITS AND CERTIFICATES

- .1 Pay all fees and obtain all permits. Provide authorities with plans and information for acceptance certificates. Provide inspection certificates as evidence that work conforms to requirements of Authority having jurisdiction.

#### 1.8 FIRE SAFETY REQUIREMENTS

- .1 Comply with the National Building Code of Canada 2010 (NBC) for fire safety in construction and the National Fire Code of Canada 2010 (NFC) for fire prevention, fire fighting and life safety in building in use.
- .2 Welding and Cutting:
  - .1 Obtain hot work permit from CHP staff.
  - .2 At least 1 week prior to commencing cutting, welding or soldering procedure, provide to Departmental Representative:
    - .1 Notice of intent, indicating devices affected, time and duration of isolation or bypass.
    - .2 Completed hot work permit.
    - .3 Return welding permit to Departmental Representative immediately upon completion of procedures for which permit was issued.
- .3 Where work requires interruption of fire alarms or fire suppression, extinguishing or protection systems:
  - .1 Provide watchman service; In general, watchman service is defined as an individual conversant with Fire Emergency Procedures, performing fire picket duty within an unprotected and unoccupied (no workers) area once per hour.
- .4 Immediately upon completion of work, notify Plant or Building staff to restore fire protection systems to normal operation and verify that all devices are fully operational.
- .5 Plant and Building staff shall inform fire alarm system monitoring agency and local Fire Department immediately prior to isolation and immediately upon restoration of normal operation.

### 1.9 HAZARDOUS MATERIAL

- .1 Refer to Section 02 81 01 - Hazardous Materials, Section 01 14 25 - Designated Substance Report, Section 02 82 00.02 - Asbestos Abatement - Intermediate Precautions, and Section 02 82 00.03 - Asbestos Abatement - Maximum Precautions.
- .2 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and the provision of Material Safety Data Sheets (MSDS).
- .3 For work in occupied buildings give the Departmental Representative 1 week notice for work involving designated substances (O. Reg. 490/09).

### 1.10 TEMPORARY UTILITIES

- .1 Existing services required for the work may be used by the Contractor without charge. Ensure capacity is adequate prior to imposing additional loads. Connect and disconnect at own expense and responsibility. Power will diminish as work proceeds further from Central Heating and Cooling Plant. Contractor shall be responsible for providing own power as required in Tunnel.
- .2 Connect to existing power supply in accordance with Canadian Electrical Code and provide meters and switching. Power supply provided is suitable for standard power equipment. If larger power requirement is required Contractor shall provide own power source.
- .3 Notify the Departmental Representative and utility companies of intended interruption of services, obtain requisite permission.
- .4 Give the Departmental Representative 7 days notice related to each necessary interruption of any mechanical or electrical service throughout the course of the work. Keep duration of these interruptions to a minimum. Carry out all interruptions after normal working hours of the occupants, preferably on weekends.

### 1.11 REMOVED MATERIALS

- .1 Refer to Section 01 74 11 - Cleaning.
- .2 Unless otherwise specified, materials for removal become the Contractor's property and shall be taken from site.

### 1.12 PROTECTION

- .1 Protect finished work against damage until take-over.

.2 Protect adjacent work against the spread of dust and dirt beyond the work areas

.3 Protect operatives and other users of site from all hazards.

#### 1.13 USE OF SITE AND FACILITIES

.1 Refer to Section 01 52 00 - Construction Facilities.

.2 Execute work with least possible interference or disturbance to the normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated. Refer to article 1.29 Scheduling below for work that must be done during "off hours".

.3 Maintain existing services to building and provide for personnel and vehicle access.

.4 Where security is reduced by work provide temporary means to maintain security.

.5 Where elevators, dumbwaiters, conveyors or escalators exist Contractor may use these at Departmental Representative's discretion. Protect from damage, safety hazards and overloading of existing equipment.

.6 Sanitary facilities will be assigned for Contractor's personnel. Others shall not be used. Keep facilities clean.

.7 Closures: Protect work temporarily until permanent enclosures completed.

#### 1.14 SITE STORAGE

.1 Refer to Section 01 52 00 - Construction Facilities.

.2 The Departmental Representative will assign storage space which shall be equipped and maintained by the Contractor.

.3 Do not unreasonably encumber site with materials or equipment.

.4 Move stored products or equipment which interfere with operations of Departmental Representative or other Contractors.

.5 Obtain and pay for use of additional storage or work areas needed for operations.

#### 1.15 CUT, PATCH AND MAKE GOOD

.1 Cut existing surfaces as required to accommodate new work.

.2 Remove all items so shown or specified.

- .3 Patch and make good surfaces cut, damaged or disturbed, to Departmental Representative approval.
- .4 Install firestops and smoke seals in accordance with CAN/ULC-S115-2011 around pipe, ductwork, cables, and other objects penetrating fire separations to provide fire resistance not less than the fire resistance rating of surrounding floor, ceiling, and wall assembly.
- .5 Co-ordinate setting and packing of sleeves and supply and installation of hangers and inserts. Obtain Departmental Representative approval before cutting into structure.

#### 1.16 EXAMINATION

- .1 Examine site and conditions likely to affect work and be familiar and conversant with existing conditions.
- .2 Provide photographs of surrounding properties, objects and structures liable to be damaged or be the subject of subsequent claims.
- .3 Provide common-use signs related to traffic control, information, instruction, use of equipment, public safety devices, etcetera, in both official languages or by the use of commonly-understood graphic symbols to the Departmental Representative approval.
- .4 No advertising will be permitted on this project.
- .5 The Contractor will provide a sign describing the project for the information of building users. Sign shall be provided at all Tunnel entrances.
- .6 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

#### 1.17 TEMPORARY BARRIERS AND ENCLOSURES

- .1 Design, erect and maintain hoarding and covered pedestrian walkways to support all loads including windloads and provide protection, complete with signs and electrical lighting as required by Authority Having Jurisdiction.
- .2 Provide one lockable truck entrance gate and one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys. Paint public side of site enclosure in colour selected by Departmental Representative.
- .3 The Contractor shall agree to install proper site separation and identification in order to maintain "Time and Space" at all times throughout the life of the project, and when PWGSC Building Operations staff requires access to equipment in order to operate the building, proper coordination and communication must exist between all parties involved.

1.18 RECORDS

- .1 As work progresses, maintain accurate records to show deviations from contract drawings. Just prior to Departmental Representative inspection for issuance of final certificate of completion, supply to the Departmental Representative one (1) set of white prints with all deviations neatly inked in. The Departmental Representative will provide two sets of clean white prints for this purpose.

1.19 WARRANTIES

- .1 Before completion of work collect all manufacturer's warranties and deposit with Departmental Representative.

1.20 CLEAN-UP

- .1 Clean up work area as work progresses. At the end of each work period, and more often if ordered by the Departmental Representative, remove debris from site, neatly stack material for use, and clean up generally.
- .2 Upon completion remove scaffolding, temporary protection and surplus materials. Make good defects noted at this stage.
- .3 Wash and polish glass, mirrors, ceramic tile, aluminum, chrome, stainless steel, baked or porcelain enamel, plastic laminate and other plastic surfaces, floors, hardware and washroom fixtures. Clean manufactured articles in accordance with manufacturer's directions.
- .4 Clean areas under contract to a condition at least equal to that previously existing and to approval of Departmental Representative.

1.21 CONTRACT DOCUMENTS

- .1 Drawings and specifications are complementary, items shown or mentioned in one and not in the other are deemed to be included in the contract work.

1.22 PROJECT SECURITY REQUIREMENT

- .1 Project Security Clearance Requirements:
  - .1 The Contractor shall comply with the provisions of the attached Security Requirements Check List in support of this project.

1.23 BUILDING SMOKING ENVIRONMENT

- .1 Smoking is not permitted in the Building. Obey smoking restrictions on building property.

1.24 DUST CONTROL

- .1 Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of work and public.
- .2 Maintain and relocate protection until such work is complete.
- .3 Protect all furnishings within work area with 0.102 mm thick polyethylene film during construction. Remove film during non- construction hours and leave premises in clean, unencumbered and safe manner for normal daytime function.

1.25 TESTING

- .1 Departmental Representative will appoint and pay for costs of inspection and testing services, unless indicated otherwise.
- .2 Provide safe working areas and assist with testing procedures, including provisions for materials or services and co-ordination, as required by testing agency and as authorized by Departmental Representative.
- .3 Where tests indicate non-compliance with specifications, Contractor to pay for initial test and all subsequent testing of work to verify acceptability of corrected work.

1.26 SCHEDULING

- .1 On award of contract submit bar chart construction schedule for work, indicating anticipated progress stages within time of completion. When schedule has been reviewed by the Departmental Representative, take necessary measures to complete work within scheduled time. Do not change schedule without notifying Departmental Representative.
- .2 Carry out work during "regular hour" Monday to Friday from 07:00 to 18:00 hours. After hours work will be required for all shut downs and building interruptions. Coordinate all shutdowns with Departmental Representative.

1.27 FIELD QUALITY CONTROL

- .1 Carry out Work using qualified licensed workers or apprentices in accordance with Provincial Act respecting manpower vocational training and qualification.
- .2 Permit employees registered in Provincial apprenticeship program to perform specific tasks only if under direct supervision of qualified licensed workers.

- .3 Determine permitted activities and tasks by apprentices, based on level of training attended and demonstration of ability to perform specific duties.

#### 1.28 SIGNS

- .1 Provide common-use signs related to traffic control, information, instruction, use of equipment, public safety devices, etc., in both official languages or by the use of commonly-understood graphic symbols to the Departmental Representative's approval.
- .2 No advertising will be permitted on this project.

#### 1.29 WORK ZONE LOCATIONS AND IDENTIFICATION

- .1 Work zone locations include:
  - .1 Building mechanical rooms as noted on plans.
  - .2 Tunnel.
  - .3 Central Heating and Cooling Plant.
- .2 The Contractor shall agree to install proper site separation and identification in order to maintain "Time and Space" at all times throughout the life of the project.

#### 1.30 COST BREAKDOWN

- .1 Before submitting first progress claim submit breakdown of Contract Amount in detail as approved by Departmental Representative and aggregating the Contract Amount. After approval by Departmental Representative cost breakdown will be used as the basis of progress payments.

### PART 2 PRODUCTS

#### 2.1 NOT USED

- .1 Not used.

### PART 3 EXECUTION

#### 3.1 NOT USED

- .1 Not used.

PART 1 GENERAL

1.1 ACCESS AND EGRESS

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .5 Closures: protect work temporarily until permanent enclosures are completed.

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.4 EXISTING SERVICES

- .1 Notify Departmental Representative of intended interruption of services.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 1 week of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .3 Provide for personnel, pedestrian and vehicular traffic.

1.5 SPECIAL REQUIREMENTS

- .1 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .2 Keep within limits of work and avenues of ingress and egress.

1.6 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking is not permitted.

PART 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

- .1 Not Used.

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**PART 1 – GENERAL**

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**1.1 REGULATORY REQUIREMENTS**

.1 An investigation into the presence of designated substances at Confederation Heights, Central Heating Plant was performed in order to meet the requirements of Section 30 of the *Ontario Occupational Health and Safety Act, Revised Statutes of Ontario, 1990, Chapter 0.1*. The *Canada Labour Code* also stipulates under Part II, Section 124, which every employer shall ensure that the health and safety at work of every person employed by the employer is protected. By having a Designated Substance Report (DSR) conducted, the Project Manager will be able to inform his or her employees, contractors, and tenants of any designated substances that may be present and possibly disturbed throughout the duration of the project. The informed Project Manager will then be able to impose appropriate health and safety precautions for all applicable personnel as required. The *Guide to Green Government* sets out the policy requirements for the federal government to meet or exceed federal environmental statutes and regulations, and the emulation of best practices from the public and private sector. Within the *Guide to Green Government*, pollution prevention efforts are required in federal projects. Pollution prevention is defined as the use of processes, practices, materials, products or energy that avoids or minimizes the creation of pollutants and waste, and reduces overall risk to human health and environment. These policies must be adhered to throughout the duration of the Branch Tunnel Study and replacement of chill water expansion joints, and cross over lines at Confederation Heights, Central Heating Plant.

.2 The designated substances identified in the *Occupational Health and Safety Act* and its corresponding regulations are:

- .1 **Acrylonitrile:** “Designated Substance – Acrylonitrile” *O.Reg 835* (as amended by *O.Reg 490/09*)
- .2 **Arsenic:** “Designated Substance – Arsenic” *O.Reg 836* (as amended by *O.Reg 490/09*)
- .3 **Asbestos**
  - .1 “The Regulation Respecting Asbestos” *O.Reg 837* (as amended by *O.Reg 490/09*)
  - .2 “General – Waste Management” *O.Reg 347* (as amended by *O.Reg 337/09*)
  - .3 “Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations” *O.Reg 278/05* (as amended by *O.Reg 493/09*)

- .4 *PWGSC Departmental Policy DP 057 – “Asbestos Management”*
- .4 **Benzene:** “Designated Substance – Benzene” *O.Reg 839* (as amended by *O.Reg 490/09*)
- .5 **Coke Oven Emissions:** “Designated Substance – Coke Oven Emissions” *O.Reg 840* (as amended by *O.Reg 490/09*)
- .6 **Ethylene Oxide:** “Designated Substance – Ethylene Oxide” *O.Reg 841* (as amended by *O.Reg 490/09*)
- .7 **Isocyanates:** “Designated Substance – Isocyanates” *O.Reg 842* (as amended by *O.Reg 490/09*)
- .8 **Lead:**
- .1 “Designated Substance – Lead” *O.Reg 843* (as amended by *O.Reg 490/09*)
- .2 “General – Waste Management” *O.Reg 347* (as amended by *O.Reg 337/09*)
- .3 Hazardous Products Act’s *Regulations Amending the Surface Coating Materials Regulations* SOR/2010-224
- .9 **Mercury:**
- .1 “Designated Substance – Mercury” *O.Reg 844* (as amended by *O.Reg 490/09*)
- .2 “General – Waste Management” *O.Reg 347* (as amended by *O.Reg 337/09*)
- .10 **Silica:** “Designated Substance – Silica” *O.Reg 845* (as amended by *O.Reg 490/09*)
- .11 **Vinyl Chloride:** “Designated Substance – Vinyl Chloride” *O.Reg 846* (as amended by *O.Reg 490/09*)
- .3 All contractors requesting tenders from subcontractors shall furnish this report to subcontractors.

## 1.2 VALIDITY DATE

- .1 Richard Farmer, Regional Asbestos Coordinator of the Environmental Services Directorate of the Real Property Branch, PWGSC, conducted the site survey for this report on 2009/12/20. Additional survey of the branch lines was conducted on 2013/09/25.

- .2 The work area is located at the Confederation Heights, Central Heating Plant located at 501 Heron Road, Ottawa, Ontario. The scope of the work proposed is understood to consist of replacement of chill water expansion joints and cross over lines.
  - .1 The scope of work for this report involved a visual inspection of building materials and contents for the presence of suspected designated substances in the project areas on 2009/12/20. Additional survey of branch lines was conducted on 2013/09/25
  - .2 From the visual inspection suspect materials were sampled and analyzed, where appropriate, for the above substances. On the basis of this inspection, a total of four (4) samples of suspected asbestos containing material, were collected on 2009/12/20, a total of twelve (12) samples of suspected asbestos containing material, were collected on 2013/09/25 and submitted to the Exova-Accutest Laboratory (an accredited CAEAL lab) located at 146 Colonnade Road, Nepean, Ontario, K2E 7Y1 for analysis.
  - .3 The surveys were limited to those areas, which could be accessed by non-destructive means. The visual inspection and sampling was limited to readily accessible areas. Destructive testing was not included in the investigation, however, is recommended prior to any major demolition. Due to the nature of building construction, some inherent limitations exist as to the possible thoroughness of the designated substance survey. The survey did not include the demolition of floors, floor finishes, plaster ceilings or walls or other areas to examine concealed conditions. No confined space was accessed for the purposes of this report.
  - .4 It is possible that the designated substances mentioned above are present in non-accessed areas and concealed spaces (i.e., wall and ceiling cavities), or confined spaces. No other areas outside the defined work boundaries have been assessed.
  - .5 Prior to beginning work, confirm with the Project Manager that no additional designated substances have been brought to the project area.
  - .6 In addition, the survey refers to PCBs and halocarbons, however, it does not refer to other substances that may be present in the day-to-day usage for specialized equipment

or areas in buildings (i.e., lead shields, fume hoods, etc.).

- .7 There is a possibility that materials may exist which could not be reasonably identified within the scope of this assessment, of which were not apparent during previous site visits. Should any designated substance be encountered in the course of demolition, stop work, take preventative measures, and notify the Project Manager immediately. Do not proceed until written instructions have been received.

## **PART 2 - DESIGNATED SUBSTANCES**

### **2.1 SURVEY RESULTS**

- .1 **ACRYLONITRILE:** Not Identified  
.2 **ARSENIC:** Not Identified  
.3 **ASBESTOS: Identified**

Asbestos is a naturally occurring material. In general, it has historically been intentionally added to many building materials in the construction industry to increase thermal or chemical resistant properties. More common uses are thermal insulation for pipes and boilers, structural steelwork fireproofing, floor tiles and in wall and ceiling plasters. There are two classes of asbestos containing materials: these are friable and non-friable. Friable asbestos containing materials are loose in composition or can be easily crumbled using hand pressure. Non-friable asbestos containing materials are more durable and are held together by a binder such as cement, vinyl or asphalt.

Representative (ACM) samples taken from the project area have been analyzed for asbestos. The samples were taken on 2009/12/20 and 2010/01/13..

Results are listed for the Main Tunnel lines from 2009 *Asbestos Containing Material Survey* conducted by SLR Consulting, identified by samples number starting with "SA"

The analytical results of the samples taken are shown in table 1 below

The results indicate that (ACM) in the Main and branch tunnels as outlined below does contain chrysotile and amosite asbestos.

**Table 1 - Asbestos Sample Results**

| Sample number | Material             | Location                        | Asbestos Type           | Asbestos content (%) |
|---------------|----------------------|---------------------------------|-------------------------|----------------------|
| AS-1          | Insulation in column | Joint A-4, bottom edge          | Chrysotile<br>Amosite   | 10 – 15<br>1 - 5     |
| AS-2          | Insulation in column | Joint A-4, top edge             | not analyzed            |                      |
| AS-3          | Insulation in column | Joint A-4, inside bottom        | not analyzed            |                      |
| AS-4          | Insulation in column | Joint A-4, inside top           | not analyzed            |                      |
| AS-10a        | Pipe insulation      | Cold water pipe near column A10 | amosite                 | 25 -30               |
| AS-6a         | Pipe insulation      | Cold water pipe near column A 6 | amosite                 | 25 -30               |
| As-1 (2013)   | Parging cement       | Radiation line- long run        | chrysotile              | 30                   |
| As-2 (2013)   | Parging cement       | Radiation line- short run       | chrysotile              | 60                   |
| As-3 (2013)   | Parging cement       | Radiation line- elbow           | chrysotile              | 60                   |
| As-4 (2013)   | Parging cement       | Annex C -valve                  | n/d                     |                      |
| As-5 (2013)   | Parging cement       | Cafeteria –top of valve         | n/d                     |                      |
| As-6 (2013)   | Parging cement       | Cafeteria –top of valve         | n/d                     |                      |
| As-7a (2013)  | Pipe insulation      | Campbell line                   | amosite                 | 60                   |
| As-7b (2013)  | Pipe insulation      | Campbell line                   | not analyzed            |                      |
| As-7c (2013)  | Pipe insulation      | Campbell line                   | not analyzed            |                      |
| As-9a (2013)  | Pipe insulation      | Taxation - room B85             | Amosite/<br>chrysotile  | 30<br>20             |
| As-9b (2013)  | Pipe insulation      | Taxation - room B85             | not analyzed            |                      |
| As-9c (2013)  | Pipe insulation      | Taxation - room B85             | not analyzed            |                      |
| SA-01         | Pipe insulation      | Main tunnel- steam line         | Amosite                 | 20                   |
| SA-06         | Parging cement       | Main tunnel- steam line         | Amosite /<br>Chrysotile | 20<br>5              |
| SA-15         | Parging cement       | Main tunnel- winter line        | Amosite /<br>Chrysotile | 20<br>5              |
| SA-18         | Mag block            | Main tunnel- high temp return   | Amosite /<br>Chrysotile | 20<br>5              |
| SA-25         | Pipe insulation      | Main tunnel- chill water line   | Amosite                 | 20                   |

n/d = none detected

n/a = not applicable

- .4 **BENZENE:** Not Identified
- .5 **COKE OVEN EMISSIONS:** Not Identified
- .6 **ETHYLENE OXIDE:** Not Identified
- .7 **ISOCYANATES:** Not Identified

**.8 LEAD: Suspected**

Lead is a naturally occurring metal. It was used primarily in paint prior to the 1980's in order to increase the drying process. Lead in paint becomes a danger when it becomes old or damaged as it creates lead dust and chips. Lead can also be found in soldered joints installed on piping up to the mid 1990s and in older cast iron bell and spigot joints.

- .1 According to the *Surface Coating Materials Regulations*, April 2005, by Health Canada's Occupational Health and Safety Agency, the allowable concentration of lead in surface coatings is 0.06 percent by weight (weight of lead to weight of paint), which is equivalent to 600 ppm.
- .2 On the basis of this inspection, no samples were taken. Lead containing solder may be present on copper piping within the room.
- .3 Due to the age of construction, lead based paints can be assumed present on mechanical equipment within the tunnel's. Lead containing solder will also be present on copper piping within the tunnel's.

**.9 MERCURY: Not Identified****.10 SILICA: Identified**

Free crystalline silica is present in concrete and other cementitious materials such as masonry, drywall, and plaster throughout the project area. Such materials will not be affected by the current scope of the project.

**.11 VINYL CHLORIDE MONOMER: Not Identified****.12 POLYCHLORINATED BIPHENYLS (PCBs): Unknown**

Although not a designated substance, PCBs are often found in light ballasts and electrical transformers. It was not feasible during the survey to verify whether PCBs are present in each ballast in the project area, therefore, if any fluorescent light ballasts are removed during this project, please refer to the Environment Canada, *Identification of Lamp Ballasts Containing PCBs, August 1991* report, for assistance with PCB identification.

**.13 HALOCARBONS: Not Identified**

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## .2 RECOMMENDATIONS

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### 1. ASBESTOS

PWGSC's *DP 057, Asbestos Management*, sets policy, establishes roles and responsibilities and provides a code of practice for the management of and working with asbestos containing materials. All work must be done in accordance with this directive, as well as all other applicable legislation. Disturbance of all asbestos (whether friable or non-friable) is regulated in Ontario by *Regulation 278/05*, which outlines the precautions required when performing work involving asbestos containing materials. The regulation stipulates appropriate respiratory protection, work procedures and ventilation requirements that must be utilized during the disturbance of any asbestos containing materials, or materials suspected to contain asbestos.

.1 The following criteria shall be utilized in determining the classification of asbestos work as indicated in *PWGSC, DP 057, Annex C, Appendix 5* and *O.Reg. 278/05*. These criteria are not exhaustive. When classification of the work is uncertain, refer to the Ontario Regulation:

**Type 1** work generally includes installation or removal of a wetted non-friable ACM with a hand tool; disturbance of wetted non-friable ACM with a powered tool equipped with a High Efficiency Particulate Aerosol (HEPA) dust collection device; removal of less than one square meter of wetted drywall materials where joint filling materials contain asbestos; removal or replacement of less than 7.5 square meters asbestos containing compressed mineral fibre type ceiling tiles; collecting wetted samples of suspected friable asbestos material, and working close to friable sprayed asbestos, where the material may be affected by the work activities.

**Type 2** work generally includes the removal or replacement of more than 7.5 square meters asbestos containing compressed mineral fibre type ceiling tiles; entry into ceiling space, crawl spaces, pipe tunnels etc., where friable asbestos debris is present; minor removal of friable ACM; Type 2 removal is limited to a maximum per work period of 1m<sup>2</sup> of surface area; the repair of asbestos mechanical insulation (no limit is imposed as to the amount of repair permitted under Type 2 conditions); and any disturbance not classified as either Type 1 or 3.

**Type 3** work generally includes more than minor removal or disturbance of friable ACM; the use of a power tool on non-friable ACM without a HEPA exhausted dust collection; the spray application of an encapsulate or sealer to friable asbestos surfacing materials; the disturbance of the ductwork and air handling equipment serving or passing through areas of buildings with sprayed asbestos fireproofing or insulation, and the repair, alteration or demolition of a boiler, furnace, kiln or similar equipment with asbestos-containing refractory.

In the event of conflict between DP-057 and Regulation 278/05, the more stringent shall apply.

## 2. LEAD

If lead-containing materials are disturbed (i.e. during dry sanding, grinding, polishing and sawing operations), then proper precautions, as outlined under "Designated Substances" *O.Reg 490/09*, as amended, of the Occupational Health and Safety Act, must be followed.

Under Ontario Regulation 490/09, as amended of the Occupational Health and Safety Act, regulatory limits have been established for occupational exposure limits to airborne lead that may be present in a workplace. The Time Weighted Average Exposure Values to airborne lead dust or fumes should not exceed the Ministry of Labour's 0.05 milligram per cubic metre (mg/m<sup>3</sup>) limit during the removal of paints and products containing any concentration of lead. The TWAEV represents the time-weighted average concentration for a conventional 8-hour workday and a 40-hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse health effects.

Contractors performing work that requires disturbance of lead-containing materials are responsible to ensure that the workers are not exposed to airborne lead dust levels in excess of the time-weighted average and Maximum Exposure Concentration for lead-containing paints. It should be noted that the use of mechanically-powered tools or torches on lead-containing materials increases the concentration of airborne lead dust or fumes and thereby requiring more stringent respiratory protection and controlled work procedures.

Ontario Ministry of Labour (MoL) has published the document entitled "*Guideline: Lead on Construction Projects*". This document classifies all disturbances of lead-containing materials as Type 1, Type 2a,

Type 2b, Type 3a or Type 3b work, based on presumed airborne concentrations of lead generated during the work each of which will have defined work practices. Although this document is not a regulation, Ministry of Labour Inspectors use it as guidance during site inspections.

guidance during site inspections.

### 3. SILICA

.1 Silica occurs as crystalline material in cement. Crystalline silica is regulated under “Designated Substance – Silica” *O.Reg 845* (as amended by *O.Reg 490/09*) of the *Occupational Health and Safety Act* as a Designated Substance.

.2 Silica dust can be generated through such processes as blasting, grinding, crushing, and sandblasting silica-containing material. Since silica is present in concrete, concrete blocks and drywall within the project area, appropriate respiratory protection and ventilation must be donned during the demolition and modifications of these structures.

.3 The Occupational Health and Safety Branch of the MoL has published the document entitled “*Guideline: Silica on Construction Projects*”. This document classifies the disturbance of materials containing silica as Type 1, Type 2 or Type 3 work, and assigns different levels of respiratory protection and work procedures for each classification. These work procedures should be followed when performing work involving the disturbance of silica-containing materials.

### 4. POLYCHLORINATED BIPHENYLS (PCBs) (NOT RECOGNIZED AS A DESIGNATED SUBSTANCE)

.1 If any fluorescent light ballast is removed during this project, please refer to the Environmental Canada, “*Identification of Lamp Ballasts Containing PCBs*”, August 1991 report in order to identify the ballast type. Ballasts for a typical 1.2 metre fluorescent light fixture made with PCBs contain approximately 23.6 grams of PCB.

.2 If any fluorescent light ballasts are removed during this project they must be sorted by a licensed electrician.

PCB-containing equipment must be disposed of in accordance with:

- Canadian Environmental Protection Act’s (*CEPA*) *PCB Regulations*
- Canadian Council of Ministers of the Environment’s “*Guidelines for the Management of Wastes Containing Polychlorinated Biphenyls*”
- Ontario Environmental Protection Act’s *O.Reg*

362/90 "Waste Management – PCB's" (O.Reg 33/07, French version).

## 5. CONTRACTORS DUTIES

.1 The contractor must review the designated substance report and take the necessary precautions to protect the health and safety of the workers and the environment. As per s. 30 (4) of the *Ontario Occupational Health and Safety Act*, the party hiring the contractor (i.e., The PWGSC Project Manager) shall ensure that the contractor and subcontractor (if any) for the project has received a copy of the designated substance report prior to entering a binding contract for the supply of work on the project. As per s. 27 (2) (a,b,c,) of the *Ontario Occupational Health and Safety Act*, while onsite, the contractor supervisor shall take every reasonable precaution in the protection of a worker. If you have any questions about the designated substance report, please contact the Project Manager.

**END OF SECTION**

PART 1 GENERAL

1.1 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 Keep one reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

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- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
  - .4 Allow 7 days for Departmental Representative's review of each submission.
  - .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
  - .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
  - .7 Accompany submissions with transmittal letter, in duplicate, containing:
    - .1 Date.
    - .2 Project title and number.
    - .3 Contractor's name and address.
    - .4 Identification and quantity of each shop drawing, product data and sample.
    - .5 Other pertinent data.
  - .8 Submissions include:
    - .1 Date and revision dates.
    - .2 Project title and number.
    - .3 Name and address of:
      - .1 Subcontractor.
      - .2 Supplier.
      - .3 Manufacturer.
    - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
    - .5 Details of appropriate portions of Work as applicable:
      - .1 Fabrication.
      - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
      - .3 Setting or erection details.
      - .4 Capacities.
      - .5 Performance characteristics.
      - .6 Standards.
      - .7 Operating weight.
      - .8 Wiring diagrams.
      - .9 Single line and schematic diagrams.
      - .10 Relationship to adjacent work.
  - .9 After Departmental Representative's review, distribute copies.

- .10 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
  - .2 Certificates must be dated after award of project contract complete with project name.
- .13 Submit electronic copies of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .14 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .15 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .16 Submit 2 copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.
- .19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, shop drawing will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .20 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.
  - .1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of

construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

### 1.3 MOCK-UPS

- .1 Erect mock-ups as required by Departmental Representative. Mock-ups required but not limited to the following:
  - .1 Expansion joint.
  - .2 Column anchor.
  - .3 Recirc line.
  - .4 HWS/CHWS cross over connection.

### 1.4 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.

## PART 2 PRODUCTS

### 2.1 NOT USED

- .1 Not Used.

## PART 3 EXECUTION

### 3.1 NOT USED

- .1 Not Used.

PART 1      GENERAL

1.1      REFERENCES

- .1 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990, c. 0.1, as amended and O. Reg. 213/91, current edition as amended.

1.2      ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .1 Results of site specific safety hazard assessment.
  - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative.
- .4 Submit copies of reports or directions issued by Federal, Provincial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
- .7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 7 days after receipt of comments from Departmental Representative.
- .8 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- .10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.3 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.

1.4 SAFETY ASSESSMENT

- .1 Perform site specific safety hazard assessment related to project.
- .2 Tunnel is identified as a confined space according to federal regulations.

1.5 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.6 REGULATORY REQUIREMENTS

- .1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

1.7 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
  - .1 Asbestos refer to DSR.
  - .2 Confined space tunnel, as identified by federal regulations.

1.8 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.9 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work. Be responsible and assume the role of "Constructor" as described in the Ontario Occupational Health & Safety Act and Regulations for Construction Projects.

- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

#### 1.10 COMPLIANCE REQUIREMENTS

- .1 Comply with the Ontario Occupational Health and Safety Act, R.S.O. 1990, c. 0.1 as amended.
- .2 Comply with Ontario Regulations for Construction Projects, O.Reg. 213/91 current edition as amended.

#### 1.11 UNFORSEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

#### 1.12 SITE SUPERVISOR

- .1 Site Supervisor shall be competent person in Health and Safety. Site Supervisor must:
  - .1 Be on site during execution of Work.

#### 1.13 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative.

#### 1.14 CORRECTION OF NON-COMPLIANCE

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

1.15            POWDER ACTUATED DEVICES

- .1        Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.16            WORK STOPPAGE

- .1        Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

PART 2        PRODUCTS

2.1            NOT USED

- .1        Not used.

PART 3        EXECUTION

3.1            NOT USED

- .1        Not used.

PART 1 GENERAL

1.1 REFERENCES AND CODES

- .1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided.
- .2 Meet or exceed requirements of:
  - .1 Contract documents.
  - .2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

- .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Departmental Representative. Refer to Section 02 82 00.02 - Asbestos Abatement - Intermediate Precautions and Section 02 82 00.03 - Asbestos Abatement - Maximum Precautions.
- .2 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Departmental Representative.

1.3 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions and municipal by-laws.

PART 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete, Includes Update No. 1 (2011).
  - .2 CSA 0121-08 (R2013), Douglas Fir Plywood, Includes Update No. 1 (2013).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

- .1 Indicate use of supplemental or other staging area.
- .2 Provide construction facilities in order to execute work expeditiously.
- .3 Remove from site all such work after use.

1.4 SITE STORAGE/LOADING

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.5 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work. Contractor shall park in site lots.
- .2 Provide and maintain adequate access to project site.

1.6 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.7 SANITARY FACILITIES

- .1 Sanitary facilities will be provided at the CHCP.

1.8 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.

PART 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

- .1 Not used.

PART 1      GENERAL

1.1            PROJECT CLEANLINESS

- .1      Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Departmental Representative or other Contractors.
- .2      Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative.
- .3      Make arrangements with and obtain permits from Authorities Having Jurisdiction for disposal of waste and debris.
- .4      Provide and use marked separate bins for recycling.
- .5      Dispose of waste materials and debris off site.
- .6      Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .7      Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .8      Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .9      Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2            FINAL CLEANING

- .1      When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2      Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3      Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4      Remove waste products and debris other than that caused by Departmental Representative or other Contractors.

- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative.
- .6 Make arrangements with and obtain permits from Authorities Having Jurisdiction for disposal of waste and debris.
- .7 Clean and sweep work area and remove waste.
- .8 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling.

PART 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 GENERAL

1.1 REFERENCES

- .1 Canadian Environmental Protection Act (CEPA)
  - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
  - .1 Convene meeting one week prior to contract completion with Contractor's Representative and Departmental Representative to:
    - .1 Review manufacturer's installation instructions and warranty requirements.
    - .2 Departmental Representative communication procedures for:
      - .1 Notifying construction warranty defects.
      - .2 Determine priorities for type of defects.
      - .3 Determine reasonable response time.
    - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
    - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals in English.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.

1.4 FORMAT

- .1 Organize data as instructional manual.
- .2 PDF document.

- .3 Arrange content by systems, under Section numbers and sequence of Table of Contents.
- .4 Text: manufacturer's printed data, or typewritten data.
- .5 Drawings: provide with reinforced punched binder tab.
  - .1 Bind in with text; fold larger drawings to size of text pages.

#### 1.5 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
  - .1 Date of submission; names.
  - .2 Addresses, and telephone numbers of Departmental Representative and Contractor with name of responsible parties.
  - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
  - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
  - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
- .6 Training: refer to Section 01 79 00 - Demonstration and Training.

#### 1.6 AS-BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative one record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to Contract.
  - .5 Reviewed shop drawings, product data, and samples.
  - .6 Field test records.
  - .7 Inspection certificates.
  - .8 Manufacturer's certificates.

- .2 Store record documents and samples in field office apart from documents used for construction.
  - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
  - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
  - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

#### 1.7 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of blue line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
  - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
  - .1 Measured depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .4 Field changes of dimension and detail.
  - .5 Changes made by change orders.
  - .6 Details not on original Contract Drawings.
  - .7 References to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
  - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
  - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.
- .7 Provide digital photos, if requested, for site records.

1.8 MAINTENANCE MATERIALS

- .1 Spare Parts:
  - .1 Provide spare parts, in quantities specified in individual specification sections.
  - .2 Provide items of same manufacture and quality as items in Work.
  - .3 Deliver to site location as directed; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative.
    - .2 Include approved listings in Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit prior to final payment.
- .2 Extra Stock Materials:
  - .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
  - .2 Provide items of same manufacture and quality as items in Work.
  - .3 Deliver to site location as directed; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative.
    - .2 Include approved listings in Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit prior to final payment.
- .3 Special Tools:
  - .1 Provide special tools, in quantities specified in individual specification section.
  - .2 Provide items with tags identifying their associated function and equipment.
  - .3 Deliver to site location as directed; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative.
    - .2 Include approved listings in Maintenance Manual.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and for review by Departmental Representative.

1.10 WARRANTIES AND BONDS

- .1 Provide warranty letter.
  - .1 Warranty shall cover all work and equipment provided under this contract for a period of 1 year from substantial completion.

PART 2      PRODUCTS

2.1            NOT USED

.1      Not Used.

PART 3      EXECUTION

3.1            NOT USED

.1      Not Used.

PART 1 GENERAL

1.1 ADMINISTRATIVE REQUIREMENTS

- .1 Demonstrate scheduled operation and maintenance of equipment and systems to Departmental Representative's personnel two weeks prior to date of final inspection, substantial performance and interim completion.
- .2 Departmental Representative: provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.
- .3 Preparation:
  - .1 Verify conditions for demonstration and instructions comply with requirements.
  - .2 Verify designated personnel are present.
  - .3 Ensure equipment has been inspected and put into operation.
  - .4 Ensure testing, adjusting, and balancing has been performed and equipment and systems are fully operational.
- .4 Demonstration and Instructions:
  - .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times, at the equipment designated location.
  - .2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
  - .3 Review contents of manual in detail to explain aspects of operation and maintenance.
  - .4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.
- .5 Time Allocated for Instructions: ensure amount of time required for instruction of each item of equipment or system as follows:
  - .1 Expansion joints: 8 hours of instruction.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Departmental Representative's approval.
- .3 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .4 Give time and date of each demonstration, with list of persons present.

- .5 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.3 QUALITY ASSURANCE

- .1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:
  - .1 Instruct Departmental Representative's personnel.
  - .2 Provide written report that demonstration and instructions have been completed.

PART 2 PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

- .1 Not Used.