

Public Works and Government Services Canada

Requisition No: EZ899-150573

DRAWINGS & SPECIFICATIONS
For:

Metchosin BC William Head Institution

PRINCIPAL ENTRANCE RENOVATIONS

Project # R.066815.001

APPROVED BY:

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June 16/2014
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2014.05.07
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IN-HOUSE – SEAL & SIGNATURE

Discipline

Seal & Signature

Structural



END OF SECTION

1 SUMMARY OF WORK

- .1 Work covered by Contract Documents:
 - .1 Work under this Contract comprises renovations at the Principal Entrance at William Head Institution, including minor architectural modifications & demolition at interior, addition of a rolling shutter; new millwork, new sheet vinyl at room 102, new acoustical tiles at rooms 100 & 102, relocate x-ray scanner, decommission, modify and reactivate security systems; vestibule at Main Entrance; touch-up painting of cell walls and ceilings where affected by renovation work. Electrical work includes the relocation of an x-ray scanner, a new security control console, new four-post security electronics racks, relocation of security electronics equipment, relocation of radio cavities, commissioning of security electronics systems, grounding of a telecom room, relocation of a UPS and other electrical work. See Phasing Plan Section 28 50 00 3.2 Work Stages for a detailed phasing plan.
 - .2 The building is to remain operational during construction.
 - .3 Contractor to have a dust control plan in place on site to minimize dust that may be generated when drilling. Ensure that staff use face masks and HEPA vacuum to collect any dust. See Appendix 1.
- .2 Occupancy:
 - .1 The Institution and Principal Entrance will be operational during entire construction period.
 - .2 Co-operate with Departmental Representative in scheduling operations to minimize conflict and to facilitate CSC usage of premises.
- .3 Work not included in Contract: Corcan Workstation Furniture supplied by others; contractor to assemble furniture and make electrical connections.
- .4 Contractor's Use of Premises:
 - .1 Contractor has use of immediate construction areas for performance of Work and limited storage space for materials.
 - .2 Obtain and pay for use of additional storage or work areas needed for operation under this Contract.
 - .3 Vehicular access through the Sally Port will be restricted during the inmate "count" at breakfast, lunch and dinner hours. Confirm times with Departmental Representative. Delays may occur when entering and exiting the Institution with vehicles due to security situations and heavy traffic.
- .5 Materials supplied by Departmental Representative:
 - .1 Departmental Representative responsibilities:
 - .1 Workstations to be provided by Corcan.
 - .2 Contractor Responsibilities:
 - .1 Contractor to remove debris off-site daily.
 - .2 Contractor to co-ordinate workstation tie-in.
 - .3 Review shop drawings and manufacturer's instructions. Submit to Departmental Representative notification of observed discrepancies or problems anticipated due to site conditions and/or non-conformance with Contract Documents.
 - .4 Handle products at site, including uncrating and temporary daily storage.
 - .5 Protect products from damage, and from exposure to elements.
 - .6 Assemble, install, connect, adjust, and finish products.
 - .7 Repair items damaged by Contractor on site (under his control).

2 WORK RESTRICTIONS

- .1 Notify, Departmental Representative of intended interruption of power and other services and provide schedule of interruption times.
 - .2 Should Work involve connecting to existing electrical lines etc., give Departmental Representative 48 hours notice, provide duration estimate for interruption of services, throughout course of work. Keep duration of interruptions to a minimum.
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- .3 Security Requirements: refer to Section 01 14 10 - Security Requirements.
- .4 Hours of work:
 - .1 Perform work during normal working hours of the Institution (0730 to 1600), Monday through Friday except holidays, except as noted in Construction Work Schedule .
 - .2 Work may be performed on weekends and holidays. 7 days of notification to the Departmental Representative are required.
 - .3 Notify Departmental Representative forty-eight hours in advance of when after hours work will be required.
 - .4 Provide schedule for prior approval of Departmental Representative.
- .5 Work restrictions and conditions for the entire Contract are listed under Part 3 (Execution) of Section 28 05 00 and are applicable to the entire Contract.

3 CONSTRUCTION WORK SCHEDULE

- .1 Commence work immediately upon official notification of acceptance of offer and complete the work within sixteen (16) weeks from the date of such notification.
- .2 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Substantial Certificate and Final Certificate, as defined times of completion are of essence of this contract.
- .3 Submittal:
 - .1 Submit to Departmental Representative within ten (10) working days of Award of Contract schedule of work.
 - .2 Departmental Representative will review schedule and return one copy.
 - .3 Re-submit two (2) copies of finalized schedule to Departmental Representative after return of reviewed preliminary copy.
- .4 Project Meetings:
 - .1 Progress meetings to be bi-weekly.

4 SUBMITTAL PROCEDURES

- .1 Administrative:
 - .1 Submit to Departmental Representative submittal listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
 - .2 Work affected by submittal shall not proceed 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 submittal 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. Submittal not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be 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 coordinated.
 - .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative review of submittal.
 - .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.

5 HEALTH AND SAFETY

Specified in Section 01 35 33.

6 ENVIRONMENTAL PROCEDURES

- .1 Do not dispose of waste or volatile materials such as oil, paint thinner or mineral spirits into storm or sanitary systems.
- .2 Under no circumstances dispose of rubbish or waste materials in CSC waste bins or on adjoining property.

7 REGULATORY REQUIREMENTS

- .1 References and Codes:
 - .1 Perform Work in accordance with National Building Code of Canada (NBCC2010) and where applicable British Columbia Building Code (BCBC2006) including all amendments up to bid closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
 - .2 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.

8 QUALITY CONTROL

- .1 Inspection:
 - .1 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
 - .2 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
 - .3 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.
- .2 Rejected Work:
 - .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
 - .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 Equipment and Systems:
 - .1 Install in accordance with manufacturer's instructions

9 TEMPORARY UTILITIES

- .1 Temporary Ventilation:
 - .1 The existing air system will be in use during work of this contract inside existing building. During dust/fume generating construction work block off all outlets and seal air tight. There will be no modifications to building HVAC during construction.:
 - .1 Provide adequate ventilation to meet health regulations for safe working environment.
 - .2 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapors or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.

- .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .2 Existing air system is to remain active during construction period to provide heat and ventilation to occupied and Work areas. Protect ducting system by filters applied to existing exhaust system grilles inspected daily and replaced as necessary.
- .3 Maintain strict supervision of operation of ventilating system to:
- .1 Conform with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
- .4 Temporary Power and Light:
- .1 Electrical power and lighting in existence in work area may be used for construction purposes at no extra cost, provided that electrical components used for temporary power are replaced when damaged.
 - .2 Conform to Section 01 35 33 Safety Requirements for use of existing power systems

10 CONSTRUCTION FACILITIES

- .1 Installation and Removal:
- .1 Provide construction facilities in order to execute work expeditiously.
 - .2 Remove from site all such work after use.
- .2 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 a weight or force that will endanger the Work.
- .3 Construction Parking:
- .1 Park personnel vehicles outside perimeter fence in designated parking areas.
- .4 Contractor's Site Office and enclosure:
- .1 Locate office outside Institution double fence as directed by the Departmental Representative.
- .5 Equipment, Tools and Material Storage:
- .1 Provide and maintain, in a clean and orderly condition, lockable bins for storage of tools, and equipment.
 - .2 Locate materials in a manner to cause least interference with work activities.
- .6 Sanitary Facilities:
- .1 Existing washroom facilities may be used during the construction period as designated by Departmental Representative .
- .7 Construction Signs:
- .1 Signs and notices for safety or instruction to be in English language, or commonly understood graphic symbols.
 - .2 Remove signs from site at completion of project or as directed by Departmental Representative.

11 TEMPORARY BARRIERS AND ENCLOSURES

- .1 Protection of openings:
- .1 Provide secure protection for openings during construction to maintain security.

- .2 Protection for Off-Site and CSC Property:
 - .1 Protect surrounding CSC property from damage during performance of Work.
 - .2 Be responsible for damage incurred.

- .3 Protection of Building Finishes:
 - .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
 - .2 Provide necessary screens, covers, and hordings.
 - .3 Confirm with Departmental Representative locations and installation schedule 3 days prior to installation.
 - .4 Be responsible for damage incurred due to lack of or improper protection.

12 COMMON PRODUCT REQUIREMENTS

- .1 Reference Standards:
 - .1 If there is a question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
 - .2 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
 - .3 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.

 - .2 Quality:
 - .1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
 - .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
 - .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

 - .3 Storage, Handling and Protection:
 - .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
 - .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
 - .3 Store products subject to damage from weather in weatherproof enclosures.
 - .4 Store cementitious products clear of earth or concrete floors, and away from walls.
 - .5 Keep cementitious materials, clean and dry.
 - .6 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
 - .7 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative .

 - .4 Transportation:
 - .1 Pay costs of transportation of products required in performance of Work.
 - .2 Products supplied by Departmental Representative are located on site at Institution.

 - .5 Manufacturer's Instructions:
 - .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products.
 - .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.
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- .6 Quality of Work:
 - .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
 - .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
 - .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

 - .7 Co-ordination:
 - .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
 - .2 Be responsible for coordination and placement of openings, sleeves and accessories.

 - .8 Concealment:
 - .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
 - .2 Before installation, inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

 - .9 Remedial Work:
 - .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
 - .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

 - .10 Location of Fixtures:
 - .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
 - .2 Inform Departmental Representative of conflicting installation. Install as directed.
 - .3 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

 - .11 Fastenings:
 - .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
 - .2 Prevent electrolytic action between dissimilar metals and materials.
 - .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing work, unless stainless steel or other material is specifically requested in affected specification Section.
 - .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
 - .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
 - .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

 - .12 Fastenings - Equipment:
 - .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
 - .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel.
 - .3 Bolts may not project more than one diameter beyond nuts.

 - .13 Protection of Work in Progress:
 - .1 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Departmental Representative.
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- .14 Substitution after award of Contract:
- .1 No substitutions are permitted without prior written approval of the Departmental Representative.
 - .2 Proposals for substitution may only be submitted after Contract award. Such request must include statements of respective costs of items originally specified and the proposed substitution.
 - .3 Proposals will be considered by the Departmental Representative if:
 - .1 products selected by tenderer from those specified are not available;
 - .2 delivery date of products selected from those specified would unduly delay completion of Contract, or
 - .4 Alternative product to that specified, which is brought to the attention of and considered by Departmental Representative as equivalent to the product specified, and will result in a credit to the Contract amount.
 - .5 Should the proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on the project. Pay for design or drawing changes required as result of substitution.
 - .6 Amounts of all credits arising from approval of the substitutions will be determined by the Departmental Representative, and the Contract price will be reduced accordingly.

13 EXAMINATION AND PREPARATION

- .1 Location of Equipment and Fixtures:
- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
 - .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
 - .3 Inform Departmental Representative of impending installation and obtain approval for actual location.
 - .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

14 TESTING AND INSPECTION SERVICES

- .1 Particular requirements for inspection and testing to be carried out by testing service or laboratory designated by Departmental Representative, are specified under various sections.
- .2 The Departmental Representative will appoint and pay for services of testing agency or of testing laboratory in accordance with paragraph .1, except where required for the following:
- .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of mechanical and electrical equipment and systems.
 - .4 Mill tests and certificates of compliance.
 - .5 Tests specified to be carried out by Contractor under the supervision of the Departmental Representative.
 - .6 Additional tests specified in following paragraph.3 and.5.
- .3 Where tests or inspections performed by the testing laboratories and service reveal work is not in accordance with the contract requirements, make corrections to bring work to specified requirements. Contractor will pay costs for additional tests or inspections required for **third and subsequent tests in a given area**. Additional cost will include inspection service per diem rate for time, travel and testing costs.
- .4 Furnish labour and facilities to:
- .1 Provide access to work to be inspected and tested;
 - .2 Make good work disturbed by inspection and test;
 - .3 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
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- .5 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.

15 EXECUTION REQUIREMENTS

- .1 Preparation:
 - .1 Inspect existing conditions, including elements subject to damage or movement during drilling and patching.
 - .2 After uncovering, inspect conditions affecting performance of Work.
 - .3 Beginning of drilling or patching means acceptance of existing conditions.
 - .4 Provide devices and methods to protect adjacent surfaces from damage.
- .2 Execution:
 - .1 Execute drilling, fitting, and patching to complete Work.
 - .2 Fit several parts together, to integrate with other Work.
 - .3 Uncover Work to install ill-timed Work.
 - .4 Remove and replace defective and non-conforming Work.
 - .5 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
 - .6 Cut rigid materials using purpose made saw or core drill. Pneumatic or impact tools not allowed on brittle materials without prior approval.
 - .7 Restore work with new products in accordance with requirements of Contract Documents.
 - .8 Fit Work airtight to penetrations through surfaces.
 - .9 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with approved material, full thickness of the construction element.
 - .10 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

16 CLEANING

- .1 Project Cleanliness:
 - .1 Maintain Work in tidy condition, free from accumulation of waste products and debris on a regular basis at the end of each daily work shift.
 - .2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
 - .3 Provide on-site containers for collection of waste materials and debris.
 - .4 Provide and use clearly marked separate bins for recycling. Refer to- Construction/Demolition Waste Management And Disposal.
 - .5 Clean interior areas prior to start of finish work, and maintain areas free of dust and other contaminants during finishing operations.
 - .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.
 - .10 Contractor to remove debris from site daily.
- .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, and equipment.
 - .4 Remove waste products and.
 - .5 Clean stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and

- mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .6 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.
- .7 Vacuum clean and dust building interior work areas.

17 CONSTRUCTION/DEMOLITION WASTE MANAGEMENT AND DISPOSAL

- .1 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and/or recyclable materials and waste.
 - .1 Separate non-salvageable materials from salvaged items.
 - .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.
 - .3 Transport and deliver non-salvageable items to licensed disposal facility.
- .2 Provide containers to deposit reusable and/or recyclable materials. Locate containers in locations, to facilitate deposit of materials without hindering daily operations. Provide containers to deposit reusable and/or recyclable materials.
- .3 Collect, handle, store on-site and transport off-site, salvaged materials in separate condition. Transport to approved and authorized recycling facility and/or users of material for recycling.
- .4 Locate waste and salvage bins on site as directed by Departmental Representative.

18 CLOSEOUT PROCEDURES

- .1 Inspection and Declaration:
 - .1 Contractor's Inspection: Conduct an inspection of Work with all subcontractors, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .2 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 - .3 Request Departmental Representative's Inspection.
- .2 Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .3 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
 - .4 Work is complete and ready for Final Inspection.
- .4 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request reinspection.

19 CLOSEOUT SUBMITTAL

- .1 Record Drawings:
 - .1 As work progresses, maintain accurate records to show all deviations from the Contract Drawings. Note on as-built drawings in red as changes occur. At completion supply:
 - .1 One (1) set of marked up as-built drawings. One disk of As-built CADD drawings.
 - .2 Contractor may place on the upper right-hand title block area a small company logo, the text "AS-BUILT" and the date.

20 COMMISSIONING

- .1 Demonstration and Training:
 - .1 Commission items where required in accordance with manufacturer's instruction manual provided by Departmental Representative.

END OF SECTION

1 PURPOSE

- .1 To ensure that both the construction project and the institutional operations may proceed without undue disruption or hindrance and that the security of the Institution is maintained at all times.

2 DEFINITIONS

- .1 "Contraband" means:
 - (a) an intoxicant, including alcoholic beverages, drugs and narcotics
 - (b) a weapon or a component thereof, ammunition for a weapon, and anything that is designed to kill, injure or disable a person or that is altered so as to be capable of killing, injuring or disabling a person, when possessed without prior authorization,
 - (c) an explosive or a bomb or a component thereof,
 - (d) currency over any applicable prescribed limit, \$25.00, and
 - (e) any item not described in paragraphs (a) to (d) that could jeopardize the security of a Penitentiary or the safety of persons, when that item is possessed without prior authorization.
- .2 "Unauthorized smoking and related Items" means all smoking items including, but not limited to, cigarettes, cigars, tobacco, chewing tobacco, cigarette making machines, matches and lighters.
- .3 "Commercial Vehicle" means any motor vehicle used for the shipment of material, equipment and tools required for the construction project.
- .4 "CSC" means Correctional Service Canada.
- .5 "Director" means Director or Warden of the Institution as applicable or their representative.
- .6 "Construction employees" means persons working for the general contractor, the sub-contractors, equipment operators, material suppliers, testing and inspection companies and regulatory agencies. Workers 18 years or younger are not permitted within Institution.
- .7 "Departmental Representative" means the Public Works and Government Services Canada representative defined in General Conditions.
- .8 "Perimeter" means the fenced or walled area of the institution that restrains the movement of the inmates.
- .9 "Construction zone" means the area, as indicated in the contract documents, that the contractor will be allowed to work". This area may or may not be isolated from the security area of the institution. Limits to be confirmed at construction start-up meeting.
 - .1 Construction zone for this contract includes the project location at Matsqui Institution - Segregation Unit .

3 PRELIMINARY PROCEEDINGS

- .1 At construction start-up meeting:
 - .1 Discuss the nature and extent of all activities involved in the Project.
 - .2 Establish mutually acceptable security procedures in accordance with this instruction and the institution's particular requirements.
 - .2 The contractors's responsibilities:
 - .1 Ensure that all construction employees are aware of the CSC security requirements.
 - .2 Ensure that a copy of the CSC security requirements is always prominently on display at the job site.
 - .3 Co-operate with institutional personnel in ensuring that security requirements are observed by all construction employees.
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4 CONSTRUCTION EMPLOYEES

- .1 Submit to the Departmental Representative a list of the names with date of birth of all construction employees to be employed on the construction site and a security clearance form for each employee.
- .2 Allow 10 working days for processing of security clearances. Employees will not be admitted to the Institution without a valid security clearance in place and a recent picture identification such as a provincial driver's license. Security clearances obtained from other CSC institutions are not valid at this Institution except as approved otherwise.
- .3 The Director may require that facial photographs may be taken of construction employees and these photographs may be displayed at appropriate locations in the Institution or in an electronic database for identification purposes. The Director may require that Photo ID cards be provided for all construction workers. ID cards will then be left at the designated entrance to be picked upon arrival at the institution and shall be displayed prominently on the construction employees clothing at all time while employees are at the institution.
- .4 Entry to Institutional Property will be refused to any person there may be reason to believe may be a security risk.
- .5 Any person employed on the construction site will be subject to immediate removal from Institutional Property if they:
 - .1 appear to be under the influence of alcohol, drugs or narcotics.
 - .2 behave in an unusual or disorderly manner.
 - .3 are in possession of contraband.
 - .4 are 18 years old or younger.

5 VEHICLES

- .1 All unattended vehicles on CSC property must have windows closed; fuel caps locked, doors and trunks locked and keys removed. The keys must be securely in the possession of the owner or an employee of the company that owns the vehicle.
- .2 The director may limit at any time the number and type of vehicles allowed within the Institution.
- .3 Drivers of delivery vehicles for material required by the project will require security clearances and must remain with their vehicle the entire time that the vehicle is in the Institution. The director may require that these vehicles be escorted by Institutional staff or PWGSC Construction Escorts while in the Institution.
- .4 If the Director permits trailers to be left inside the secure perimeter of the Institution, the trailer doors must be locked at all times. All windows must be securely locked bars when left unoccupied. Cover all windows with expanded metal mesh. When not in use lock all storage trailers located inside and outside the perimeter. All storage trailers inside and outside the perimeter must be locked when not in use.

6 PARKING

- .1 The parking area(s) to be used by construction employees will be designated by the Director. Parking in other locations will be prohibited and vehicles may be subject to removal.
-

7 SHIPMENTS

- .1 To avoid confusion with the Institution's own shipments, address all shipments of project material, equipment and tools in the Contractor's name and have a representative on site to receive any deliveries or shipments. CSC or PWGSC staff will **NOT** accept receipt of deliveries or shipments of any material equipment or tools for the contractor.

8 TELEPHONES

- .1 The installation of telephones, facsimile machines and computers with Internet connections is not permitted within the Institution perimeter unless prior approved by the Director.
- .2 The Director will ensure that approved telephones, facsimile machine and computers with Internet connections are located where they are not accessible to inmates. All computers will have an approved password protection that will stop an Internet connection to unauthorized personnel.
- .3 Wireless cellular and digital telephones, including but not limited to devices for telephone messaging, pagers, Blackberries, PDAs, telephone used as 2-way radios are not permitted within the Institution unless approved by the Director. If wireless cellular telephones are permitted, the user will not permit their use by any inmate.
- .4 The Director may approve but limit the use of 2-way radios.

9 WORK HOURS

- .1 Work hours within the Institution are: conform to Division 1.
- .2 Work is not permitted during weekends and statutory holidays without the permission of the Director. A minimum of seven days advance notice will be required to obtain the required permission. In case of emergencies or other special circumstances, this advance notice may be waived by the Director.

10 OVERTIME WORK

- .1 Conform to Division 1.
- .2 Provide 48 hours advance notice to Director for all work to be performed after normal working hours of the Institution. Notify Director immediately if emergency work is required, such as to complete a concrete pour or make the construction site safe and secure.

11 TOOLS AND EQUIPMENT

- .1 Maintain a complete list of all tools and equipment to be used during the construction project. Make this inventory available for inspection when required by the Institution.
 - .2 Throughout the construction project maintain up-to-date the list of tools and equipment specified above.
 - .3 Keep all tools and equipment under constant supervision, particularly power-driven and cartridge-driven tools, cartridges, files, saw blades, rod saws, wire, rope, ladders and any sort of jacking device.
 - .4 Store all tools and equipment in approved secure locations.
 - .5 Lock all tool boxes when not in use. Keys to remain in the possession of the employees of the contractor. Secure and lock scaffolding when not erected and when erected Secure in a manner agreed upon with the Institution designate.
-

- .6 Report all missing or lost tools or equipment immediately to the Departmental Representative/Director.
- .7 The Director will ensure that the security staff members carry out checks of the Contractor's tools and equipment against the list provided by the Contractor. These checks may be carried out at the following intervals:
 - .1 At the beginning and conclusion of every work day or shift upon entering and exiting the Institution.
 - .2 At any time when contractor is on Institution property.
- .8 Certain tools/equipment such as cartridges and hacksaw blades are highly controlled items. The contractor will be given at the beginning of the day, a quantity that will permit one day's work. Used blades/cartridges will be returned to the Director's representative at the end of each day. Maintain up to date inventory of all used blades/cartridges.
- .9 If propane or natural gas is used for heating the construction, the institution will require that the contractor supervise the construction site during non-working hours.

12 KEYS

- .1 Security Hardware Keys.
 - .1 Arrange with the security hardware supplier/installer to have the keys for the security hardware to be delivered directly to Institution, specifically the Security Maintenance Officer (SMO).
 - .2 The SMO will provide a receipt to the Contractor for security hardware keys.
 - .3 Provide a copy of the receipt to the Departmental Representative.
- .2 Other Keys
 - .1 Use standard construction cylinders for locks for his 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 each phase of the construction, the CSC representative will, in conjunction with the lock manufacturer:
 - .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 and install the operational core in all locks.
 - .4 Upon putting operational security keys into use, the PWGSC construction escort will obtain these keys as they are required from the SMO and open doors as required by the Contractor. The Contractor shall issue instructions to his employees advising them that all security keys shall always remain with the PWGSC construction escort.

13 SECURITY HARDWARE

- .1 Turn over all removed security hardware to the Director of the Institution for disposal or for safekeeping until required for re-installation.

14 PRESCRIPTION DRUGS

- .1 Employees of the contractor who are required to take prescription drugs during the workday shall obtain approval of the Director to bring a one day supply only into the Institution.
-

15 SMOKING RESTRICTIONS

- .1 Smoking is not permitted inside correctional facilities or outdoors within the perimeter of a correctional facility and persons must not possess unauthorized smoking items within the perimeter of a correctional facility.
- .2 Persons in violation of this policy will be requested to immediately cease smoking or dispose of any unauthorized smoking items and, if they persist will be directed to leave the Institution.
- .3 Smoking is permitted outside the perimeter of a correctional facility in an area designated by the Director.

16 CONTRABAND

- .1 Weapons, ammunition, explosives, alcoholic beverages, drugs and narcotics are prohibited on institutional property.
- .2 The discovery of contraband on the construction site and the identification of the person(s) responsible for the contraband shall be reported immediately to the Director.
- .3 Contractors should be vigilant with both their staff and the staff of their sub-contractors and suppliers that the discovery of contraband may result in cancellation of the security clearance of the affected employee. Serious infractions may result in the removal of the company from the Institution for the duration of the construction.
- .4 Presence of arms and ammunition in vehicles of contractors, sub-contractors and suppliers or employees of these will result in the immediate cancellation of security clearances for the driver of the vehicle.

17 SEARCHES

- .1 All vehicles and persons entering institutional property may be subject to search.
- .2 When the Director suspects, on reasonable grounds, that an employee of the Contractor is in possession of contraband, he may order that person to be searched.
- .3 All employees entering the Institution may be subject to screening of personal effects for traces of contraband drug residue.

18 ACCESS TO AND REMOVAL FROM INSTITUTIONAL PROPERTY

- .1 Construction personnel and commercial vehicles will not be admitted to the institution after normal working hours, unless approved by the Director.

19 MOVEMENT OF VEHICLES

- .1 Construction vehicles are not to leave the Institution until an inmate count is completed. Escorted commercial vehicles will be allowed to enter or leave the institution through the vehicle access gate during the following hours:
 - .1 AM: 0745 hrs. to 1100 hrs.
 - .2 PM: 1300hrs. to 1530 hrs.
- .2 The contractor will advise the Director twenty four (24) hours in advance to the arrival on the site of heavy equipment such as concrete trucks, cranes, etc.

- .3 Vehicles being loaded with soil or other debris, or any vehicle considered impossible to search, must be under continuous supervision by CSC staff or PWGSC construction escorts working under the authority of the Director.
- .4 Commercial vehicles will only be allowed access to institutional property when their contents are certified by the Contractor or his representative as being strictly necessary to the execution of the construction project.
- .5 Vehicles will be refused access to institutional property if, in the opinion of the Director, they contain any article which may jeopardize the security of the Institution. Arrange with Director for parking of contractor's vehicles at minimum security Institutions.
- .6 Private vehicles of construction employees will not be allowed within the security wall or fence of medium or maximum security Institutions without the authorization of the Director.
- .7 With the approval of the Director, certain equipment may be permitted to remain on the construction site overnight or over the weekend. This equipment must be securely locked, with the battery removed. The Director may require that the equipment be secured with a chain and padlock to another solid object.

20 MOVEMENT OF CONSTRUCTION EMPLOYEES ON INSTITUTIONAL PROPERTY

- .1 Subject to the requirements of good security, the Director will permit the Contractor and his employees as much freedom of action and movement as is possible.
- .2 However, notwithstanding paragraph above, the Director may:
 - .1 Prohibit or restrict access to any part of the Institution.
 - .2 Require that in certain areas of the Institution, either during the entire construction project or at certain intervals, construction employees only be allowed access when accompanied by a member of the CSC Security Staff or PWGSC Construction Escort Officer.
- .3 During the lunch and coffee/health breaks, all construction employees will remain within the construction site. Construction employees are not permitted to eat in the Institution cafeteria and dining room.

21 SURVEILLANCE AND INSPECTION

- .1 Construction activities and all related movement of personnel and vehicles will be subject to surveillance and inspection by CSC security staff members to ensure that established security requirements are met.
- .2 CSC staff members will ensure that an understanding of the need to carry out surveillance and inspections, as specified above, is established among construction employees and maintained throughout the construction project.

22 STOPPAGE OF WORK

- .1 The director may request at any time that the contractor, his employees, sub-contractors and their employees not enter or leave the work site immediately due to a security situation occurring within the Institution. The contractor's site supervisor will note the name of the staff member giving the instruction, the time of the request and obey the order as quickly as possible.
 - .2 The contractor shall advise the Departmental Representative of this interruption of the work within 24 hours.
-

23 CONTACT WITH INMATES

- .1 Unless specifically authorized, it is forbidden to come into contact with inmates, to talk with them, to receive objects from them or to give them objects. Any employee doing any of the above will be removed from the site and his security clearance revoked.
- .2 Digital cameras (or any other type) are not allowed on CSC property.
- .3 Notwithstanding the above paragraph, if the director approves of the use of cameras, it is strictly forbidden to take pictures of inmates, of CSC staff members or of any part of the Institution other than those required as part of this contract.

24 COMPLETION OF CONSTRUCTION PROJECT

- .1 Upon completion of the construction project or, when applicable, the takeover of a facility, the Contractor shall remove all remaining construction material, tools and equipment that are not specified to remain in the Institution as part of the construction contract.

END OF SECTION

1. REFERENCES

- .1 Government of Canada.
 - .1 Canada Labour Code - Part II
 - .2 Canada Occupational Health and Safety Regulations.
- .2 National Building Code of Canada (NBC):
 - .1 Part 8, Safety Measures at Construction and Demolition Sites.
- .3 Canadian Standards Association (CSA):
 - .1 CSA Z797-2009, Code of Practice for Access Scaffold.
 - .2 CSA S269.1-1975 (R2003), Falsework for Construction Purposes.
 - .3 CSA-S350-M1980, Code of Practice for Safety in Demolition of Structures.
- .4 Fire Protection Engineering Services (HRSDC):
 - .1 FCC No. 301, Standard for Construction Operations.
 - .2 FCC No. 302, Standard for Welding and Cutting.
- .5 American National Standards Institute (ANSI):
 - .1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.
- .6 Province of British Columbia:
 - .1 Workers Compensation Act Part 3 - Occupational Health and Safety.
 - .2 Occupational Health and Safety Regulation.

2. RELATED SECTIONS

- .1 Refer to the following current NMS sections as required:
 - .1 Submittals procedures: Section 01 01 50
 - .2 Demolition and Removal Work: Section 02 41 19

3. WORKERS' COMPENSATION BOARD COVERAGE

- .1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.
- .2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

4. COMPLIANCE WITH REGULATIONS

- .1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.
 - .2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.
-

5. SUBMITTALS

- .1 Make submittals in accordance with Section 01 01 50.
- .2 Work effected by submittal shall not proceed until review is complete.
- .3 Submit the following:
 - .1 Health and Safety Plan.
 - .2 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.
 - .3 Copies of incident and accident reports.
 - .4 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
 - .5 Emergency procedures.
- .4 The Departmental Representative will review the Contractor's site-specific project Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 5 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative
- .5 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.
- .6 Submission of the Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:
 - .1 Be construed to imply approval by the Departmental Representative.
 - .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.
 - .3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

6. RESPONSIBILITY

- .1 Assume responsibility as the Prime Contractor for work under this contract.
 - .2 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.
 - .3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial, Territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
-

7. HEALTH AND SAFETY COORDINATOR

- .1 The Health and Safety Coordinator must:
 - .1 Be responsible for completing all health and safety training, and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.
 - .2 Be responsible for implementing, daily enforcing, and monitoring the site-specific Health and Safety Plan.
 - .3 Be on site during execution of work.

8. GENERAL CONDITIONS

- .1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
- .2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.
 - .1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.
 - .2 Secure site at night time or provide security guard as deemed necessary to protect site against entry.

9. PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
 - .1 Inmates of the Institution.

10. REGULATORY REQUIREMENTS

- .1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.
- .2 In event of conflict between any provision of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.

11. WORK PERMITS

- .1 Obtain specialty permits related to project before start of work.

12. FILING OF NOTICE

- .1 The Contractor is to complete and submit a Notice of Project as required by Provincial authorities.
-

13. HEALTH AND SAFETY PLAN

- .1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.
 - .2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:
 - .1 Primary requirements:
 - .1 Contractor's safety policy.
 - .2 Identification of applicable compliance obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.
 - .4 General safety rules for project.
 - .5 Job-specific safe work, procedures.
 - .6 Inspection policy and procedures.
 - .7 Incident reporting and investigation policy and procedures.
 - .8 Occupational Health and Safety Committee/Representative procedures.
 - .9 Occupational Health and Safety meetings.
 - .10 Occupational Health and Safety communications and record keeping procedures.
 - .2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.
 - .3 List hazardous materials to be brought on site as required by work.
 - .4 Indicate Engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
 - .5 Identify personal protective equipment (PPE) to be used by workers.
 - .6 Identify personnel and alternates responsible for site safety and health.
 - .7 Identify personnel training requirements and training plan, including site orientation for new workers.
 - .3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.
 - .4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.
 - .5 Departmental Representative's review: the review of Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.
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14. EMERGENCY PROCEDURES

- .1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:
 - .1 Designated personnel from own company.
 - .2 Regulatory agencies applicable to work and as per legislated regulations.
 - .3 Local emergency resources.
 - .4 Departmental Representative and PWGSC site staff.
- .2 Include the following provisions in the emergency procedures:
 - .1 Notify workers and the first-aid attendant, of the nature and location of the emergency.
 - .2 Evacuate all workers safely.
 - .3 Check and confirm the safe evacuation of all workers.
 - .4 Notify the fire department or other emergency responders.
 - .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
 - .6 Notify Departmental Representative and PWGSC site staff.
- .3 Provide written rescue/evacuation procedures as required for, but not limited to:
 - .1 Work at high angles.
 - .2 Work in confined spaces or where there is a risk of entrapment.
 - .3 Work with hazardous substances.
 - .4 Underground work.
 - .5 Work on, over, under and adjacent to water.
 - .6 Workplaces where there are persons who require physical assistance to be moved.
- .4 Design and mark emergency exit routes to provide quick and unimpeded exit.
- .5 Revise and update emergency procedures as required, and re-submit to the Departmental Representative.

15. HAZARDOUS PRODUCTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labeling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.
 - .2 Where use of hazardous and toxic products cannot be avoided:
 - .1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as per Section 01 01 50.
 - .2 In conjunction with Departmental Representative, schedule to carry out work during "off hours" when tenants have left the building.
 - .3 Provide adequate means of ventilation.
-

16. REMOVAL OF LEAD CONTAINING PAINTS

- .1 All paints containing TCLP lead concentrations above 5 ppm are classified as hazardous.
- .2 Carry out demolition activities involving lead-containing paints in accordance with applicable Provincial or Territorial regulations.

17. ELECTRICAL SAFETY REQUIREMENTS

- .1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.
 - .1 Before undertaking any work, coordinate required energizing and de-energizing of new and existing circuits with Departmental Representative.
 - .2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel site.

18. ELECTRICAL LOCKOUT

- .1 Develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.
- .2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Departmental Representative.
- .3 Keep the documents and lockout tags at the site and list in a log book for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

19. OVERLOADING

- .1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

20. SCAFFOLDING

- .1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA-Z797-2009 and B.C. Occupational Health and Safety Regulations.

21. POWDER-ACTIVATED DEVICES

- .1 Use powder-actuated devices in accordance with ANSI A10.3 only after receipt of written permission from the Departmental Representative.
-

22. FIRE SAFETY AND HOT WORK

- .1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.
- .2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

23. FIRE SAFETY REQUIREMENTS

- .1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

24. FIRE PROTECTION AND ALARM SYSTEM

- .1 Fire protection and alarm systems shall not be:
 - .1 Obstructed.
 - .2 Shut off.
 - .3 Left inactive at the end of a working day or shift.
- .2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.
- .3 Be responsible/liable for costs incurred from the fire department, the building owner and the tenants, resulting from false alarms.

25. UNFORESEEN HAZARDS

- .1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and advise the Departmental Representative verbally and in writing.

26. POSTED DOCUMENTS

- .1 Post legible versions of the following documents on site:
 - .1 Health and Safety Plan.
 - .2 Sequence of work.
 - .3 Emergency procedures.
 - .4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshaling station, and the emergency transportation provisions.
 - .5 Notice of Project.
 - .6 Floor plans or site plans.
 - .7 Notice as to where a copy of the Workers' Compensation Act and Regulations
-

- are available on the work site for review by employees and workers.
- .8 Workplace Hazardous Materials Information System (WHMIS) documents.
 - .9 Material Safety Data Sheets (MSDS).
 - .10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.
- .2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.
 - .3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

27. MEETINGS

- .1 **Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.**

28. CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.
- .3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a "stop work order".

END OF SECTION

1 General**1.1 RELATED WORK**

- .1 Section 01 01 50 - General Instructions: Hours and schedule of work, dust screens, waste management and safety barriers.
- .2 Security Requirements - Section 01 14 10.
- .3 Section 01 35 33 - Health and Safety.

1.2 REGULATORY REQUIREMENTS

- .1 Comply with WCB Industrial Health and Safety Regulations and Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.3 REFERENCES

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

1.4 EXISTING CONDITIONS

- .1 Take over areas where demolition/removal work is indicated based on the condition at time of examination prior to tendering.
- .2 Should unidentified Asbestos Containing Materials (ACM) or other substance encountered in course of removal work or cutting and boring activities, stop work, take preventative measures, and notify Departmental Representative immediately. Do not proceed until written instructions have been received from the Departmental Representative.
- .3 Unidentified ACM removal is additional work and will be paid either as an extra to the contract price in accordance with General Conditions, or removed under a separate contract by the Departmental Representative.
- .4 The existing building will be occupied and operational by the Institution during work of this Contract. Maintain building access around protected work areas.

1.5 PROTECTION

- .1 Prevent movement, settlement or damage of services and adjacent parts of existing walls, ceilings.

1.6 DEFINITIONS

- .1 Alternate Disposal: reuse and recycling of materials by designated facility, user or receiving organization which has valid Certificate of Approval to operate. Alternative to landfill disposal.
-

PRINCIPAL ENTRANCE RENOVATIONS

- .2 Hazardous Containing Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, including but not limited to: corrosive agents, flammable substances, asbestos containing materials, or other material that can endanger human health, well being or environment if handled improperly.
- .3 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .4 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form.
 - .1 Recycling does not include burning, incinerating, or thermally destroying waste.
- .5 Reuse: repeated use of product in same form but not necessarily for same purpose.
- .6 Salvage: removal of materials from deconstruction/disassembly for purpose of reuse or recycling offsite.
- .7 Source Separation: acts of keeping different types of waste materials separate, beginning from first time they became waste.

1.7 ENVIRONMENTAL PROTECTION

- .1 Do not dispose of waste or volatile materials into watercourses, storm or sanitary sewers.
- .2 Employ reasonable means necessary to protect salvaged materials from vandalism, theft, adverse weather, or inadvertent damage.
- .3 Organize site and workers in manner which promotes efficient flow of materials through disassembly, processing, stockpiling, and removal.
- .4 Remove and transport toxic or dangerous materials from site in accordance with provincial authority.

2 Products N/A**3 Execution****3.1 SITE VERIFICATION OF CONDITIONS**

- .1 Employ necessary means to assess site conditions to determine quantity and locations of hazardous materials.
 - .2 Investigate site and building to determine removal work, processing and storage logistics required prior to beginning of Work.
 - .3 Dismantle and remove items as indicated on drawings or directed by Departmental Representative and dispose of removed material off property in accordance with local authorities having jurisdiction and in accordance with Section 01 01 50 General Instructions - Construction Waste Management and Disposal clause.
-

PRINCIPAL ENTRANCE RENOVATIONS

- .4 Inspect site with Departmental Representative to verify extent and location of items designated for removal and disposal and items to remain .
- .5 Locate and protect building systems. Preserve active systems in operating condition, serving remainder of site and building.

3.2 PREPARATION

- .1 Provide scanning of concrete floors and walls in area of drilling, using approved sonar equipment, to locate any conduit, or rebar etc. Submit 2D and 3D pictures to encountered obstructions.
- .2 Conform to schedule for all removal work.

3.3 REMOVAL WORK

- .1 At end of each day's work, leave work in safe and secure condition, clean up and remove debris and materials not being reinstalled. Remove all debris from site daily.

3.4 REMOVAL FROM SITE

- .1 Dispose of removed materials and equipment not reusable or salvageable to approved disposal facilities in accordance with applicable regulations.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Comply with requirements of this Section when performing the removal & disposal work of materials noted within the attached **Appendix 1 – Hazardous Materials Survey – Principal Entrance Building William Head Institution Metchosin BC**. Work includes minor renovations at existing walls and doors (lead in paint); concrete dust (silica).

1.2 SECTION INCLUDES

- .1 Requirements and procedures for Hazardous Materials Abatement & Removal.

1.3 RELATED SECTIONS

- .1 Section 01 35 33 - Health and Safety Requirements.

1.4 REFERENCES

- .1 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .2 Transport Canada (TC).
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.5 DEFINITIONS

- .1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Amended Water: water with non-ionic surfactant wetting agent added to reduce water tension to allow thorough wetting of fibres.
- .3 Asbestos-Containing Materials (ACMs): materials identified under Existing Conditions including fallen materials and settled dust. Includes concrete dust when drilling.
- .4 Hazardous Materials Work Area: area where work takes place, which will, or may, disturb ACMs.
- .5 Authorized Visitors: Engineers, Consultants or designated representatives, and representatives of regulatory agencies.
- .6 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .7 Occupied Area: area of the building that is outside Hazardous Materials Work Area.

- .8 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required providing protection and isolation.
- .9 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for work.

1.6 REGULATORY REQUIRMENTS

- .1 Comply with Federal, Provincial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications the more stringent requirement applies. Comply with regulations in effect at time work is performed.

1.7 HAZARDOUS MATERIAL ASSESSMENT

- .1 Refer to Appendix A Pre-Renovation Hazardous Building Materials Assessment – William Head Institution Principal Entrance Metchosin BC

1.8 SUBMITTALS

- .1 Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of Hazardous Materials-containing waste in accordance with requirements of authority having jurisdiction.
- .2 Submit copy of “Hazardous/Special Waste Disposal request Form” provided to provincial authorities, in accordance with the provincial “Asbestos Policy Directive”
- .3 Submit proof of Contractor's Asbestos Liability Insurance.
- .4 Submit to Departmental Representative necessary permits for transportation and disposal of Hazardous Materials-containing waste and proof that Hazardous Materials-containing waste has been received and properly disposed.

1.9 INSTRUCTION AND TRAINING

- .1 .1 Before commencing work, provide to Engineer satisfactory proof that every worker has had instruction and training in hazards of Hazardous Materials exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing. Renovation space to be provided with HEPA filter air filtration during work.
- .2 IP+C Dust Control Logistic Plan to be in place throughout construction phase. (Inspection Control Plan for hording). Contractor to be CSA approved for hording. Maintain negative air pressure within the containment area.
- .3 Instruction and training related to respirators includes, at a minimum:
 - .1 Fitting of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Disinfecting of equipment.

- .4 Limitations of equipment.
- .4 Instruction and training must be provided by a competent, qualified person.

1.10 WORKER PROTECTION

- .1 Protective equipment and clothing to be worn by workers while in the Hazardous Materials Work Area include:
 - .1 Non-powered reusable or replaceable filter-type respirator equipped with HEPA filter cartridges, personally issued to the worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to the Provincial Authority having jurisdiction.
 - .2 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres, consisting of full-body covering including head covering with snug-fitting cuffs at wrists, ankles, and neck.
- .2 Eating, drinking, chewing, and smoking are not permitted in Hazardous Materials Work Area.
- .3 Before leaving the Hazardous Materials Work Area , dispose of protective clothing as contaminated waste as specified.
- .4 Ensure workers wash hands and face when leaving Hazardous Materials Work Area. Facilities for washing are located as indicated on drawings.
- .5 Ensure that no person required to enter an Hazardous Materials Work Area has facial hair that affects the seal between the respirator and the face.

1.11 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications, more stringent requirement applies. Comply with regulations in effect at time Work is performed.
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements.
- .3 Departmental Representative to retain a qualified consultant to specify, inspect and verify successful removal or disturbance of hazardous material.

1.12 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Waste Management Plan.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

- .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Separate for reuse and recycling and place in designated containers Steel Metal Plastic waste in accordance with Waste Management Plan.
- .5 Place materials defined as hazardous or toxic in designated containers.
- .6 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .7 Fold up metal banding, flatten and place in designated area for recycling.
- .8 Disposal of Hazardous Materials waste generated by removal activities must comply with Federal, Provincial, and Municipal regulations. Dispose of Hazardous Materials waste in sealed double thickness 6 ml bags or leak proof drums. Label containers with appropriate warning labels.
- .9 Provide manifests describing and listing waste created. Transport containers by approved means to licence landfill for burial.

1.13 EXISTING CONDITIONS

- .1 During tender evaluate existing site conditions.

1.14 SCHEDULING

- .1 Not later than ten (10) days before beginning Work on this Project notify following in writing:
 - .1 Regional Office of WorkSafeBC.
- .2 Inform sub-trades of presence of Hazardous Materials-containing materials identified in Existing Conditions.
- .3 Submit to Departmental Representative copy of notifications prior to start of Work.

1.15 OWNER'S INSTRUCTIONS

- .1 Before beginning Work, provide Departmental Representative satisfactory proof that every worker has received instruction and training in hazards of Hazardous Materials exposure, personal hygiene and work practices, and use, cleaning, and disposal of respirators and protective clothing.

Part 2 Products

2.1 MATERIALS

- .1 Drop Sheets:
 - .1 Polyethylene: 0.15 mm thick.

- .2 FR polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.
- .2 Hoarding Wall:
 - .1 Wood stud framing: 2"x4" studs
 - .2 Plywood sheeting: 3/8" plywood (4'x8'); exterior white primer or white polyethylene
 - .3 Polyethylene: 0.15 mm thick; white
- .3 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in a concentration to provide thorough wetting of Hazardous Materials-containing material.
- .4 Waste Containers: contain waste in two separate containers.
 - .1 Inner container: 0.15 mm thick sealable polyethylene waste bag.
 - .2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise, outer container may be sealable metal or fibre type or second 0.15 mm thick sealable polyethylene bag.
 - .3 Labelling requirements: affix pre-printed cautionary asbestos warning in both official languages that is visible when ready for removal to disposal site.

Part 3 Execution

3.1 PROCEDURES

- .1 Do deconstruction in accordance with Section 01 35 33 - Health and Safety Requirements.
- .2 Before beginning Work, isolate Hazardous Materials Work Area using, minimum, pre-printed cautionary Hazardous Materials warning signs in both official languages that are visible at access routes to Hazardous Materials Work Area.
 - .1 Remove visible dust from surfaces in the work area where dust is likely to be disturbed during course of work.
 - .2 Use HEPA vacuum or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate.
 - .3 Do not use compressed air to clean up or remove dust from any surface.
- .3 Prevent spread of dust from Hazardous Materials Work Area using measures appropriate to work to be done.
- .4 Wet materials containing Hazardous Materials to be cut, ground, abraded, scraped, drilled, or otherwise disturbed unless wetting creates hazard or causes damage.
 - .1 Use garden reservoir type low - velocity fine - mist sprayer.
 - .2 Perform Work to reduce dust creation to lowest levels practicable.
 - .3 Work will be subject to visual inspection and air monitoring.
 - .4 Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.

- .5 Clean-Up:
- .1 Frequently during Work and immediately after completion of Work, clean up dust and Hazardous Materials-containing waste using HEPA vacuum or by damp mopping.
 - .2 Place dust and Hazardous Materials-containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as Hazardous Materials waste; wet and fold these items to contain dust, and then place in plastic bags.
 - .3 Clean exterior of each waste-filled bag using damp cloths or HEPA vacuum and place in second clean waste bag immediately prior to removal from Hazardous Materials Work Area.
 - .4 Seal waste bags and remove from site. Dispose of in accordance with requirements of Provincial and Federal Authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and those guidelines and regulations for Hazardous Materials disposal are followed.
 - .5 Perform final thorough clean-up of Work areas and adjacent areas affected by Work using HEPA vacuum.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 0330001 Cast-in-Place Concrete Short Form.

1.2 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 No measurement will be made under this Section.
 - .1 Include reinforcement costs in items of concrete work in Section 03 30 001 - Cast-In-Place Concrete.

1.3 REFERENCES

- .1 American Concrete Institute (ACI)
 - .1 SP-66-04, ACI Detailing Manual 2004.
- .2 ASTM International
 - .1 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - .2 ASTM A143/A143M-07, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .3 ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - .4 ASTM A775/A775M-07b, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
- .3 CSA International
 - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.
 - .3 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA-G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .6 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

1.5 QUALITY ASSURANCE

- .1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.
 - .1 Mill Test Report: upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.
 - .2 Upon request, submit in writing to Departmental Representative proposed source of reinforcement material to be supplied.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
- .4 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 SP-66 Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
 - .1 SP-66 unless indicated otherwise.
- .2 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Departmental Representative weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 SOURCE QUALITY CONTROL

- .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.
- .2 Upon request inform Departmental Representative of proposed source of material to be supplied.

Part 3 Execution

3.1 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.
- .2 When field bending is authorized, bend without heat, applying slow and steady pressure.
- .3 Replace bars, which develop cracks or splits.

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel in accordance with CSA-A23.1/A23.2.
- .2 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .3 Ensure cover to reinforcement is maintained during concrete pour.

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 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 060899 Rough Carpentry
- .2 Section 051223 Structural Steel for Buildings.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - .2 ASTM D260-86(2001), Standard Specification for Boiled Linseed Oil.
 - .3 ASTM D1751-04, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non extruding and Resilient Bituminous Types).
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.
- .3 CSA International
 - .1 CSA-A23.1/A23.2-2004, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .3 CAN/CSA-G30.18-M92(R2002), Billet-Steel Bars for Concrete Reinforcement.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: convene pre-installation meeting one week prior to beginning concrete works.
 - .1 Ensure key personnel attend.
 - .2 Verify project requirements.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide testing results for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.
- .3 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.

1.5 QUALITY ASSURANCE

- .1 Provide to Departmental Representative 4 weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete.

- .1 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements.
- .2 Sustainability Standards Certification:
 - .1 Construction Waste Management: provide copy of plan.
 - .2 Recycled Content:
 - .1 Provide listing of recycled content products used.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements:
 - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
 - .2 Deviations to be submitted for review by the Departmental Representative.
 - .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.
 - .3 Packaging Waste Management: in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 DESIGN CRITERIA

- .1 Alternative 1 – Performance: to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

2.2 PERFORMANCE CRITERIA

- .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

2.3 MATERIALS

- .1 Cement: to CSA A3001, Type GU.
- .2 Blended hydraulic cement: Type GUB to CSA A3001.
- .3 Supplementary cementing materials: with minimum 20% fly ash replacement, by mass of total cementitious materials to CSA A3001.
- .4 Water: to CSA A23.1/A23.2.
- .5 Reinforcing bars: to CAN/CSA-G30.18, Grade 400.
- .6 Welded steel wire fabric: to ASTM A185.
- .7 Premoulded joint filler:

- .1 Bituminous impregnated fibreboard: to ASTM D1751.
- .8 Joint sealer/filler: grey to CAN/CGSB-19.24, Type 1, Class B.
- .9 Sealer: boiled linseed oil to ASTM D260, mixed with mineral spirits 1:1.
- .10 Other concrete materials: to CSA A23.1/A23.2.
- .11 Adhesive set anchor rods:
 - .1 Anchor rods: to ASTM A307
 - .2 Anchoring Adhesive: two-component 100% solids based epoxy system supplied in manufacturer's standard side by side cartridge and dispensed through a static mixing nozzle supplied by manufacturer. Epoxy to meet the minimum requirements of ASTM C-881 Specification for type I, II, IV, and V, grade 3, class B and C must develop a minimum 90 MPa compressive yield strength after a seven day cure. Epoxy to have a heat deflection temperature of 58 degrees Celcius.

2.4 MIXES

- .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in PART 3 - VERIFICATION.
 - .2 Provide concrete mix to meet following plastic state requirements:
 - .1 Concrete mixes shall be proportioned to provide a workable mix suitable for the complexity of that class of work, without segregation or bleeding.
 - .2 Proportion normal density concrete in accordance with CAN/CSA-A23.1 Alternative 1, for the specified exposure class, to give the properties stipulated in this section for each concrete type.
 - .3 Slump shall be measured at time and point of discharge. Slump indicated is without superplasticizer. Concrete shall be placed at the lowest possible slump compatible with conditions of placement.
 - .3 Provide concrete mix to meet following hard state requirements for exterior slab on grade:
 - .1 Durability and class of exposure: C-2
 - .2 Compressive strength at 28 days age: 32 MPa minimum.
 - .3 Intended application: Exterior slab on grade .
 - .4 Aggregate size 19mm maximum.
 - .5 Maximum slump =75mm
 - .4 Provide concrete mix to meet following hard state requirements for interior slab on grade:
 - .1 Durability and class of exposure: N
 - .2 Compressive strength at 28 days age: 25MPa minimum.
 - .3 Intended application: Interior slab on grade .
 - .4 Aggregate size 19mm maximum.

.5 Maximum slump =75mm

Part 3 Execution

3.1 PREPARATION

- .1 Provide Departmental Representative 24 hours notice before each concrete pour.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of rehandling, and without damage to existing structure or Work.
- .4 Protect previous Work from staining.
- .5 Clean and remove stains prior to application of concrete finishes.

3.2 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.
- .2 Sleeves and inserts:
 - .1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required to be built-in.
 - .2 Sleeves and openings greater than 100 mm x 100 mm not indicated, must be reviewed by Departmental Representative.

3.3 FINISHES

- .1 Formed surfaces exposed to view: sack rubbed finish in accordance with CSA A23.1/A23.2.
- .2 Interior floor slabs requiring smooth surface: initial finishing operations followed by final finishing comprising mechanical floating and steel trowelling as specified in CSA A23.1/A23.2 to produce hard, smooth, dense trowelled surface free from blemishes.
- .3 Floor slabs to receive mortar bed: screed to correct grade to provide broomed texture.
- .4 Pavements, walks, curbs and exposed site concrete:
 - .1 Screed to plane surfaces and use wood floats.
 - .2 Provide round edges and joint spacings using standard tools.
 - .3 Trowel smooth to provide lightly brushed non-slip finish.

3.4 CONTROL JOINTS

- .1 Control joints in slabs on grade at locations indicated, to CSA A23.1/A23.2 and install specified joint sealer/filler.

3.5 EXPANSION AND ISOLATION JOINTS

- .1 Install premoulded joint filler in expansion and isolation joints full depth of slab flush with finished surface to CSA A23.1/A23.2.

3.6 CURING

- .1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and to CSA A23.1/A23.2.

3.7 SEALING APPLICATION

- .1 After curing is complete, apply two even coats of linseed oil mixture to clean dry surfaces, each at 8 m²/L. Allow first coat to dry before applying second coat.

3.8 SITE TOLERANCES

- .1 Concrete floor slab finishing tolerance to CSA A23.1/A23.2.

3.9 FIELD QUALITY CONTROL

- .1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory designated and paid for by Departmental Representative. Accelerated test methods will apply.

3.10 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Use trigger operated spray nozzles for water hoses.
- .3 Designate cleaning area for tools to limit water use and runoff.
- .4 Cleaning of concrete equipment to be done in accordance with Section 01 35 43 Environmental Procedures.
- .5 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Divert unused concrete materials from landfill to local facility after receipt of written approval from Departmental Representative.
 - .2 Provide appropriate area on job site where concrete trucks and be safely washed.
 - .3 Divert admixtures and additive materials from landfill to approved official hazardous material collections site after receipt of written approval from Departmental Representative.
 - .4 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 061753 Shop Fabricated Trusses
- .2 Section 060899 Rough Carpentry
- .3 Section 0330001 Cast-in-Place Concrete Short Form

1.2 REFERENCES

- .1 ASTM International Inc.
 - .1 ASTM A36/A36M-08, Standard Specification for Carbon Structural Steel.
 - .2 ASTM A193/A193M-08, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature or High-Pressure Service and Other Special Purpose Applications.
 - .3 ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .4 ASTM A325-07a, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - .5 ASTM A325M-[08], Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength Metric.
 - .6 ASTM A490M-04ae, Standard Specification for High-Strength Steel Structural Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints Metric.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-85.10-99, Protective Coatings for Metals.
- .3 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturers Association (CPMA).
 - .1 Handbook of the Canadian Institute of Steel Construction.
 - .2 CISC/CPMA Standard 2-75, Quick-Drying Primer for use on Structural Steel.
- .4 Canadian Standards Association (CSA International)
 - .1 CSA G40.20/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA-S16-01(R2007), Limit States Design of Steel Structures.
 - .4 CAN/CSA-S136-07, North American Specifications for the Design of Cold Formed Steel Structural Members.
 - .5 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel.
 - .6 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.
 - .7 CSA W55.3-1965(R2003), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.

- .8 CSA W59-03, Welded Steel Construction (Metal Arc Welding).
- .5 Master Painters Institute
 - .1 MPI-INT 5.1-08, Structural Steel and Metal Fabrications.
 - .2 MPI-EXT 5.1-08, Structural Steel and Metal Fabrications.
- .6 The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineers (NACE) International
 - .1 NACE No. 3/SSPC SP-6-06, Commercial Blast Cleaning.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Provide shop drawings showing structural steel assemblies, components, and connections
- .3 Fabrication drawings:
 - .1 Submit fabrication drawings showing designed assemblies, components and connections.
- .4 Source Quality Control Submittals:
 - .1 Submit 4 copies of mill test reports 4 weeks prior to fabrication of structural steel.
 - .1 Mill test reports to show chemical and physical properties and other details of steel to be incorporated in project.
 - .2 Provide mill test reports certified by metallurgists qualified to practice in Province of British Columbia, Canada.
- .5 Fabricator Reports:
 - .1 Provide structural steel fabricator's affidavit stating that materials and products used in fabrication conform to applicable material and products standards specified and indicated.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials in manufacturer's original, undamaged containers with identification labels intact.
- .3 Packaging Waste Management: remove for reuse and return by manufacturer of all packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Structural steel: to CSA-G40.20/G40.21
 - .1 W shapes and HSS to Grade 350W.
 - .2 Other rolled sections to grade 300W.
- .2 Anchor bolts: to ASTM A307.
- .3 Bolts, nuts and washers: to ASTM A325M.
- .4 Welding materials: to CSA W48 Series and certified by Canadian Welding Bureau.
- .5 Shop paint primer: to CISC/CPMA2-75.
- .6 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 600 g/m².

2.2 FABRICATION

- .1 Fabricate structural steel in accordance with CAN/CSA-S16 and in accordance with reviewed shop drawings.
- .2 Continuously seal members by continuous welds where indicated. Grind smooth.
- .3 Provide holes in flanges for attachment of wood nailers where indicated on drawings.

2.3 SHOP PAINTING

- .1 Clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16, MPI INT 5.1, MPI EXT 5.1, except where members to be encased in concrete.
- .2 Clean members, remove loose mill scale, rust, oil, dirt and foreign matter. Prepare surface according to NACE No.3/SSPC-SP-6.
- .3 Apply one coat of primer in shop to steel surfaces except:
 - .1 Surfaces to be encased in concrete.
 - .2 Surfaces to be hot dip galvanized.
 - .3 Surfaces to receive field installed stud shear connections.
 - .4 Surfaces and edges to be field welded.
 - .5 Faying surfaces of slip-critical connections.
 - .6 Below grade surfaces in contact with soil.
- .4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5 degrees C.
- .5 Maintain dry condition and 5 degrees C minimum temperature until paint is thoroughly dry.
- .6 Strip paint from bolts, nuts, sharp edges and corners before prime coat is dry.

Part 3 Execution

3.1 APPLICATION

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

3.2 GENERAL

- .1 Structural steel work: in accordance with CAN/CSA-S16.
- .2 Welding: in accordance with CSA W59.
- .3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.
- .4 All steel protruding through the building envelope to be hot dip galvanized.

3.3 CONNECTION TO EXISTING WORK

- .1 Verify dimensions and condition of existing work, report discrepancies and potential problem areas to Departmental Representative for direction before commencing fabrication.

3.4 MARKING

- .1 Mark materials in accordance with CSA G40.20/G40.21. Do not use die stamping. When steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection.
- .2 Match marking: shop mark bearing assemblies and splices for fit and match.

3.5 ERECTION

- .1 Erect structural steel, as indicated and in accordance with CAN/CSA-S16 and in accordance with erection drawings.
- .2 Field cutting or altering structural members: to approval of Departmental Representative.
- .3 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.
- .4 Continuously seal members by continuous welds where indicated. Grind smooth.

3.6 FIELD QUALITY CONTROL

- .1 Where required, Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Departmental Representative.
- .2 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Departmental Representative.
- .3 Submit test reports to Departmental Representative within 1 weeks of completion of inspection.
- .4 Departmental Representative will pay costs of tests as specified in Section 01 29 83 - Payment Procedures for Testing Laboratory Services.

3.7 FIELD PAINTING

- .1 Paint in accordance with Section 09 91 23 - Interior Painting.
 - .1 Touch up damaged surfaces and surfaces without shop coat with primer to NACE No.3/SSPC-SP-6 except as specified otherwise. Apply in accordance: MPI Architectural Painting Specification Manual.

3.8 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 051223 Structural Steel for Buildings
- .2 Section 061753 Shop Fabricated Trusses

1.2 REFERENCES

- .1 CSA International
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
 - .2 CSA O121-08, Douglas Fir Plywood.
 - .3 CSA O141-05(R2009), Softwood Lumber.
 - .4 CSA O151-09, Canadian Softwood Plywood.
 - .5 CAN/CSA-O325.0-07, Construction Sheathing.
 - .6 CAN/CSA-Z809-08, Sustainable Forest Management.
- .2 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .3 Green Seal Environmental Standards (GS)
 - .1 GS-11-11, Paints and Coatings.
- .4 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2010.
- .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2011, Architectural Coatings.
- .6 Sustainable Forestry Initiative (SFI)
 - .1 SFI-2010-2014 Standard.

1.3 ACTION AND INFORMATIONAL 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 rough carpentry work and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Low-Emitting Materials:
 - .1 Submit listing of paints and coatings used in building, comply with VOC and chemical component limits or restriction requirements.

1.4 MAINTENANCE MATERIALS SUBMITTALS

- .1 Extra Stock Materials:
 - .1 Provide electrical equipment backboards for mounting electrical equipment as indicated. Use 19 mm thick plywood on 19 x 38 mm furring around spacing, perimeter and at maximum 300 mm intermediate

1.5 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.
- .3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground in a dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wood from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal

Part 2 Products

2.1 MATERIALS

- .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
 - .1 to CSA O86-09 and CSA O141-05 species and stress group specified or better, to National Lumber Grades Authority, Standard Grading Rules
- .2 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
 - .1 Board sizes: "Standard" or better grade.
 - .2 Dimension sizes: "Standard" light framing or better grade.
 - .3 Post and timbers sizes: "Standard" or better grade.
- .3 Panel Materials:

- .1 Douglas fir plywood (DFP): CSA O151-04, exterior sheathing grade
- .2 Plywood, OSB and wood based composite panels: to CAN/CSA-O325.
 - .1 Urea-formaldehyde free.
- .4 Wood Preservative: ACQ (Ammoniacal Copper Quarternary) to CSA O80 Series. Pressure treated wood products shall bear the stamp of the Canadian Wood Preservers Bureau (CWPB).
- .5 Primers, Paints, and Coatings: in accordance with manufacturer's recommendations for surface conditions:
 - .1 Primer: VOC limit 150 g/L maximum to GS-11.
 - .2 Paint: VOC limit 50 g/L maximum to GS-11
 - .3 Coating: VOC limit 300 g/L maximum to GS-11.

2.2 ACCESSORIES

- .1 Fasteners: to CAN/CSA-G164, for exterior work.
- .2 Nails, spikes and staples: to CSA B111.
- .3 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .4 Lag screws: CSAB34, hot dip galvanized to CSA G164.
- .5 Bolts, nuts, washers and Drift Pins: ASTM A307, Hot dipped galvanized for exterior locations
- .6 Proprietary fasteners: toggle bolts, expansion shields, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.
- .7 Joist hangers: minimum 1 mm thick sheet steel, galvanized ZF001 coating designation.
- .8 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, sheet metal, formed to prevent dishing. Bell or cup shapes not acceptable.
- .9 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, extruded 6063-T6 aluminum alloy type approved by Departmental Representative.
- .10 Fastener Finishes:
 - .1 Galvanizing: to ASTM A123/A123M, use galvanized fasteners for exterior work, pressure-preservative, or fire-retardant treated lumber.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for rough carpentry installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.

- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

- .1 Treat surfaces of material with wood preservative, before installation.
- .2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and 1 minute soak on plywood.
- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
- .4 Treat material as follows :
 - .1 Wood cants, fascia backing, curbs, nailers, sleepers on roof deck.
 - .2 Wood furring on outside surface of exterior masonry and concrete walls.
 - .3 Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.

3.3 INSTALLATION

- .1 Comply with requirements of NBC, supplemented by the following paragraphs.
- .2 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required.
- .3 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .4 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .5 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using steel fasteners, galvanized when outside the building envelope.
- .6 Install wood backing, dressed, tapered and recessed slightly below top surface of roof insulation for roof hopper.
- .7 Install sleepers as indicated.
- .8 Use caution when working with particle board. Use dust collectors and high quality respirator masks.
- .9 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .10 Countersink bolts where necessary to provide clearance for other work.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 060899 Rough Carpentry.
- .2 Section 051223 Structural Steel for Buildings

1.2 REFERENCES

- .1 CSA International
 - .1 CAN/CSA O80 Series-08, Wood Preservation.
 - .2 CSA O86 Consolidation-09, Engineering Design in Wood.
 - .3 CSA O141-05(R2009), Softwood Lumber.
 - .4 CSA S307-M1980(R2001), Load Test Procedure for Wood Roof Trusses for Houses and Small Buildings.
 - .5 CSA S347-99(R2009), Method of Test for Evaluation of Truss Plates Used in Lumber Joints.
 - .6 CSA W47.1-09, Certification of Companies for Fusion Welding of Steel.
 - .7 CAN/CSA-Z809-08, Sustainable Forest Management.
- .2 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .3 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2010.
- .4 National Research Council (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC)
 - .1 CCMC-[on-line edition], Registry of Product Evaluations.
- .5 Truss Plate Institute of Canada (TPIC)
 - .1 TPIC - 2007, Truss Design Procedures and Specifications for Light Metal Plate Connected Wood Trusses (Limit States Design).
- .6 Sustainable Forestry Initiative (SFI)
 - .1 SFI-2010-2014 Standard.

1.3 ACTION AND INFORMATIONAL 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 wood trusses and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:

- .1 Submit drawings stamped and signed by professional engineer registered or licensed in British Columbia, Canada.
- .2 Include on drawings:
 - .1 Each shop drawing submission showing connection details.
 - .2 Indicate TPIC Truss Design Procedure and CSA O86 Engineering Design in Wood and specific CCMC Product Registry number of the truss plates
 - .3 Indicate species, sizes, and stress grades of lumber used as truss members. Show pitch, span, camber, configuration and spacing of trusses. Indicate connector types, thicknesses, sizes, locations and design value. Show bearing details. Indicate design load for members.
 - .4 Submit stress diagram or print-out of computer design indicating design load for truss members. Indicate allowable load and stress increase.
 - .5 Indicate arrangement of webs or other members to accommodate ducts and other specialties.
 - .6 Show location of lateral bracing for compression members.
 - .7 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .8 Instructions: submit manufacturer's installation instructions.
- .4 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Wood Certification: submit manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.

1.4 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Fabricator for trusses to show evidence of quality control program such as provided by regional wood truss associations, or equivalent.
 - .2 Fabricator for welded steel connections to be certified in accordance with CSA W47.1.
- .2 Sustainable Standards Certification:
 - .1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:

- .1 Store materials off ground in a dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wood trusses from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
 - .4 Provide bearing supports and bracings. Prevent bending, warping and overturning of trusses.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
 - .5 Packaging Waste Management: remove for reuse and return packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 DESIGN REQUIREMENTS

- .1 Design light metal plate connected wood trusses in accordance with TPIC truss design procedures for wood truss chords and webs in accordance with engineering properties in CSA O86.
- .2 Design light metal plate connected wood trusses in accordance with TPIC truss design procedures for truss joint designs to test engineering properties in accordance with CSA S347 and listed in CCMC Registry of Product Evaluations.
- .3 Design trusses, bracing and bridging in accordance with CSA O86.1 for loads indicated and minimum uniform and minimum concentrated loadings stipulated in NBC commentary.
- .4 Limit live load deflection to 1/360th of span where ceilings are hung directly from trusses.
- .5 Limit live load deflections to 1/240th of span unless otherwise specified or indicated.

2.2 MATERIALS

- .1 Lumber: SPF /2 or better with maximum moisture content of 19% at time of fabrication and to following standards:
 - .1 CSA O141.
 - .2 NLGA (National Lumber Grading Association), Standard Grading Rules for Canadian Lumber.
 - .3 CAN/CSA-Z809 or FSC or SFI certified.
- .2 Fastenings: to CSA O86.

2.3 FABRICATION

- .1 Fabricate wood trusses in accordance with reviewed shop drawings.
- .2 Provide for design camber and roof slopes when positioning truss members.
- .3 Connect members using metal connector plates.

2.4 SOURCE QUALITY CONTROL

- .1 Identify lumber by grade stamp of an agency certified by Canadian Lumber Standards Administration Board.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 MANUFACTURER'S INSTRUCTIONS

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

3.3 ERECTION

- .1 Erect wood trusses in accordance with reviewed shop drawings.
- .2 Handling, installation, erection, bracing and lifting in accordance with manufacturers instructions.
- .3 Make adequate provisions for handling and erection stresses.
- .4 Exercise care to prevent out-of-plane bending of trusses.
- .5 Install temporary horizontal and cross bracing to hold trusses plumb and in safe condition until permanent bracing and decking are installed.
- .6 Install permanent bracing in accordance with reviewed shop drawings, prior to application of loads to trusses.
- .7 Do not cut or remove any truss material without approval of Departmental Representative.
- .8 Remove chemical and other surface deposits on treated wood, in preparation for applied finishes.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

1 General**1.1 REFERENCES**

- .1 Architectural Woodwork Manufacturers Association of Canada (AWMAC) 2003.
- .2 American National Standards Institute (ANSI)
 - .1 ANSI A208.1-99, Particleboard.
 - .2 ANSI A208.2-94, Medium Density Fibreboard (MDF).
- .3 American Society for Testing and Materials (ASTM)
 - .1 ASTM E 1333-96, Test Method for Determining Formaldehyde Concentrations in Air and Emissions Rates from Wood Products Using a Large Chamber.
- .4 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
 - .1 AWMAC Quality Standards for Architectural Woodwork 2003.
- .5 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-11.3-M87, Hardboard.
- .6 Canadian Standards Association (CSA)
 - .1 CSA B111-74(R1998), Wire Nails, Spikes and Staples.
 - .2 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA O115-M82(R2001), Hardwood and Decorative Plywood.
 - .4 CSA O121-M78(R1998), Douglas Fir Plywood.
 - .5 CAN/CSA O141-05, Softwood Lumber.
 - .6 CSA O151-M78 (R1998), Canadian Softwood Plywood.
 - .7 CSA-O112 Series M1977, Adhesive, Contact, Brushable.
- .7 National Electrical Manufacturers Association (NEMA)
 - .1 NEMA LD3-2000, High Pressure Decorative Laminates.
- .8 National Hardwood Lumber Association (NHLA)
 - .1 Rules for the Measurement and Inspection of Hardwood and Cypress January 2004.
- .9 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2003.

1.2 SUBMITTALS

- .1 Submit shop drawings, product data, samples and maintenance data in accordance with Section 01 01 50.
 - .1 Samples:
 - .1 Plastic Laminate:
 - .1 Submit duplicate samples of manufacturer's standard range of solid colours and finishes.
 - .2 Shop drawings:
 - .1 Clearly indicate details of construction, profiles, jointing, fastening and other related details.
 - .3 Product Data:
 - .1 Submit two copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's for adhesives, solvents and cleaners.
 - .4 Provide maintenance data for plastic laminate work for incorporation into manual.

1.3 WARRANTY

- .1 For the work specified in this Section pertaining to Laminated Plastic, the twelve (12) months warranty period prescribed in Subsection GC3.13.1 of General Conditions is extended to twenty-four (24) months.

1.4 PRODUCT HANDLING

- .1 Cover finished laminated plastic surfaces with heavy kraft paper or put in cartons during shipment. Protect installed laminated surfaces by approved means. Do not remove until immediately before final inspection.
- .2 Do not store or install materials in areas where relative humidity is less than 25% or greater than 60% at 22°C.

2 Products**2.1 MATERIALS**

- .1 Softwood lumber: to CAN/CSA-0141 and National Lumber Grades Authority (NLGA), 1991 requirements, with maximum moisture content of 12% for interior work, to AWMAC custom grade construction, D-Fir species. Clear edge grain D-Fir where exposed.
- .2 Douglas fir plywood: to CSA 0121;
 - .1 Interior semi-exposed surfaces: good one/two sides grade
 - .2 Concealed areas: to AWMAC guidelines.
- .3 Thermally fused plastic finish: Melamine surface both sides of either particleboard or MDF, minimum 19 mm thickness for areas indicated and shelves inside cabinets. Provide extruded pvc edging for all edges exposed in final assembly.
- .4 Interior mat-formed wood particleboard: to CAN3-0188.1.
- .5 Medium density fibreboard (MDF): to ANSI A208.2, density 769 kg/m³.
- .6 Nails and staples: to CSA B111; galvanized for interior highly humid areas and for treated lumber; plain finish elsewhere.
- .7 Wood screws: steel, electro-plated.
- .8 Plastic Laminate:
 - .1 Based on solid colour range with selected texture finish conforming to the following:
 - .1 Laminated plastic for flatwork: to CAN/CSA-A172, Grade GP, Standard Duty, 1.15 mm thick for horizontal surfaces and 0.8 mm for vertical surfaces.
 - .2 Laminated plastic for postforming work: to CAN3-A172, Grade PF, minimum 0.75 mm thick.
 - .3 Backing grade laminated plastic: minimum 0.7 mm thick, same manufacturer as facing sheet, sanded one (1) face.
 - .2 Core:
 - .1 For post formed countertops: particle board to CAN3-0188.1, sanded faces, of minimum 19 thickness.
 - .2 For non-postformed horizontal and vertical surfaces: D-Fir plywood, 19 mm thickness.

PRINCIPAL ENTRANCE RENOVATIONS

- .3 Laminated plastic adhesive: Low VOC contact adhesive.
- .4 Sealant: silicone, one component to CAN/CGSB-19.18.
- .5 Drawbolts and splines: type as recommended by fabricator.
- .6 Sealer: water resistant sealer or glue acceptable to laminate manufacturer.

- .9 Casework hardware furnished and installed under this Section as follows:
 - .1 Counter/cupboard door hinges: self closing, 3-way adjustable unit for overlay construction or offset concealed type
 - .2 Pulls: 100 mm long "D" shaped chrome plated brass/steel, stainless steel or aluminum, brushed finish.
 - .3 Drawer slides: self-closing, baked-on epoxy coated steel slides with nylon rollers, parallel close feature, with tolerance adjustment on one side and 100% extension, 45 kg capacity.
 - .4 Cabinet Locks: minimum five pin tumbler cylinder, with solid brass bolt, non-handed, mortise mounting, with trim collar, strike plate, 626 finish, 3 keys for each lock group (KD to each room).

- .10 Applied finish: low VOC clear lacquer, satin finish. Acceptable product: Cloverdale Paint Ecologic water-borne clear lacquer 458 Series or approved equivalent.

2.2 CASEWORK

- .1 Fabricate caseworks to AWMAC custom quality grade.
- .2 CONSTRUCTION
 - .1 AWMAC custom grade.
 - .2 Construction: plastic laminate on 19 mm plywood.
 - .3 Exposed drawer fronts and exposed faces: laminated plastic with white plastic lam backing grade on interior face.
 - .4 Interior shelves and drawers: Melamine faced MDF or particle board.
 - .5 Exposed edge banding: laminated plastic and thermally fused Melamine.
 - .6 Hardware: 100 D pulls, drawer slides, 3 cabinet drawer locks.

2.3 DRAWERS

- .1 Fabricate drawers to AWMAC custom grade supplemented as follows:
 - .1 Sides and Backs:
 - .1 Melamine faces, 12.7 mm thickness.
 - .2 Bottoms:
 - .1 Melamine faces, 6.4 mm thickness.
 - .3 Fronts and Edges:
 - .1 19 mm thickness, plywood and finish as indicated.

2.4 EDGE BANDING

- .1 Melamine panels: thermally fused PVC.
 - .2 Plastic laminate edging for gables, fronts and facings.
-

2.5 FABRICATION

- .1 Set nails and countersink screws, apply matching wood filler to indentations, sand smooth and leave ready to receive finish.
- .2 Shop install cabinet hardware for drawers.
- .3 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.

3 Execution

3.1 INSTALLATION

- .1 Install prefinished millwork at locations shown on reviewed shop drawings. Position accurately, shim level, plumb and straight.
- .2 Fasten and anchor millwork securely. Provide heavy duty fixture attachments for wall mounted shelving. Coordinate with carpentry trade where backing is required inside walls.
- .3 Use draw bolts at joints in countertops.
- .4 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects. Install trim to conceal spaces between walls and cabinets.
- .5 Fit hardware accurately and securely in accordance with manufacturer's directions.

3.2 INSTALLATION SITE APPLIED PLASTIC LAMINATE

- .1 Use straight self-edging laminate strip, at post-formed tops, to cover exposed ends of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.

END OF SECTION

1 General**1.1 REFERENCES**

- .1 Underwriters Laboratories of Canada (ULC).
 - .1 CAN/ULC-S704-05, Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-93.1-M85 Sheet, Aluminum Alloy, Prefinished, Residential.
- .3 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A 653/A653M - 11, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A354-11, Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
 - .3 ASTM D2794-93(2010) Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid deformation (Impact).
 - .4 ASTM D3359-09e2, Standard Test Methods for measuring Adhesion by Tape Test.
 - .5 ASTM D2247-11, Standard Practice for Testing water Resistance of Coatings in 100% RH. .

1.2 DESIGN CRITERIA

- .1 Design preformed standing snap-on roof panel system to provide for thermal movement of component materials caused by ambient temperature range of 70°C without causing buckling, failure of seals, leakage and undue stress on fasteners or other detrimental effects.
- .2 Ensure air tightness of roof system is continuous, is sealed at openings and terminations and is overlapped at changes in wall structure.
- .3 Roof panel description:
 - .1 Snap-in friction fit ribbed panel system, minimum 38 mm high, rib spacing 200 - 250 mm oc with concealed fastening clip screwed directly to 38 x 89 mm strapping.
 - .2 Panels manufactured from sheet steel with galvanized coating and prefinished with factory-applied, oven-baked finish based on polyvinylidene fluoride resin, meeting the performance criteria of AAMA 2605 specification. Submit independent tests results to demonstrate coating will retain minimum 50% gloss retention and maximum 5% colour change after ten year test conditions.
 - .3 Air infiltration: to ASTM E-283 no air leakage at 2.86 lbs/sf.
 - .4 Water penetration: no leakage at 20 lbs/sf when tested to ASTM E-331.
 - .5 Approved product profiles and support system or approved equivalents:
 - .1 KlipRib System by AEP Span - Tacoma WA - <http://www.aepspan.com>.
 - .2 Rib-Roof By Mercury Metals Ltd.- Delta, BC.
 - .3 Nordic Clip by Westform - Chilliwack, BC - <http://www.westform.com>.
 - .6 Design members to withstand dead load, live loads from foot traffic, roof snow load as indicated and positive and negative wind loads for locality, in accordance with NBCC 2010 and notes listed on structural drawings. Maximum allowable deflection is 1/180th of span. Design members to accommodate building movement, local temperature extremes and to be watertight.
 - .7 Make allowance for additional snow drifting load at elevated walls and extra

PRINCIPAL ENTRANCE RENOVATIONS

fastening where required.

.8 Panels formed by portable forming machines on site are not acceptable.

.9 Snow retention system specified in this clause must be approved by the roof panel manufacturer for installation on selected roof panels.

.4 Snow retention system:

.1 Rib clamps: fastens directly to the standing seams without penetrating the metal roof panels and damaging the prefinished coating.

.2 Coordinate snow retention system with roof panel system.

.3 All loads incurred by snow retention system are transferred to the roof panel system and must be designed to accept these additional loads.

.4 Design to meet snow load, climatic conditions for locality, length of roof panel and spacing of ribs. Provide addition rows of snow retention to meet these requirements.

.5 Submit manufacturer's specifications and detail drawings for installation onto roof panel system.

.5 Corrugated wall panel description:

.1 Prefinished galvanized sheet steel, 0.76 m thickness x 22 mm deep corrugated profiled panel by 726 ± mm wide, lapping side joints, exposed fastening, with prefinished oven-baked finish based on polyvinylidene fluoride resin to para 1.3.3.2 in colour as selected by Departmental Representative from manufacturer's standard range.

.6 Corrugated perforated Soffit panel description:

.1 Prefinished galvanized sheet steel, 0.6 m thickness x 22 mm deep corrugated profile perforated metal panel by 726 ± mm wide, lapping side joints, exposed fastening, with prefinished oven-baked finish based on polyvinylidene fluoride resin to para 1.3.3.2 in colour as selected by Departmental Representative from manufacturer's standard range. Round hole perforations of 7.938 mm ϕ spaced 11.113 c/c on diagonal, 47% open.

1.3 QUALIFICATIONS OF INSTALLERS

.1 Installation of preformed metal cladding to be performed by manufacturer approved installers having at least five years experience in metal panel installations.

.2 Panel installer/fabricator to have a minimum of five years experience in fabricating and or installing composite panels. Panel supplier must be an authorized fabricator of the specified composite supplier and have a certification program acceptable to local code authorities.

1.4 SUBMITTALS

.1 Submit shop drawings and samples in accordance with Section 01 01 50 - General Instructions for Submittals clause.

.2 Clearly indicate dimensions, system components, method of thermal expansion adjustment between panels and mounting clips, details at juncture with other membranes and panel system, material and finish, compliance with design criteria and related structural and metal flashing work. Submit shop drawings and/or product data for wall panel assembly composite panel.

.3 Submit duplicate samples of representative prefinished panel materials and sealant for colour selection by Departmental Representative.

1.5 COMPATIBILITY

- .1 Compatibility between components of structural insulated standing seam roof system is essential. Provide written declaration to Departmental Representative stating that materials and components, as assembled in system, meet this requirement.
- .2 Provide written declaration to Departmental Representative stating that the Manufacturer/Distributor for the materials, accessories and components, as assembled in system, for the structural insulated standing seam roof system, will use one Manufacturer/Distributor only for this system.

1.6 SOURCE QUALITY CONTROL

- .1 At least 2 weeks prior to fabrication of steel wall panels, submit two (2) copies of mill test reports showing chemical and physical properties from manufacturer. Such mill test reports shall be certified by qualified metallurgists confirming that tests conform to requirements of referenced standards.

1.7 WARRANTY

- .1 For the Standing Rib Steel Roofing work in this Section 07 46 13, the 12 month warranty period specified in General Conditions GC3. 13.1 is extended to 60 months.
- .2 Provide Departmental Representative with manufacturer's written guarantee stating the extended warranty time period indicated in paragraph 1.6.1. Provide inspection services and include costs for this work.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 01 50 - General Instructions for Construction/Demolition Waste Management And Disposal clause.
 - .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
 - .3 Collect and separate for disposal packaging material for recycling in accordance with Waste Management Plan.
 - .4 Place materials defined as hazardous or toxic in designated containers.
 - .5 Ensure emptied containers are sealed and stored safely for disposal away from public.
 - .6 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
 - .7 Unused sealant material must be disposed of at an official hazardous material collections site as approved by Departmental Representative.
 - .8 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
 - .9 Fold up metal banding, flatten and place in designated area for recycling.
-

PRINCIPAL ENTRANCE RENOVATIONS**2 Products****2.1 MATERIALS**

- .1 Sheet steel: to ASTM A 653/A653M, Grade E or D, minimum yield strength of 500 or 290 MPa, with galvanized Z275 zinc coating.
- .2 Coating systems:
 - .1 Roof, wall and soffit panels and flashing: factory finish coating of, factory-applied, oven-baked finish based on Kynar 500® polyvinylidene fluoride resin, meeting the performance criteria of AAMA 2605 specification, in colour selected by Departmental Representative.
 - .2 Snow retention system: to match roof panels.

2.2 ACCESSORIES

- .1 Fasteners: self-tapping screws to ASTM A354, purpose made, galvanized finish and stainless steel fasteners as indicated.
 - .1 Exposed fasteners "Climaseal" with colour matched heads where exposed.
 - .2 Concealed fasteners: stainless steel, pan heads.
 - .3 Screws of self drilling/threading threads.
 - .4 All other screws galvanized except as specified above.
- .2 Sealants:
 - .1 Exposed sealant: as recommended by manufacturer.
 - .2 Tape: butyl tape to manufacturer's standard, to meet design criteria.
- .3 Eave protection and underlayment: 1.65 mm thickness self adhering underlayment to ASTM D1970, fiberglass mat with a top coating of blended SBS polymer modified bitumen, sand release agent, and has a proprietary asphalt based self-adhering coating applied to the bottom of the sheet with a split release film is applied to the bottom. Acceptable Product: Titanium PSU 30 by Interwrap.

2.3 GUTTERS AND DOWNSPOUTS

- .1 Form continuous rain gutters and down pipes from prefinished sheet aluminum, with installed purpose made leaf protection to prevent ingress of leaves and debris, without impeding water drainage, prefinished paint coating, minimum size 125 x 100 mm profile gutter with leaf cover, 75 x 100 mm rectangular aluminum down pipes, complete with elbows, strap anchors and leaf screens.

2.4 COMPONENTS

- .1 Roof assembly:
 - .1 Preformed sheet steel ribbed roof panels of minimum 0.6 mm thickness conforming to Design Criteria in Clause 1.2, with self-locking standing ribs and factory applied sealer tape or sealant, ribs spaced 200 to 250 mm oc and min. 38 mm high, secured by panel support system in accordance with reviewed shop drawings using proprietary sheet metal subgirts or wood strapping spaced to meets loads and manufacturer's recommendations.
 - .2 Form roof panels in one continuous length of roof slope.
 - .3 Panel clips: fabricated from galvanized sheet steel designed to accommodate
-

thermal movement and loads from roof panels, and for attachment to subgirts or directly to steel deck through rigid insulation. (To suit system design)

.4 Form flashings from 0.6 mm thickness prefinished sheet steel; at ridge, roof edge-eave closure, gable edge, profile closures, curb flashings for roof penetrations and trim to match roof panel finish.

.5 Provide all fabricated and proprietary flashings, of size to accommodate roof penetrations. Prefinished where exposed in final assembly and described as follows:

.1 Pipe and stack flashing: flexible neoprene or EPDM flashing, adjustable hole size, resistant to ozone and UV, with collar clamp and integral fastening ring at base of 1mm thick aluminum alloy A1100-0 or stainless steel, and stainless steel screws. Acceptable Product: Buildex Dektite.

.2 Wall cladding assembly:

.1 Corrugated panels of minimum 0.76 mm thickness, with exposed fasteners conforming to profile and shape specified in Design Criteria in Clause 1.3.

.2 Wall support framing: horizontal 'Z' bars installed in conjunction with rigid insulation, Designed to transfer wind loads to stud wall and support wall panels..

.3 Form trim and flashings from 0.6 mm prefinished sheet steel for wall panels; at base, corners, wall penetrations, terminations and openings; and trim at doors, windows, and metal profile closures to match wall panel finish. Bend trim at corners without exposing cut edges except as approved by Departmental Representative.

.4 Screw fasteners: galvanized steel with colour matched caps where exposed.

.3 Soffit panel assembly:

.1 Corrugated panels of minimum 0.6 mm thickness, with exposed colour matched fasteners conforming to profile and shape specified in Design Criteria in Clause 1.3.

.2 Support framing: furring channels fastened to wood frame structure designed to transfer wind loads to soffit support structure.

.3 Form trim and flashings from 0.6 mm prefinished sheet steel for soffit panels; at wall penetrations, terminations and openings and metal profile closures to match soffit panel finish. Bend trim at corners without exposing cut edges except as approved by Departmental Representative.

.4 Screw fasteners: galvanized steel with colour matched caps where exposed.

2.5 METAL FLASHINGS AND TRIM - GENERAL

.1 Form flashings, trim and sheet metal work to profiles, finishes and thicknesses specified for wall and composite panels.

.2 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.

.3 Hem exposed edges on underside 12 mm, provide clip fasteners spaced at 610 mm oc. Mitre and seal corners with sealant. Make allowance for expansion at joints. Use either S-lock seams at joints and seal with sealant or fasten through 12 mm slotted holes using fasteners with washers to conceal holes, space fasteners at maximum 600 mm oc. At mitred corners use standing seams. All exposed screws in wall panels with colour matched heads.

.4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.5 Apply isolation coating to metal surfaces in contact with pressure treated wood and dissimilar bare metals.

2.6 RIGID INSULATION

- .1 Exterior insulation:
 - .1 Rigid polyisocyanurate rigid insulation to meet CAN/ULC-S704-97 and CAN/ULC S-770 with a LTTR (Long Term Thermal Resistance) of RSI 1.05 (R6), faced with manufacturer's standard foil facing on both sides, thickness as indicated.

2.7 PANEL MATERIALS

- .1 Panel standards: type, grade and thickness as specified, in accordance with following standards:
 - .1 Douglas fir plywood (DFP): to CSA 0121, standard construction.
- .2 Roof sheathing: DFP sheathing grade T&G edge, 16 mm thick.

3 Execution**3.1 PREPARATION**

- .1 Install wall, panel assembly following completion and approval of structural stud wall framing installation.
- .2 Precut panels and flashing sections in factory where practical. Saw cutting or torch cutting of material on site is not acceptable.

3.2 ROOFING SYSTEM INSTALLATION

- .1 Installation of roof system in accordance with reviewed shop drawings and manufacturer's instructions.
 - .2 Over plywood sheathing install self-adhering sheet membrane eave protection and underlayment for a continuous moisture seal in accordance with manufacturer's instructions. Prime sheathing and allow to cure before installing membrane. Reinforce corners and joints with additional layer of membrane minimum 100 mm beyond each side of joint and corners. Lap membrane minimum 150 mm.
 - .3 Fasten concealed panel retainer clip to plywood sheathing using minimum 4 screws per clip at maximum 1220 mm intervals in accordance with manufacturer's instructions. Alternatively install pressure treated 38 x 89 Hem-Fir strapping over membrane and plywood sheathing screwed to top chord of trusses.
 - .4 Install snap fit roof panels to retainer clips and at drag strip in accordance with manufacturer's instructions.
 - .5 Install prefinished sheet metal flashings in accordance with reviewed shop drawings and manufacturer's instructions.
 - .6 Commence installation of panels on one end and arrange panels symmetrically so that roof ribs are symmetrical.
-

3.3 WALL PANEL

- .1 Installation of wall panel in accordance with reviewed shop drawings and manufacturer's instructions.
- .2 Install horizontal steel Z girts to wall and vertical steel girts at corners, terminations, fasten with purpose made anchors to meet wind load and dead load requirements.
- .3 Install insulation in single layer with foil facing, and tape joints. Butt insulation boards tight to ensure continuity of thermal protection in roof spaces. Use manufacturer approved tape.
- .4 Attach wall panels to girt framing using exposed fastening system. Semi-conceal fasteners at flashings and trim where possible. Install wall panels starting from one corner or at termination point. Fit panels tight to flashings and trim to ensure installation is continuously weather tight. Install panels in one piece lengths.
- .5 Install break formed trim at corners, cap trim at top of panel, as indicated and seal. Install drip flashing at base of wall, headers, window sills.
- .6 Install and seal notched and formed closures, to arrest direct weather penetration behind panels at all openings.

3.4 GUTTER ASSEMBLY

- .1 Install continuous length gutter or in minimum 3 m lengths to roof eaves. Fasten gutter clips or straps at 610 mm oc .
- .2 Install down pipes with minimum three straps to siding at 1500 oc maximum fastened with purpose made screws.
- .3 Provide down pipe with elbow at base of wall and connect to existing sys.
- .4 Fasten gutter leaf screen to gutter using stainless steel screws.

3.5 SOFFIT PANEL ASSEMBLY

- .1 Installation of soffit panel system to layout indicated in accordance with manufacturer's instructions.
- .2 Attach perforated soffit panels and metal screw channels to wood support framing using colour matched exposed fastening system.
- .3 Conceal fasteners at trim where possible. Install soffit panels starting from one corner or termination point and insure installation is tight fitting with no exposed edges.
- .4 Install break formed trim at exposed edges.

3.6 CLEANING

- .1 Clean prefinished metal panels flashings and trim.

END OF SECTION

1 General

1.1 SUMMARY

- .1 This Section specifies caulking and sealants not specified in other Sections.

1.2 REFERENCES

- .1 CAN/CGSB-19.13-M87 Sealing Compound, One-component, Elastomeric, Chemical Curing.

1.3 SAMPLES

- .1 Submit duplicate samples of each type of material and colour to be used in accordance with Section 01 01 50.

1.4 ENVIRONMENTAL AND SAFETY REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .3 Sealant and substrate materials to be minimum 5°C.
- .4 Should it become necessary to apply sealants below 5°C, consult sealant manufacturer and follow their recommendations.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Collect and separate for disposal; packaging material for recycling in accordance with Waste Management Plan.
 - .4 Place materials defined as hazardous or toxic in designated containers.
 - .5 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
 - .6 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
 - .7 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Engineer.
-

- .8 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.

1.6 PROJECT CONDITIONS

- .1 Environmental Limitations:
 - .1 Do not proceed with installation of joint sealants under following conditions:
 - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.
 - .2 When joint substrates are wet.
 - .2 Joint-Width Conditions:
 - .1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
 - .3 Joint-Substrate Conditions:
 - .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

2 Products

2.1 SEALANT MATERIALS

- .1 Use caulking that does not emit strong odours, contain toxic chemicals or is not certified as mould resistant in air handling units.
- .2 When low toxicity caulks are not possible, confine usage to areas which off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.
- .3 Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

- .1 Urethanes One Part.
 - .1 Non-Sag to CAN/CGSB-19.13, Type 2, MCG-2-40, colour as selected.
- .2 Preformed Compressible and Non-Compressible back-up materials.
 - .1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
 - .1 Extruded closed cell foam backer rod.
 - .2 Size: oversize 30 to 50%.
 - .2 Neoprene or Butyl Rubber.
 - .1 Round solid rod, Shore A hardness 70.
 - .3 High Density Foam.
 - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m³ density, or neoprene foam backer, size as recommended by manufacturer.
 - .4 Bond Breaker Tape.
 - .1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

- .1 Perimeters of exterior openings where frames meet exterior facade of building: Sealant type: one component urethane, non-sag.
- .2 Colour of sealants: selected by Engineer from manufacturer's standard range to match adjacent surfaces.

2.4 JOINT CLEANER

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
- .2 Primer: as recommended by manufacturer.

3 Execution

3.1 PROTECTION

- .1 Protect installed Work of other trades from staining or contamination.

3.2 PREPARATION OF JOINT SURFACES

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair work.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

- .1 Apply bond breaker tape where required to manufacturer's instructions.
 - .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.
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3.5 MIXING

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

- .1 Sealant.
 - .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing.
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.
- .3 Cleanup.
 - .1 Clean adjacent surfaces immediately and leave work neat and clean.
 - .2 Remove excess and droppings, using recommended cleaners as work progresses.
 - .3 Remove masking tape after initial set of sealant.

END OF SECTION

1 General

1.1 RELATED WORK

- .1 Section 08 80 50 - Glazing.

1.2 REFERENCE STANDARDS

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A 653/A653M-06a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A 794-06 - Standard Specification for Commercial Steel (CS), Sheet, Carbon (0.16 % Maximum to 0.25 % Maximum), Cold-Rolled.
 - .3 ASTM A659/659M-06 - Standard Specification for Commercial Steel (CS), Sheet and Strip, Carbon (0.16 Maximum to 0.25 Maximum Percent), Hot-Rolled.
 - .4 ASTM E 90-04 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - .5 ASTM E1408-91(2000) - Standard Test Method For Laboratory Measurement of Airborne Sound Transmission Loss of Door Panels and Door Systems.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .3 Canadian Steel Door Manufacturers' Association, (CSDMA).
 - .1 CSDMA, Specifications for Commercial Steel Doors and Frames, 1990.
 - .2 CSDMA, Recommended Selection and Usage Guide for Commercial Steel Doors, 1990.
- .4 Canadian Standards Association (CSA International)
 - .1 G40.20/G40.21-98(R2003), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA W59-03), Welded Steel Construction (Metal Arc Welding) (Metric Version).
- .5 Underwriters Laboratories Canada (ULC)
 - .1 CAN/ULC-S702-97, Thermal Insulation, Mineral Fibre, for Buildings.
 - .2 CAN4-S104M-80, rev. 1985
 - .3 CAN4-S105M-1985 Rev 1992

1.3 SUBMITTALS

- .1 Submit shop drawings and test reports in accordance with Section 01 01 50.
 - .1 Clearly indicate type of door, material core thickness, mortises, reinforcements, anchorages, glazing and hardware arrangements.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 01 50 - General Instructions; Construction/Demolition Waste Management And Disposal clause.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard

PRINCIPAL ENTRANCE RENOVATIONS

packaging material for recycling in accordance with Waste Management Plan.

- .4 Divert unused metal materials from landfill to metal recycling facility approved by Engineer.
- .5 Divert unused wood materials from landfill to either recycling, reuse or composting facility.

2 Products

2.1 MATERIALS

- .1 Sheet Steel (WGCS): commercial grade steel to ASTM A653M, Class 1, hot-dip galvanized with ZF75 zinc wiped finish.
- .2 Hot Rolled Carbon Steel Sheet (HRCS): commercial quality, to ASTM A659/A659M, for concealed reinforcement for materials, 2.7 mm minimum thickness.
- .3 Cold rolled carbon steel sheet (CRCS) commercial quality, TO ASTM A794, shop prime coated.

2.2 COMPONENTS

- .1 Doors: 1.2 mm base thickness steel.
- .2 Hinge, lock, strike, flush bolt and surface applied hardware reinforcing: 3.5 mm minimum base metal thickness.
- .3 Door bumpers: black neoprene single stud.
- .4 Reinforcing channel: to CAN/CSA G40.21-M, Type 300 W.
- .5 Primer: to CAN/CGSB-1.181, zinc rich.

2.3 DOOR TYPES

- .1 (HCM) Doors: flush steel with full honeycomb core of 25 mm size bonded resin - impregnated kraft reinforcement, with reinforcement for hardware.

2.4 FABRICATION

- .1 Fabricate door as detailed; in accordance with Canadian Steel Door and Frame Manufacturer's Association (CSDFMA), "Canadian Manufacturing for Steel Doors and Frames"; for hollow steel construction; ULC requirements, reviewed shop drawings.
 - .2 Mortise, reinforce, drill and tap doors and reinforcements to receive hardware using templates provided by finish hardware supplier
 - .3 Touch up galvanized finish damaged during fabrication.
-

2.5 DOORS

- .1 Assemble components using spot or arc welding.
- .2 Make provision for glazing where indicated and provide necessary glazing stops.
- .3 Make provision for hardware as indicated.
- .4 Spot weld longitudinal door edges, fill continuously and grind smooth to conceal edge seams. Mechanical locked open seams not acceptable.
- .5 Touch up doors with primer where galvanized finish damaged during fabrication.

3 Execution

3.1 DOOR INSTALLATION

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions.
- .2 Adjust operable parts for correct function.

END OF SECTION

1 General**1.1 RELATED WORK**

- .1 Section 01 01 50 - General Instructions for:
 - .1 Submittal Procedures.
 - .2 Waste Management And Disposal.
 - .3 Closeout Submittals.

1.2 REFERENCES

- .1 Aluminum Anodizers Council (AAC)
 - .1 Aluminum Association Designation System for Aluminum Finishes.
- .2 Aluminum Association (AA).
 - .1 DAF 45-03, Designation System for Aluminum Finishes.
 - .2 Aluminum Alloys and Tempers - 2000.
- .3 American Architectural Manufacturers Association (AAMA).
 - .1 AAMA 609-09, Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum.
 - .2 AAMA 1503.1 Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
- .4 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A123 / A123M - 09 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - .2 ASTM B221 - 08 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - .3 ASTM C1363 - 05 Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.
 - .4 ASTM E283 - 04 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - .5 ASTM E 330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .5 Canadian General Standards Board (CGSB).
 - .1 CGSB 1.40-97, Primer, Structural Steel, Oil Alkyd Type.
 - .2 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
 - .3 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.
- .6 Canadian Standards Association (CSA International).
 - .1 CAN/CSA-G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

1.3 DESIGN CRITERIA

- .1 Design frames and doors in exterior walls:
 - .1 Air Infiltration: for single acting offset pivot or butt hung entrances in the closed and locked position, the test specimen shall be tested in accordance with ASTM E 283 at a pressure differential of 300 Pa for single doors. A single 915 x 2134 entrance door
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and frame shall not exceed 0.50 cfm per square foot.

.2 Structural: Corner strength tested per manufacturer's dual moment load test procedure and certified by an independent testing laboratory to ensure weld compliance and corner integrity. Submit testing procedure and certified test as requested.

.3 Thermal Transmittance Coefficient (U-factor): When tested to ASTM C1363 and AAMA Specification 1503.1, the conductive thermal transmittance (U-factor) shall not be more than 0.72 BTU/hr/sf/°F.

.2 Design frames and door in vestibule walls: to meet paragraph 1.3.1.2 Structural.

.3 Size glass thickness and glass unit dimensions to limits in accordance with CAN/CGSB-12.20.

.4 Provide continuous air barrier and vapour retarder through door system. Primarily in line with inside pane of glass and heel bead of glazing compound.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 01 50 - General Instructions for Submittals.

.2 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01 01 50 - General Instructions for Submittals.

.2 Indicate materials and profiles and provide full-size, scaled details of components for each type of door and frame. Indicate:

.3 Interior trim and exterior junctions with adjacent construction.

.4 Junctions between combination units.

.5 Elevations of units.

.6 Core thicknesses of components.

.7 Type and location of exposed finishes, method of anchorage, number of anchors, supports, reinforcement, and accessories.

.8 Location of caulking.

.9 Each type of door system including location.

.10 Arrangement of hardware and required clearances.

.3 Samples:

.1 Submit samples in accordance with Section 01 01 50 - General Instructions for Submittal Procedures.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.5 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for door closers, locksets and door holders for incorporation into manual specified in Section 01 01 50 - General Instructions for closeout Submittals.

.2 Brief maintenance staff regarding proper care of hardware such as lubrication of locksets, adjustments of door closers, cleaning, and general maintenance.

1.6 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer Qualifications: Installer experienced (as determined by contractor) to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.
 - .2 Manufacturer Qualifications: Manufacturer capable of providing structural calculations, applicable independent product test reports, installation instructions, a review of the application method, customer approval and periodic field service representation during construction.
- .2 Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.
- .3 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .4 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .5 Source Quality Control:
 - .1 Source Quality: Provide aluminum entrances specified herein from a single source.
 - .2 When aluminum entrances are part of a storefront sidelight framing, and related products, provide products from a single source manufacturer.
 - .3 Fabrication Tolerances: Fabricate aluminum entrances in accordance with entrance manufacturer's prescribed tolerances.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
- .2 Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- .3 Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle entrance doors and components to avoid damage. Protect entrance doors against damage from elements, construction activities, and other hazards before, during and after entrance installation.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .2 Dispose of packaging material in appropriate on-site bin for recycling in accordance with site waste management program.
 - .3 Separate and recycle waste materials in accordance with Section 01 01 50 - General Instructions for Waste Management And Disposal.
 - .4 Place materials defined as hazardous or toxic waste in designated containers.
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- .5 Divert unused metal to metal recycling facility approved by Departmental Representative.
- .6 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.

2 Products

2.1 MATERIALS

- .1 Material Standard: ASTM B 221; 6063-T6 alloy and temper.
- .2 Sheet aluminum: Aluminum Association alloy AA 1100, AA 5005 - anodizing quality to manufacturer's standard.
- .3 Steel reinforcement: to CAN/CSA-G40.20/G40.21, grade 300 W.
- .4 Door bumpers: black neoprene.
- .5 Isolation coating: bituminous paint or epoxy resin solution.
- .6 Glass: laminated safety glass to Section 08 80 50.
- .7 Sealants: as recommended by manufacturer, matching colour approved by Departmental Representative.

2.2 ALUMINUM DOORS AND SIDELIGHTS

- .1 Major portions of the door members 3 mm nominal thickness and glazing moulding of 1.3 mm thickness.
 - .2 Tolerances: for wall thickness and other cross-sectional dimensions of entrance members in compliance with Aluminum Standards and Data, published by The Aluminum Association.
 - .3 Glazing gaskets: either EPDM elastomeric extrusions or a thermoplastic elastomer.
 - .4 Thermal separators for exterior entrance door cladding: rigid polyvinylchloride (PVC) extrusions.
 - .5 Provide adjustable glass jacks to center the glass in the door opening.
 - .6 Accessories:
 - .1 Fasteners: Where exposed, shall be aluminum, stainless steel or plated steel.
 - .2 Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
 - .7 Entrance Hardware:
 - .1 Weatherstripping:
 - .1 Thermoplastic elastomer weathering on a tubular shape with a semi-rigid polymeric backing.
 - .2 Sill Sweep Strips: EPDM blade gasket sweep strip in an aluminum
-

- extrusion applied to the interior exposed surface of the bottom rail with concealed fasteners to meet specified performance tests.
- .2 Threshold: to full width of door opening, aluminum extruded mill finish, fluted surface, fitted to door frame opening size and profile, with thermal break, maximum 12mm rise, one or two piece.
 - .3 Butt Hinge: 1-1/2 pr butts 4 BB 114 x 102 mm Stainless Steel.
 - .1 Hinges to ANSI/BHMA A156.1 type, full mortise template hinges finished to 626.
 - .2 All hinges with minimum leaf thickness of 3.4mm and of 5 knuckle 2 ball bearing.
 - .4 Push/Pull: 25 mm ϕ 'D' style offset pull minimum 300 mm long at exterior and 25 mm ϕ horizontal round bar full width of door on exterior, to meet barrier free requirements.
 - .5 Closers: provide adjustable backcheck for 90° to 180° opening. Finish to be 628 satin aluminum, powder coated finish.
 - .1 Surface mounted overhead door closers: to ANSI/BHMA A156.4, door mounted, top jamb or parallel mounted, non-handed, non-sized with site adjustable spring tension from size 2-6, with heavy duty forged steel arms, full rack and pinion hydraulic action, adjustable closing speed, adjustable back-checking action, high strength cast iron cylinder walls with stable hydraulic fluid to make winter/summer adjustments unnecessary.
 - .2 Provide through bolts for attachment to doors. Closer housing of smooth rectangular design approximately 90 mm high.
 - .3 Finish to C28 in lacquer or polyester powder coat finish.
 - .4 Provide closers with the following accessories as noted in schedule.
 - .1 CS: Cushion stop arm.
 - .2 HO: Hold open arm.
 - .3 DA: Delayed action.
 - .4 PA: Parallel arm.
 - .5 Products with universal mounting and adjustments to take into account changing door configurations.

2.3 ALUMINUM FRAMES

- .1 Exterior entrance:
 - .1 Construct thermally broken insulated frames of aluminum extrusions with minimum wall thickness of 3 mm. Non-thermally broken frames for door frames is permissible.
 - .2 Frame members 50 x 114 mm nominal size, for flush double glazing.

2.4 FINISHING

- .1 Factory finish: Color Anodic Coating to AA-M12C22A44, AAMA 611, Architectural Class I Color as selected by the Departmental Representative.

2.5 FABRICATION

- .1 Exterior entrance door:
 - .1 Door corner construction: to consist of mechanical clip fastening, SIGMA deep penetration plug welds and 29 long fillet welds inside and outside of all four corners. Glazing stops of hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.
 - .2 Exposed portions of door cladding mouldings: 2.4 thick.
 - .3 PVC separators: applied to the interior side of door structure with screws spaced not more than 247 on centers. Interlock aluminum cladding with PVC separators at both edges and mechanically secured to door without adhesives with no metal to metal contact,

direct or indirect, between the cladding or the cladding attachments and the door structure.

- .4 Accurately fit and secure joints and corners. Make joints hairline in appearance.
- .5 Prepare components with internal reinforcement for door hardware.
- .6 Arrange fasteners and attachments to conceal from view.

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 EXAMINATION

- .1 Site Verification of Conditions:
 - .1 Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.
 - .2 Verify openings are sized to receive entrance system and sill plate is level in accordance with manufacturer's acceptable tolerances.
- .2 Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

3.3 INSTALLATION

- .1 General: Install entrance systems and screens in accordance with manufacturer's instructions and AAMA storefront and entrance guide specifications manual.
 - .2 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
 - .3 Provide alignment attachments and shims to permanently fasten system to building structure.
 - .4 Align assembly plumb and level, free of warp and twist. Maintain assembly dimensional tolerances aligning with adjacent work.
 - .5 Set thresholds in bed of mastic and secure.
 - .6 Adjusting: Adjust operating hardware for smooth operation.
 - .7 Related Products Installation Requirements:
 - .1 Sealants (Perimeter): Refer to Joint Treatment (Sealants).
 - .2 Glass: Refer to Glass and Glazing Section 08 80 50.
 - .3 Reference: ANSI Z97.1, CPSC 16 CFR 1201 and GANA Glazing Manual.
-

3.4 CLEANING AND PROTECTION

- .1 Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

- .2 Protection: Protect installed product's finish surfaces from damage during construction. Protect aluminum entrances from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants. Remove and replace damaged aluminum entrances at no extra cost to contract.

END OF SECTION

1 General

1.1 RELATED WORK

- .1 Section 01 01 50 - General Instructions: Submittal Procedures, Construction/Demolition Waste and Disposal, Closeout Submittals.

1.2 REFERENCES

- .1 Aluminum Association (AA).
 - .1 DAF 45-03, Designation System for Aluminum Finishes.
 - .2 American Architectural Manufacturers Association (AAMA).
 - .1 AAMA 609.1-02, Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum.
- .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A 653/A653M-10, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-coated (Galvannealed) by the Hot-Dip Process.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.38-2000, Interior Enamel Undercoat.
 - .2 CAN/CGSB-1.213-95, Etch Primer (Pretreatment Coating) for Steel and Aluminum.

1.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 01 50 - General Instructions; Submittal Procedures clause.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 01 50 - General Instructions; Submittal Procedures clause.
 - .2 Indicate type of coiling counter door, arrangement of hardware, operating mechanism and required clearances.
- .3 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.4 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance data for overhead coiling counter doors and hardware for incorporation into manual specified in Section 01 01 50 - General Instructions; Closeout Submittal clause.
- .2 Submit a written 2 year warranty for materials and workmanship.

1.5 QUALITY ASSURANCE

- .1 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Installation by factory approved installers.
-

- .2 Design counter doors for maximum 10 cycles per day and 10,000 cycles for life of the door. Rolling door to operate at a speed of 150 mm per second.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Dispose of corrugated cardboard, polystyrene, plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.
- .3 Remove from site and dispose of packaging materials at appropriate recycling facilities
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Engineer.

2 Products

2.1 MATERIALS

- .1 Aluminum sheet metal: plain finish utility sheet.
- .2 Aluminum extrusions: Aluminum Association alloy AA6063-T5.
- .3 For exposed aluminum surfaces: powder coated polyester finish or clear anodized 204-R1 finish.

2.2 COILING COUNTER DOOR

- .1 Assemble coiling counter door curtain of interlocking extruded aluminum slat sections 1.4 mm thick, 12.7 deep and individually 70 mm high, with perforations to allow 25% airflow with an overall width sized to suit door opening. Slat and hood with polyester powder coating or clear anodized coating.
- .2 Brackets: Fabricate from 3 mm steel plate.
- .3 Tube Motor Shaft Assembly:
 - .1 Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 2.5 mm per meter of width.
 - .2 Brackets: Fabricate from reinforced 3 mm steel plate with bearings at rotating support points to support counterbalance shaft assembly and form end closures for hood.
 - .1 Finish: phosphate treatment followed by baked-on gray polyester powder coat; minimum 0.025 mm cured film thickness; ASTM D3363 pencil hardness: H or better.
- .4 Hood and mechanism covers: 0.6 mm galvanized steel with reinforced top and bottom edges.
 - .1 Finish: coating System to include an ASTM A 653 galvanized base coating, bonderized coating for prime coat adhesion, and factory applied thermosetting powder coating applied with a minimum thickness of 2.5 mils. The color shall be selected by the architect and shall be chosen from [standard color chart] [custom color selection].

PRINCIPAL ENTRANCE RENOVATIONS

- .5 Locking: Padlockable slide bolt on coil side of bottom bar at each jamb extending into slots in guides. Provide interlock switches on motor operated units.
- .6 Special Features:
 - .1 A three button control station.
 - .2 An electric eye.
 - .3 A sensing edge.

2.3 OPERATION

- .1 Tube Motor Operated: rated for a maximum of 10 cycles per day, cULus recognized, rated (50nm) or (100nm) as recommended by door manufacturer for size and type of door, 115 Volts, 1 Phase, 60 Hertz. Provide complete with electric tube motor, maintenance free electric brake, emergency manual crank hoist and control station(s). Protect motor against overload with an auto-reset thermal sensing device. Equip operator with an emergency manual crank hoist.
 - .1 Disconnect chain shall not be required to engage or release the manual crank hoist.
 - .2 Operator capable of 10-14 RPM with fully adjustable, mechanical internal worm limit switch mechanism to synchronize the operator with the door:
 - .1 Automatic closure activated by a local panic button.
 - .2 Doors to maintain an average closing speed of not more than 300 mm per second during closing. When closure is activated by panic button, electric sensing edge and push button are inoperable.
 - .3 Doors: fail-safe and close upon power failure.
 - .4 Resetting of spring tension or mechanical dropouts is not required. Upon restoration of power and door controls immediately reset by opening with the standard push button. The control station(s) and supply of the appropriate disconnect switch, all conduit and wiring per the overhead door wiring instructions specified in Division 26.
 - .3 Control Station: Flush mounted, "Open/Close" key switch with "Stop" push button; NEMA 1B.
 - .4 Panic button: flush mounted switch to "Close" counter door without activating reverse switch.
- .2 Provide operator to function with constant pressure close operation.
 - .1 Tube Motor Operation: Provide the following device to enable momentary contact close operation.
 - .1 Provide a 2-wire electric sensing edge seal extending full width of door bottom bar. Contact before door fully closes to cause door to immediately stop downward travel and reverse direction to the fully opened position. Provide a self-coiling cable connection to control circuit.

3 Execution

3.1 INSTALLATION

- .1 Install counter doors in accordance with manufacturer's printed instructions.
 - .1 Fasten guides to structural supports with concealed fasteners at max. 610 mm o.c.
- .2 Adjust door operating components to ensure smooth opening and closing of door.

- .3 Adjust operable parts for correct function and smooth operation.

3.2 CLEANING

- .1 Clean surfaces soiled by work as recommended by manufacturer and remove surplus materials and debris from site.

3.3 DEMONSTRATION

- .1 Demonstrate proper operation to Departmental Representative and instruct in maintenance procedures.

END OF SECTION

1 General

1.1 RELATED WORK

- .1 Section 08 11 14 - Metal Door.
- .2 Section 08 11 16 - Aluminum Door, Frames and Glazed Screens.

1.2 REFERENCES

- .1 CSA International:
 - .1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
 - .2 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings
 - .3 CAN/CGSB-19.13-M87 Sealing Compound, One-Component, Silicone Base, Solvent Curing.
 - .4 CAN/CGSB-12.8-M90 Insulating Glass Units.
- .2 Environmental Choice Program (ECP).
 - .1 CCD-045-95, Sealants and Caulking.
- .3 Glass Association of North America (GANA).
 - .1 GANA Glazing Manual - 50th Anniversary Edition (2008).
- .4 Glass Association of North America (GANA)
 - .1 Laminated Glazing Reference Manual, 2006 Edition.
- .5 ASTM International:
 - .1 ASTM D2240 - 05(2010) Standard Test Method for Rubber Property—Durometer Hardness.
 - .2 ASTM E330 - 02(2010) Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

1.3 SYSTEM DESCRIPTION

- .1 Performance Requirements:
 - .1 Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follows:
 - .1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.
 - .2 Size glass to withstand wind loads, dead loads and positive and negative live loads acting normal to plane of glass to a design pressure for locality as measured in accordance with ASTM E330.
 - .3 Limit glass deflection to 1/200 with full recovery of glazing materials.

1.4 SUBMITTALS

- .1 Submit shop drawings or catalogue illustrations of accessories in accordance with Section 01 01 50.
 - .2 Submit test reports from approved independent testing laboratories, certifying compliance with specifications for:
 - .1 Windows Classification Rating to CAN/CSA-A440.
 - .2 Anodized finish.
 - .3 Air tightness: A3
 - .4 Water tightness: B7
 - .5 Wind load resistance: C5
 - .6 Condensation resistance: Temperature Index, 1 50
-

- .3 Provide maintenance data for aluminum windows for incorporation into Operation and Maintenance Manual specified in Section 01 01 50.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 01 50 - General Instructions; Construction/Demolition Waste Management And Disposal clause.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Engineer.
- .5 Divert unused wood materials from landfill to either recycling, reuse or composting facility.

2 Products

2.1 GLASS MATERIALS

- .1 Safety glass:
 - .1 To CAN2 12.1M , transparent, 6 mm thickness, Type 2 tempered, Class B-float, category II, concealed edge.
 - .2 Fixed Units incorporating thermal break extruded aluminum glazing stop and sealed double glazing. (Door 100 does not require thermal break.)
- .2 Materials: to CAN/CSA-A440 supplemented as follows:
 - .1 All aluminum widows by same manufacturer.
 - .2 Sash thermally broken.
 - .3 Main frame: aluminum, thermally broken.(Storefront System)
 - .4 Bedding compound: to CGSB 19-GP-14M, one compound butyl polyisobutylene polymer base, solvent curing.
- .3 Silvered glass mirror: to CAN/CGSB 12.5M-86, silvered, Type 1B (blue label), clear, 6.0 mm thick, unframed ground and polished edges and supported with tamperproof concealed fasteners. Mirror size as indicated.

2.2 GLAZING AND SEALING COMPOUND MATERIALS

- .1 Sealant compound: glazing sealant: purpose made for glazing use, compatible with hermetically sealed insulating glass units sealants, colours selected by Engineer where exposed to view.
 - .2 Glazing tape: Preformed macro-polyisobutylene tape with continuous integral Neoprene shim, paper release, black colour, width x thickness recommended by sash manufacturer to suit installation.
 - .3 Setting blocks: Setting blocks: Neoprene or EPDM, 80-90 Shore A durometer hardness to ASTM D 2240, to suit glazing method, glass light weight and area.
 - .4 Spacer shims: neoprene, 40-60 Shore "A" durometer hardness as required.
 - .5 Primer-sealers and cleaners: to glazing manufacturer's standard.
-

3 Execution

3.1 WORKMANSHIP

- .1 Remove protective coatings and clean contact surfaces with solvent and wipe dry.
- .2 Apply primer-sealer to contact surfaces.
- .3 Place setting blocks as per manufacturer's instructions.
- .4 Install glass, rest on setting blocks, ensure full contact and adhesion at perimeter.
- .5 Install removable stops, without displacing tape or sealant.
- .6 Provide edge clearance of 3 mm minimum for glass in accordance with manufacturer's instructions.
- .7 Insert spacer shims to centre glass in space. Place shims at 600 mm oc and keep 6 mm below sight line.
- .8 Apply cap bead of clear silicone sealant at exterior void and between stop and glazing.
- .9 Apply sealant to uniform and level line, flush with sightline and tooled or wiped with solvent to smooth appearance.
- .10 Do not cut or abrade laminated glass.

3.2 INSTALLATION: INTERIOR/EXTERIOR - DRY METHOD (TAPE AND TAPE)

- .1 Perform work in accordance with IGMAC and GANA Glazing Manual for glazing installation methods.
- .2 Cut glazing tape to length; install on glazing light. Seal corners by butting tape and sealing junctions with sealant.
- .3 Place setting blocks at 1/3 points, with edge block maximum 150 mm from corners.
- .4 Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- .5 Install removable stops without displacing glazing tape. Exert pressure for full continuous contact.
- .6 Trim protruding tape edge.
- .7 Exterior glazing: fill gaps between light and applied stop with sealant to depth equal to bite on glazing, to uniform and level line. Seal joints between window frames and window sills with sealant to provide weather tight seal at outside. Caulk between sill upstand and window frame.

3.3 FINISHING

- .1 Immediately remove sealant and compound droppings from finished surfaces. Remove labels after work is completed. Conceal sealant within window units except where exposed use is permitted by Departmental Representative.

END OF SECTION

PRINCIPAL ENTRANCE RENOVATIONS

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- 1 General**
- 1.1 REFERENCE STANDARDS**
- .1 C636/C636M-06 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels. (Update seismic only).
 - .2 CAN-ULC S102-03 - Standard Test Method for Burning Characteristics of Building Materials.
- 1.2 DESIGN CRITERIA**
- .1 Maximum deflection: 1/360th of span to ASTM C635 deflection test.
- 1.3 SAMPLES**
- .1 Submit duplicate 300 x 300 mm samples of acoustical units in accordance with Section 01 01 50.
- 1.4 MAINTENANCE MATERIALS**
- .1 Deliver acoustical units for maintenance use amounting to 2% of gross ceiling area for pattern and type required for project in accordance with Section 01 01 50. Store where directed and identify contents.
 - .2 Maintenance materials to be same production run as installed materials.
- 1.5 WASTE MANAGEMENT AND DISPOSAL**
- .1 Separate and recycle waste materials in accordance with Section 01 01 50 - General Instructions; Construction/Demolition Waste Management And Disposal clause.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities
 - .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.
 - .4 Divert unused metal materials from landfill to metal recycling facility approved by Engineer.
 - .5 Divert unused wood materials from landfill to either recycling, reuse or composting facility.
- 2 Products**
- 2.1 MATERIALS**
- .1 Acoustic units for suspended ceiling system, to CAN/CGSB-92.1M-89:
 - .1 Type 3, mineral composition with standard painted finish.
 - .2 Pattern D fissure size "F", non-directional, with tegular edge and 24 mm wide reveal across middle of tile.
 - .3 Flame spread rating of 25 or less.
 - .4 Smoke developed 50 or less.
 - .5 Noise reduction coefficient (NRC) designation of 0.50 to 0.60.
-

PRINCIPAL ENTRANCE RENOVATIONS

- .6 STC rating: minimum 35.
- .7 Light reflectance: minimum 75%.
- .8 Edges: square.
- .9 Colour: factory white finish.
- .10 Size: Imperial 610 x 1220 x 19 mm thick.
- .11 Shape: flat.

3 Execution

3.1 ACOUSTICAL CEILING INSTALLATION

- .1 Support new light fixtures, diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture. (If required.)
- .2 Scribe acoustical units to fit adjacent work. Butt joints tight, install wall mould at junction of acoustical ceilings and other construction to entire length of such junctions.
- .3 Provide tegular edge at all edges of tile cut to size and supported by existing wall angles. Duplicate tegular edge, in depth and width profile, using sharp utility knife and steel straight edge. Paint exposed cut edges white to match tile finish with approved paint.

3.2 CLEANING

- .1 Touch up scratches, abrasions, voids and other defects in system finish.

END OF SECTION

PRINCIPAL ENTRANCE RENOVATIONS

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RESILIENT FLOORING

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1 GENERAL

1.1 RELATED SECTIONS

- .1 Submittal Procedures: Section 01 01 50

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM F 1303-99, Specification for Sheet Vinyl Floor Covering with Backing.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-ISO 14040-[97], Environmental Management - Life Cycle Assessment - Principles and Framework (Adopted ISO 14040:1997, first edition).

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 01 50.
- .2 Submit duplicate 300 x 300 mm sample pieces of sheet material & 300 mm long base.

1.4 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 01 50 - Closeout Submittals.

1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20 C for 48 hours before, during and 48 hours after installation.

2 PRODUCTS

2.1 MATERIALS

- .1 Sheet vinyl: to ASTM F 1303, commercial.
 - .1 Type I - PVC binder content 90%
 - .2 Class 1
 - .3 Grade: A
 - .4 Pattern: smooth.
 - .5 Texture: printed to simulate marble.
 - .6 Colour: selected by Departmental Representative.
 - .7 Overall Thickness: 2.0 mm.
 - .8 Acceptable products or approved equivalents:
 - .1 PolyFlor 2000
 - .2 Magna (Mannington Commercial)

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RESILIENT SHEET FLOORING

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- .2 Resilient base: CAN/CSA A126.5, continuous, top set, complete with premoulded end stops and external corners:
 - .1 Type: 1-rubber.
 - .2 Style: B-cove.
 - .3 Thickness: 2.36 mm.
 - .4 Height: 101.6 mm.
 - .5 Lengths: cut lengths minimum 2400 mm.
 - .6 Colour: selected by Departmental Representative.
- .3 Primers and adhesives: waterproof, recommended by flooring manufacturer for specific material on applicable substrate above, at or below grade.
- .4 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste as recommended by flooring manufacturer for use with their product.
- .5 Sealer and wax: type recommended by resilient flooring material manufacturer for material type and location.

3 EXECUTION

3.1 SITE VERIFICATION OF CONDITIONS

- .1 Remove existing sheet flooring and adhesives. Level floor to accept new sheet flooring. Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.

3.2 PREPARATION

- .1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .2 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .3 Old vinyl flooring & rubber base to be removed by trained personnel. Refer to Hazardous Materials Survey in Appendix "1".
- .4 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.
- .5 Seal concrete slab to resilient flooring manufacturer's printed instructions.

3.3 APPLICATION - FLOORING

- .1 To minimize emissions from adhesives, use water-based, solvent-free styrene-butadiene-rubber adhesive for linoleum. Butadiene exposure may cause eye and nose irritation, headaches, dizziness, and vomiting.

- .2 Apply adhesive uniformly using recommended trowel. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .3 Lay flooring with seams parallel to building lines to produce a minimum number of seams. Border widths minimum 1/3 width of full material.
- .4 Run sheets in direction of traffic. Double cut sheet joints and continuously seal according to manufacturer's printed instructions.
- .5 Heat weld seams of sheet flooring in accordance with manufacturer's printed instructions.
- .6 As installation progresses, and after installation roll flooring with 45 kg minimum roller to ensure full adhesion.
- .7 Cut flooring neatly around fixed objects.
- .8 Continue flooring over areas which will be under built-in furniture.
- .9 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.
- .10 Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.4 APPLICATION - BASE

- .1 Lay out base to keep number of joints at minimum.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .7 Cope internal corners. Use premoulded corner units for right angle external corners, and formed straight base material for external corners of other angles.

3.5 CLEANING

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.

PRINCIPAL ENTRANCE RENOVATIONS

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RESILIENT SHEET FLOORING

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3.6 PROTECTION

- .1 Protect new floors from time of final set of adhesive until final inspection.
- .2 Prohibit traffic on floor for 48 hours after installation.

END OF SECTION

1 General**1.1 SAMPLES AND PRODUCT DATA**

- .1 Submit colour samples of each paint type specified.
- .2 Submit full records of all products used. List each product and include the following:
 - .1 Finish formula designation.
 - .2 Product type and use.
 - .3 CGSB number.
 - .4 Manufacturer's product number.
 - .5 Colour number.
 - .6 Manufacturer's Material Safety Data Sheets (MSDS).
 - .7 Maximum VOC classification.
 - .8 Ecologo certification.

1.2 ENVIRONMENTAL REQUIREMENTS

- .1 Do not apply paint finish in areas where dust is being generated.
- .2 Provide paint products certified to meet the requirements of the Environmental Choice Program, Department of the Environment.
- .3 Submit CSA Certification Reports that products proposed for use are certified under the Environmental Choice program. Water-based paints are to be certified to ECP-07-89, and solvent-based paints are to be certified to ECP-12-89.
- .4 Comply with requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials.
- .5 Provide continuous ventilation during and after paint application. of paint. Run ventilation system 24 hours per day during installation, and provide continuous ventilation for 7 days after completion of application of paint.
- .6 Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
- .7 Substrate and ambient temperature must be within limits prescribed in paint standard and by manufacturer, to the approval of the Engineer.
- .8 Provide temporary heating where permanent facilities are not available to maintain minimum recommended temperatures.
- .9 Apply paint only when surface to be painted is dry, properly cured and adequately prepared.

1.3 QUALITY ASSURANCE

- .1 Do paint work to standards of the Master Painters Association of B.C. (MPA).
-

2 Products

2.1 MATERIALS

- .1 Paint materials: to CGSB Standards listed in Finishing Formulae.
- .2 Paint materials for each coating formula to be products of only one manufacturer.

3 Execution

3.1 PREPARATION OF SURFACES

- .1 Prepare wall board surfaces to CGSB 85-GP-33M-1979. Fill minor cracks with plaster patching compound.
- .1 Touch up shop paint primer on steel with CAN/CGSB 1.40M-89 to CGSB 85-GP-14M-1978.

3.2 APPLICATION

- .1 Sand and dust between each coat to remove defects visible from distance up to 1.5 m.
- .2 Finish bottoms, edges, tops and cutouts of doors after fitting as specified for door surfaces.

3.3 INTERIOR FINISHES

- .1 Formula 7: for gypsum board walls in office areas apply:
One coat latex primer CAN/CGSB 1.119M
Two coats eggshell latex paint CAN/CGSB 1.118M.
- .2 Formula 12: for primed ferrous metal surfaces apply:
one coat spot priming
one coat latex primer General Paint #51-050.
two coats acrylic semi-gloss water base enamel

3.4 EXTERIOR FINISHES

- .1 Formula 36: for primed ferrous metal surfaces apply:
One coat spot priming CAN/CGSB 1.40M-89
One coat, quick-drying, primer CISC/CPMA 2-75
Two coats exterior enamel CAN/CGSB 1.59M-89.

END OF SECTION

1.1 GENERAL

- .1 This Section covers items common to Section of Division 26, 27 and 28. This section supplements requirements of Division 01.

1.2 CODES AND STANDARDS

- .1 Do complete installation in accordance with Canadian Electrical Code, CSA C22.1-2012.
- .2 Comply with CSA Certification Standards and Electrical Bulletins in force at time of tender at time of tender submission.
- .3 Perform work in accordance with CSA Z426 - Workplace Electrical Safety and Worksafe BC Regulations.

1.3 PERMITS, FEES

- .1 Submit to Electrical Inspection Department necessary number of drawings and specifications for examination and approval prior to commencement of work.
- .2 Pay associated fees.
- .3 Obtain and pay for an electrical permit to cover all work under Divisions 26, 27 and 28.
- .4 Submit a copy of electrical permit to the Departmental Representative prior to commencement of work on site.
- .5 Departmental Representative will provide drawings and specifications required by Electrical Inspection Department at no cost.
- .6 Notify Departmental Representative of changes required by Electrical Inspection Department prior to making changes.
- .7 Furnish Certificates of Acceptance from Electrical Inspection Department on completion of work to Departmental Representative.

1.4 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- .1 Submit shop drawings, product data and samples in accordance with Section 01 01 50 – General Instructions.
- .2 Indicate details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material.
- .3 Where applicable, include wiring, single line and schematic diagrams.

- .4 Include wiring drawings or diagrams showing interconnection with work of other Sections.

1.5 MAINTENANCE MATERIALS

- .1 Provide maintenance materials in accordance with Section 01 01 50 – General Instructions.
- .2 Additional maintenance material requirements are included under various other Sections.

1.6 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for incorporation into operation and maintenance manual specified in Section 01 01 50 – General Instructions.
- .2 Include in operations and maintenance data:
 - .1 Details of design elements, construction features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.
 - .2 Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items, and parts lists. Advertising or sales literature not acceptable.
 - .3 Wiring and schematic diagrams and performance curves.
 - .4 Names and addresses of local suppliers for items included in maintenance manuals.
 - .5 Copy of reviewed shop drawings.
- .3 Provide four paper copies of manuals in binders.
- .4 Provide three electronic copies of manuals on USB sticks. Provide pdf copies of documents. Provide dwg copies of AutoCAD as-builts.

1.7 CARE, OPERATION AND START-UP

- .1 Instruct departmental representative and operating personnel in the operation, care and maintenance of equipment.
- .2 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

1.8 VOLTAGE RATINGS

- .1 Operating voltages: to CAN3-C235-83 (R1996).

- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.9 MATERIALS AND EQUIPMENT

- .1 Equipment and material to be new and CSA certified, and manufactured to standard quoted.
- .2 Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Inspection Department.

1.10 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates as follows:
- .2 Nameplates:
 - .1 Lamicoid 3 mm thick plastic engraving sheet, white face and black core, self adhesive unless specified otherwise.

NAMEPLATE SIZES

- Size 1 10 x 50 mm 1 line 3 mm high letters
- Size 2 12 x 70 mm 1 line 5 mm high letters
- Size 3 12 x 70 mm 2 lines 3 mm high letters
- Size 4 20 x 90 mm 1 line 8 mm high letters
- Size 5 20 x 90 mm 2 lines 5 mm high letters
- Size 6 25 x 100 mm 1 line 12 mm high letters
- Size 7 25 x 100 mm 2 lines 6 mm high letters

- .3 Wording on nameplates and labels to be approved by departmental representative prior to manufacture.
- .4 Allow for average of twenty-five (25) letters per nameplate.
- .5 Identification to be English.
- .6 Nameplates for junction boxes to indicate system and/or voltage characteristics.
- .7 Nameplates for pull boxes to indicate system and type of cable.

1.11 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, numbered plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

- .2 Maintain phase sequence and colour coding for 120/208 V wiring throughout.
- .3 Identify Telecommunications cabling as indicated.

1.12 WIRING TERMINATIONS

- .1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

1.13 MANUFACTURERS AND CSA LABELS

- .1 Visible and legible after equipment is installed.

1.14 WARNING SIGNS

- .1 As specified and to meet requirements of Electrical Inspection Department and Departmental Representative.
- .2 Use decal signs, minimum 175 x 250 mm size.

1.15 LOCATION OF OUTLETS

- .1 Locate outlets as indicated on drawings.
- .2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.
- .3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3 m, and information is given before installation.

1.16 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .3 Install electrical equipment at following heights unless indicated otherwise.
 - .1 Local switches: 1 200 mm.
 - .2 Wall receptacles: 400 mm.
 - .3 Voice and Data outlets: 400 mm.

1.17 PROTECTION

- .1 Protect exposed live equipment during construction for personnel safety.

- .2 Shield and mark live parts "LIVE 120 VOLTS", or with appropriate voltage.

1.18 CONDUIT AND CABLE INSTALLATION

- .1 Refer to drawings for type of conduit and cable to be used.
- .2 Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete; schedule 40 plastic pipe, sized for free passage of conduit, and protruding 50 mm.
- .3 Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

1.19 FIRESTOPPING

- .1 Where cables or conduits pass through fire rated ceilings and fire rated walls, pack space full with a ULC approved firestopping system.

1.20 FIELD QUALITY CONTROL

- .1 Conduct and pay for testing, commissioning, demonstration and training of the following:
 - .1 Insulation resistance testing:
 - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
 - .2 Check resistance to ground before energizing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Lighting and associated controls.
 - .4 Voice and Data cabling and jacks.
 - .5 Door control and monitoring systems.
 - .6 Intercom System.
 - .7 Radio systems.
 - .8 CCTV System.
 - .9 Flare/Flash/PPAS systems.
 - .10 Cheque Room Alarm
 - .11 Other systems as specified.
- .2 Refer to each Section for additional testing requirements.
- .3 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .4 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that each system is taken out of service the shortest possible amount of time.
- .5 Submit test results for Departmental Representative review.

1.21 CLEANING

- .1 Do final cleaning in accordance with Section 01 01 50 – General Instructions.

- .2 At time of final cleaning, clean lighting reflectors, lenses, and other lighting surfaces that have been exposed to construction dust and dirt.

1.22 RECORD DRAWINGS

- .1 Refer to Section 01 01 50 – General Instructions.
- .2 Indicate conduit and cable runs, junction boxes and circuit numbers.
- .3 Indicate communication voice/data outlet numbers.
- .4 Additional record drawing requirements are included under various other Sections.

1.23 ENVIRONMENTAL PROTECTION AND WASTE MANAGEMENT

- .1 Refer to Section 01 01 50 – General Instructions.

1.24 CLOSEOUT

- .1 Turn over all keys to the Departmental Representative complete with a transmittal form.

END OF SECTION

1 General

1.1 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 01 50 – General Instructions.

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 01 50 – General Instructions.

2 Products

2.1 BUILDING WIRES

- .1 Conductors: stranded for 10 AWG and larger, minimum size 12 AWG.
- .2 Copper conductors with 600 V insulation of chemically cross-linked thermosetting polyethylene material rated RW90.

2.2 ARMOURED CABLES

- .1 Type AC90. Conductors: Insulated, copper, minimum size 12 AWG.
- .2 Armour: interlocking type fabricated from aluminum strip.

3 Execution

3.1 INSTALLATION OF BUILDING WIRES

- .1 Install wiring as follows:
 - .1 In conduit systems in accordance with Section 26 05 34 – Conduits, Fastenings and Fittings.
 - .2 Provide a green insulated bond conductor in all conduits sized in accordance with CSA C22.1-2012, Canadian Electrical Code, Part 1.

3.2 INSTALLATION OF ARMOURED CABLES

- .1 Use armoured cables for final connection to luminaires installed in T-Bar ceiling and as specified elsewhere.
- .2 Terminate cables using connectors approved for armoured cable.

END OF SECTION

1 General

1.1 RELATED WORK

- .1 This Section covers items common to Sections of Division 26, 27 and 28. This Section supplements requirements of Division 01.

1.2 REGULATORY REQUIREMENTS

- .1 Restraints shall meet the requirements of the National Building Code, B.C. Building Code and any local regulations.
- .2 All electrical and communications equipment that is new or being relocated is to be seismically restrained.

1.3 SEISMIC RESTRAINT DESIGN AND INSPECTION

- .1 Arrange and pay for the services of a professional engineer registered in the province of B.C. "Seismic Engineer" shall provide all required engineering services related to seismic restraints of the electrical and communications equipment.
- .2 The Seismic Engineer shall provide assistance to the contractor during the course of the equipment install if necessary.
- .3 The Seismic Engineer shall inspect the completed seismic installation and shall submit a letter to the departmental representative stating that the complete seismic installation is installed in accordance with the seismic engineers drawings and it complies with all regulatory requirements.

1.4 SUBMITTALS

- .1 Submit shop drawings of all restraining devices, including details of attachments to the structure, either tested in an independent testing laboratory or approved by a B.C. registered professional Engineer.

1.5 SCOPE OF WORK

- .1 Provide seismic restraints for the cabinets in room 122. Refer to specifications for the cabinets. Seismic restraints are to prevent injury or hazard to persons and equipment and to retain equipment in its normal position in the event of an earthquake.
- .2 Provide all seismic restraint related hardware, including bolts and anchors, from point of attachment to equipment through to and including attachment to structure.
- .3 It is the entire responsibility of equipment manufactures to design their equipment so that the strength and anchorage of internal components of the equipment exceeds the force level used to restrain and anchor the unit itself to the supporting structure.

2 Products

2.1 GENERAL

- .1 Provide anchor bolts, straps and other mounting materials as specified by Seismic Engineer.

3 Execution

3.1 INSTALLATION

- .1 Carry out all seismic restraint works on electrical equipment as per the recommendations of the Seismic Engineer and in accordance with all regulatory requirements.
- .2 Co-ordinate the work with other trades as required.

END OF SECTION

1 General

1.1 REFERENCES

- .1 CSA C22.1-2012 Canadian Electrical Code.
- .2 ANSI/TIA-607-B Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
- .3 This Section covers items common to Section of Division 26, 27 and 28.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 01 50 - Submittal Procedures.

2 Products

2.1 EQUIPMENT (GENERAL)

- .1 Clamps for grounding of conductor, size as required.
- .2 Insulated grounding conductors: green, type RW90.
- .3 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
 - .1 Grounding and bonding bushings.
 - .2 Protective type clamps.
 - .3 Bolted type conductor connectors.
 - .4 Bonding jumpers, straps.
 - .5 Pressure wire connectors.
 - .6 Copper ground bar.

2.2 GROUND BARS

- .1 ANSI/TIA-607-B compliant, 110 alloy copper bus bars.
- .2 Pre-drilled and tapped to receive grounding conductor compression lugs.
- .3 Main ground bus in Room 122: 102mm x 406mm x 6.35mm, 16x7.9mm hole sets, 6x11.1mm hole sets, standoff insulators, wall mounting brackets.
- .4 Ground bus in console in Room 100: 51mm x 305mm x 6.35mm, 6x7.9mm hole sets, 3x11.1mm hole sets, mounting brackets.
- .5 Ground bus in cabinets in room 122: 25mm x 489mm x 4.76mm, 8-#6-32 tapped lug holes, 2x7.9mm hole sets, length suitable for horizontal rack mounting, one bar per cabinet.

2.2 PEDESTAL CLAMPS

- .1 Pedestal and grounding connectors.
- .2 Specifically manufactured to ground raised access floor pedestals.
- .3 Plated copper.
- .4 Review existing pedestals and provide appropriately sized round or square clamps.

3 Execution

3.1 INSTALLATION GENERAL

- .1 Install complete permanent, continuous, telecommunications, equipment, grounding systems including, ground bars, conductors, connectors, accessories, as indicated, to conform to requirements of departmental representative, and local authority having jurisdiction over installation. Installation shall be in compliance with ANSI/TIA-607-B.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .5 Soldered joints not permitted.
- .6 Use high-pressure compression type connectors where indicated.
- .7 Provide a green insulated bond conductor in all conduits and ducts.
- .8 Ground all new raceways.
- .9 Ground items of electrical equipment to ground bars with individual copper compression lugs.

3.3 EQUIPMENT GROUNDING

- .1 Install grounding connections to typical equipment included in, but not necessarily limited to transformers, panels, distribution panels, raceways, telecommunications and security systems.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results - Electrical.
- .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of departmental representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing equipment.

END OF SECTION

1 General

1.1 RELATED WORK

- .1 Section 26 05 00 - Common Work Results - Electrical

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 01 50 – General Instructions.

2 Products

2.1 JUNCTION AND PULL BOXES

- .1 Welded steel construction with screw-on flat covers for surface mounting.
- .2 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.
- .3 Minimum size: 104 mm square.
- .4 Cast aluminum, one or two gang FS or FD boxes with factory threaded hubs and mounting feet for all boxes mounted on finished wall or ceiling surfaces.

3 Execution

3.1 JUNCTION AND PULL BOX INSTALLATION

- .1 Install pull boxes in inconspicuous but accessible locations.
- .2 All junction and pull boxes are not indicated. Install pull boxes so as not to exceed 30 m of conduit run between pull boxes.
- .3 Ground pull boxes as indicated.

3.2 IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Install size 2 identification lamicooids indicating system name on pull boxes and junction boxes.

END OF SECTION

1 General

1.1 REFERENCES

- .1 CSA C22.1-2012 Canadian Electrical Code, Part 1.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 01 50 – General Instructions.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Refer to Section 01 01 50 – General Instructions.

1.4 ENVIRONMENTAL PROTECTION

- .1 Refer to Section 01 01 50 – General Instructions.

2 Products

2.1 RECESSED OUTLET AND CONDUIT BOXES GENERAL

- .1 Size boxes in accordance with CSA C22.1.
- .2 102 mm square or larger outlet boxes as required for special devices.
- .3 102 mm square outlet boxes for lighting fixture outlets.
- .4 102 mm square outlet boxes with extension and plaster rings for flush mounting devices in finished walls.
- .5 Gang boxes where wiring devices are grouped.
- .6 Blank cover plates for boxes without wiring devices.

2.2 SURFACE CONDUIT AND DEVICE BOXES

- .1 Cast aluminum, one or two gang FS or FD boxes with factory threaded hubs and mounting feet for all boxes mounted on finished wall or ceiling surfaces.

2.3 FITTINGS - GENERAL

- .1 Bushing and connectors with nylon insulated throats.
- .2 Knock-out fillers to prevent entry of debris.

- .3 Conduit outlet bodies for conduit up to 35 mm and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.

3 Execution

3.1 INSTALLATION

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- .3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.
- .4 Provide correct size of openings in boxes for conduit and armoured cable connections. Reducing washers are not allowed.

END OF SECTION

1 General

1.1 LOCATION OF CONDUIT

- .1 Drawings do not show all conduits. Those shown are in diagrammatic form only.

1.2 CONDUIT SIZES

- .1 Note that conduit sizes referenced in the 2012, Canadian Electrical Code are used.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Refer to Section 01 01 50 - Waste Management.

1.4 ENVIRONMENTAL PROTECTION

- .1 Refer to Section 01 01 50 – General Instructions.

2 Products

2.1 CONDUITS

- .1 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
- .2 Rigid steel conduit: to CSA C22.2 No. 45, galvanized steel.

2.2 CONDUIT FASTENINGS

- .1 One hole steel straps to secure surface conduits 53 mm and smaller. Two hole steel straps for conduits larger than 53 mm.

2.3 CONDUIT FITTINGS

- .1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.
- .2 EMT couplings and connectors shall be malleable steel, set screw type. Connectors shall have insulated throats. Cast fittings are not acceptable.

2.4 FISH CORD

- .1 Polypropylene.

3 Execution

3.1 INSTALLATION

- .1 Provide EMT conduit for all cabling and wiring except where indicated otherwise.
- .2 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .3 Conceal conduits above finished ceilings, except in mechanical and electrical rooms and in unfinished areas or where surface-mounted conduit is indicated.
- .4 Where conduits become blocked, remove and replace blocked section. Do not use liquids to clean out conduits.
- .5 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .6 Mechanically bend steel conduit over 21 mm diameter.
- .7 Dry conduits out before installing wire.
- .8 Install fish cord in empty conduits.

3.2 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Group conduits wherever possible on surface channels.
- .3 Do not pass conduits through structural members except as indicated.
- .4 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum 25 mm at crossovers.

3.3 CONCEALED CONDUITS

- .1 Run parallel or perpendicular to building lines.

END OF SECTION

1 General

1.1 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit engineered shop drawings and product data in accordance with Section 01 01 50 - Submittal Procedures. Examine existing control panels.

1.2 MANUFACTURER

- .1 Manufacturer shall be a CSA-approved panel shop normally engaged in the business of manufacturing control panels.
- .2 Label all conductors and devices in accordance with normal CSA-approved panel shop industry practice.

1.3 SCOPE

- .1 This section is applicable to the:
 - .1 Door Control Panels
 - .2 Cheque Room Alarm System
- .2 Refer to the drawings for additional information.

2 Products

2.1 DOOR CONTROL PANELS

- .1 14 gauge steel, powder coat painted grey, to match existing.
- .2 Hinged desktop mounted for Panel C, wall-mounted for Panel D.
- .3 30mm oiltight control devices.
- .4 Illuminated devices - LED.
- .5 Lamicoid labels to match existing.
- .6 Layout to match existing with modifications as indicated.
- .7 Panel C – sloped top to match existing.

2.2 CHEQUE ROOM CONTROL PANELS

- .1 Rack Mounted Alarm Panel
 - .1 Black textured powder-coated, standard EIA nineteen-inch, one rack-unit, steel panel.
 - .2 23mm oiltight control devices
 - .3 Illuminated devices LED.
 - .4 Lamicoid labels

- .2 Enclosure containing relays and transformer
 - .1 Standard steel NEMA-1 hinged enclosure with lockable latch
 - .2 Enclosure shall be as thin and compact as possible to minimize protrusion into corridor and to minimize wall space.

3 Execution

3.1 INSTALLATION GENERAL

- .1 Remove existing control panels and make changes to wiring and controls as indicated.
- .2 Install new control panels.
- .3 Test and commission all new and existing control panels.

END OF SECTION

1 General

1.1 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 01 50 – General Instructions.

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Refer to Section 01 01 50 - Waste Management.

1.3 ENVIRONMENTAL PROTECTION

- .1 Refer to Section 01 01 50 – General Instructions.

2 Products

2.1 SWITCHES

- .1 Specification Grade, 20 A, 120 V, single pole, double pole, three-way, four-way switches to: CSA-C22.2, No.55 and CSA – C22.2, No.111.
- .2 Manually-operated general purpose ac switches with following features:
 - .1 Terminal holes approved for No. 10 AWG wire.
 - .2 Silver alloy contacts.
 - .3 Urea molded housing.
 - .4 Suitable for back and side wiring.
 - .5 Ivory toggle.
- .3 Toggle operated fully rated for tungsten filament and fluorescent lamps, and up to 80% of rated capacity of motor loads.

2.2 RECEPTACLES

- .1 Specification Grade, duplex receptacles, CSA type 5-15.R, 125 V, 15 A, U ground, with following features:
 - .1 Urea molded housing.
 - .2 Suitable for No. 10 AWG for back and side wiring.
 - .3 Break-off links for use as split receptacles.
 - .4 Eight back wired entrances, four side wiring screws.
 - .5 Triple wipe contacts and riveted grounding contacts.
 - .6 Ivory color.
 - .7 Decora, black colour for control console, with black faceplate.
- .2 Other receptacles with ampacity and voltage as indicated.

2.3 COVER PLATES

- .1 Stainless steel cover plates for wiring devices.
- .2 Sheet steel coverplates with turned over edges for surface mounted boxes.

3 Execution

3.1 INSTALLATION

- .1 Switches:
 - .1 Install single pole throw switches with handle in “UP” position when switch closed.
 - .2 Install switches in gang type outlet box when more than one switch is required in one location.
 - .3 Mount toggle switches at height in accordance with Section 26 05 00 – Common Work Results – Electrical.
- .2 Receptacles:
 - .1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.
 - .2 Mount receptacles at height in accordance with Section 26 05 00 – Common Work Results - Electrical.
- .3 Cover Plates:
 - .1 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.
 - .2 Install suitable common cover plates where wiring devices are grouped.
 - .3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

END OF SECTION

1 General

1.1 RELATED WORK

- .1 Section 26 05 00 – Common Work Results – Electrical.
- .2 Section 26 05 31 – Junction and Pull Boxes.
- .3 Section 26 05 32 – Outlet Boxes and Conduit Boxes.
- .4 Section 26 05 34 – Conduits, Fastenings and Fittings.

1.2 STANDARDS AND CODES

- .1 Comply with latest issues and all addendums of the following standards:
 - .1 TIA/EIA, 568-C series standards – Commercial Building Telecommunications Standards.
 - .2 ANSI/TIA 607-B – Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises.
 - .3 NECA/BICSI 568-2006 – Standard for Installing Commercial Building Telecommunications Cabling.
 - .4 Canadian Electrical Code including all BC amendments and bulletins.
 - .5 National Building Code.
- .2 All products shall be fully standard-compliant and shall be the product of a single manufacturer.

1.3 CONTRACTOR QUALIFICATIONS

- .1 The cabling contractor shall be a certified systems vendor of the manufacturer and use only technicians fully trained and qualified on installation and testing of the components installed.
- .2 All staff performing any type of work contained in this Section shall be certified in the installation, termination and testing of all aspects of Category 6 UTP cabling and components by:
 - .1 The cable manufacturer or,
 - .2 A recognized educational institution or,
 - .3 Being the holder of the designation of Registered Communications Distribution Designer (RCDD).

1.4 SHOP DRAWINGS

- .1 Submit shop drawings and product data in accordance with Section 01 01 50 – General Instructions.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Refer to Section 01 01 50 – General Instructions.

1.6 ENVIRONMENTAL PROTECTION

- .1 Refer to Section 01 01 50 – General Instructions.

2 Products

2.1 CATEGORY 6 UTP HORIZONTAL CABLE

- .1 Four (4) pair, unshielded, twisted, solid copper core, 100 ohm, 24 AWG, Category 6, FT4 rated.
- .2 Category 6 cable for both voice and data horizontal cabling. Blue color for data cables and White color for voice cables.
- .3 Transmission requirements shall conform to or exceed all applicable sections of the TIA/EIA 568 C-2 current specifications and addendums for Category 6 cable and components.
- .4 Electromagnetic radiation: cables shall comply with Class A limits of FCC Part 15, Subpart J for computing devices.
- .5 Nearby sources of radio and electrical interference such as radio transmitters, HVAC, arc welders, motors, intercom or radar installations shall be evaluated for any possible effects.

2.2 IDC CONNECTORS

- .1 Insulation Displacement Type (IDC) terminations.
- .2 Category 6 for all horizontal cabling to set run, wall outlets.

2.3 MODULAR VOICE AND DATA JACKS

- .1 For installation on stainless steel face plates, except where noted otherwise.
- .2 Non-keyed, 4 pair, 8P/8W modular jacks, Category 6, T568A (ISDN) wiring.
- .3 Snap-in type connectors.
- .4 Color code for jacks:
 - .1 Voice – Black.
 - .2 Data – White.
- .5 Arrange voice and data jacks in identical sequence at every outlet, with data jacks on top and voice on the bottom.

2.4 CATEGORY 6 UTP CONNECTORS

- .1 Applies to both voice and data terminations.
- .2 All UTP connectors at each horizontal cable run shall meet the following specifications:
 - .1 Data horizontal cable runs shall use 8P/8W female RJ45 components at both ends.
 - .2 Voice horizontal cable runs shall use 8P/8W female RJ45 components at the faceplate end and direct IDC termination in the telecommunications room.
- .3 Cables shall be wired straight through, no crossover is allowed. Pin 1 at one end is connected to Pin 1 at the other end of the cables.
- .4 Components:
 - .1 Configured to support 8 position EIA/TIA, ISDN cabling, 1000Base T and Token Ring standards.
 - .2 Insulation Displacement Type (IDC), modular, non-keyed, utilizing block type connectors.
- .5 Connectors at outlet end; install in appropriate stainless steel coverplate.

2.7 CABLE LABELS

- .1 Label all new voice and data cables.
- .2 Bold face laser quality printed labels, black print on white background.
- .3 Self adhesive, one piece label and clear cover wrapped around cable.
- .4 Wording on labels to be approved by Departmental Representative prior to manufacture.

3 Execution

3.1 CATEGORY 6 UTP HORIZONTAL CABLE INSTALLATION

- .1 Install each cable in one continuous run from the Lan Cabinet or telecommunications room to the faceplate. Breaks or spliced not allowed.
- .2 No single cable run shall exceed 90 metres in length, measure from the terminations in the Cabinet or BIX Connector to each RJ45 faceplate jack. Ensure the distance is not exceeded before installing the cabling system.
- .3 Locate all cables:
 - .1 At least 130 mm from power lines carrying 2 kVA or less.
 - .2 At least 300 mm from power lines carrying 2 kVA to 5 kVA.
 - .3 At least 600 mm from power lines carrying more than 5 kVA.
 - .4 At least 300 mm from fluorescent fixtures.

- .4 Ensure that all clearances between the installed cables and any type of electrical equipment, lines, and lighting are met and/or exceeded such that EMI is well within acceptable industry specifications.
- .5 Should the Contractor encounter cable runs that cannot be installed to meet required clearance specifications, then the Contractor shall install fully satisfactory shielding.
- .6 Cable terminations:
 - .1 Terminate data cables with 8P/8W female RJ45 components at both ends.
 - .2 Terminate voice cables with 8P/8W female RJ45 components at faceplate end, direct IDC termination in the Telephone Room.
- .7 Cable bends shall not be less than the minimum radius specified by the manufacturer for the particular cable in use and shall be made without strain or stress to the cable.
- .8 All cables shall be installed in conduit raceway system unless otherwise indicated on contract drawings.
- .9 All cables shall be clearly labeled at both ends.
- .10 Use no more than 25 lbs of force to install the voice and data cabling in raceways.
- .11 Provide Velcro wraps to fasten all cables. Do not use tie-wraps.

3.2 CABLE SLACK FOR TERMINATED CABLES

- .1 For each cable run terminated, there shall be a minimum cable slack of 1 metre at the originating end (i.e. Patch Panel), and 300 mm at the outlet location.
- .2 Place cable slack in the LAN Cabinet or as deemed appropriate by the Departmental Representative, on condition that storage slack is neat.

3.3 UTP CABLE TERMINATIONS

- .1 All terminations to the UTP cable shall be properly connected using industry-standard Insulation Displacement Connection conventions and procedures to 8P/8W, T568A connector and in full compliance with the manufacturer's installation specifications and instructions.
- .2 Maintain the cable twist up to the connection point at both ends of the cables. Remove a maximum of 12 mm of the cable jacket measured from the connection point.
- .3 Terminate all four horizontal cable pairs at the RJ45 jack, patch panel and connector strip.
- .4 Label each voice and data jack and voice connector strip as indicated using bold face laser quality labels. Label voice and data jacks as indicated.

3.4 UTP CABLE LABEL INSTALLATION

- .1 Install label on each end of cable.
- .2 Install label not less than 150 mm from termination end of cable.
- .3 All labels to be clearly visible and readable after final termination of cables without having to move or rotate cables.

3.5 CATEGORY 6 UTP CABLE TESTING

- .1 Testing, General:
 - .1 Perform a basic link test to verify and ensure full functional capabilities.
 - .2 Test each cable on a pair-to-pair basis ensuring continuity and eliminating the possibilities of shorts or reversals.
 - .3 Use testing equipment based on TDR (Time Domain Reflectometry) technology.
 - .4 Test each cable to ensure compliance with transmission requirements outlined in the specification.
 - .5 Test all cables.
- .2 Test all cables with a Level II-E tester for conformance with basic link performance as described in EIA/TIA-568 standards.
- .3 The test results information for each link shall be recorded in the memory of the field tester upon completion of the test.
- .4 The test results records saved by the tester shall be transferred to a windows-based database utility that allows for the maintenance, inspection, and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered, i.e. "As saved in the tester" at the end of each test and that these results cannot be modified at a later time.
- .5 The database for the completed job shall be stored and delivered on CD-ROM including the software tools required to view, inspect and print a selection of the test reports.
- .6 Documentation of tests shall be given in report form and will, at a minimum, contain the following data:

OPERATOR:
LOCATION:

DATE:
CABLE TYPE:

CABLE #

TESTER, MAKE AND MODEL

TEST RESULTS (PAIRS):
PINS 1,2 / PINS 3,6 / PINS 4,5 / PINS 7,8
LENGTH:
ATTENUATION:
IMPEDENCE:

WIRE MAP:
NEXT (PAIR-TO-PAIR):
PSNEXT:
RETURN LOSS:
ELFEXT (PAIR-TO-PAIR):
PSELFEXT:
PROPAGATION DELAY:
DELAY SKEW:

- .7 No marginal passes or conditional passes will be accepted.
- .8 The Departmental Representative shall be notified 5 working days before testing is completed. At the completion of testing, the Departmental Representative will select a random sample of up to 5% of the installed links for retesting by the Contractor for comparison with the submitted test data. Should the retest show a "Fail" result, or should any measure parameter vary by more than 10% from the test results previously submitted, the installation Contractor shall, at his own expense, repeat the entire testing in the presence of the Departmental Representative.
- .9 Provide paper copy of all test results for incorporation into Maintenance Manuals specified in Section 01 01 50 – General Instructions.

3.6 CATEGORY 6 UTP CABLE DOCUMENTATION AND CERTIFICATION

- .1 Provide record drawings upon completion:
 - .1 Indicate all changes.
 - .2 Indicate cable Ids adjacent to outlets.
 - .3 Indicate conduit runs, pull boxes and conduit sizes on record drawings.
- .2 **Provide a certificate document issued by the cable/component manufacturer, guaranteeing transmission capabilities of the cabling system to support 1000 Mbps applications for a period of 25 years.**
- .3 Installation technicians shall be certified through the manufacturer's certification program. Technicians shall provide evidence of their training certification, or Contractor shall supply documentation verifying their current participation in the manufacturer's certification program.
- .4 Manufacturer's certification:
 - .1 The manufacturer's certification shall guarantee that design and installation on the part of the certified Contractor will not negate or void any portion of the certified system.
 - .2 In the event that the Contractor is no longer in business, the full certification remains valid and will be covered by the manufacturer.
- .5 The installed structured cabling system shall be covered by a warranty which includes, as a minimum:

- .1 25 Year Coverage.
- .2 Warranty against defects in material and workmanship from the date of the interim acceptance of installation.
- .3 Repair or replacement of a failed component, covering parts and labour, at no charge to the Owner.
- .4 Single point of contact for all warranty service.

- .6 Upon request at no additional cost, provide a manufacturer's technical representative to conduct an on-site visit to ensure complete technical compliance.

- .7 Provide paper copy of all test results for incorporation into Maintenance Manuals specified in Section 01 01 50 – General Instructions.

- .8 Provide electronic copy of all test results on DVD format.

END OF SECTION

1 General

1.1 REFERENCES

- .1 CSA C22.1-2012 Canadian Electrical Code.
- .2 EIA/TIA 310D – Cabinets, Racks, Panels and Associated Equipment.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 01 50 - Submittal Procedures.

1.3 RELATED WORK

- .1 Section 26 05 26 – Grounding and Bonding
- .2 Section 26 05 25 – Seismic Restraints

2 Products

2.1 CABINETS

- .1 Standard 483mm (nineteen inch), gangable, four-post, enclosed, EIA equipment cabinet, seismic certified for Zone 4.
- .2 Compliant with EIA/TIA 310D.
- .3 Overall Dimensions:
 - .1 Height: 2027mm.
 - .2 Width: 610 mm.
 - .3 Depth: 1067mm.
- .4 Useable Dimensions:
 - .1 Height: 42 rackspaces.
 - .2 Depth: 1000mm.
- .5 Construction: Fully welded.
- .6 Materials:
 - .1 Top and Bottom: 14-gauge steel.
 - .2 Horizontal Braces: 16-gauge steel.
- .7 Finish: Black textured powder coat.
- .8 Rackrail:
 - .1 Two pairs of fully adjustable, 14-gauge steel rackrail with cage nut mounting holes in universal EIA spacing, two rear Z-rail adaptors. 10-32 cage nuts.
 - .2 Rackspaces: Numbered.
- .9 Front Door: Single, lockable handle, vented perforated steel 64% open area
- .10 Rear Door: Split cupboard style, lockable handles, fans, vented perforated steel 79% open area.
 - .1 A total of four 114mm fans spaced evenly on rear doors, alternating left and right.
 - .2 Movable fans & fan guards.
 - .3 Proportional speed thermostatic fan control unit – one per cabinet.

- .11 Grounding and Bonding Stud: 1/4-20 by 25mm threaded, installed in base.
- .12 Cable Gland Grommets: 100mm diameter, quantity five, located in top.
- .13 Vertical Lacer Strip: 83mm width, highly perforated, cable tie posts, at least two per cabinet, 42 rackspaces, velcro ties.
- .14 Vertical Power Strip: 20 Amp, 120 Volt, 2 circuits, 12 outlets divided between the two circuits, 5-20R outlets, full height.
- .15 Horizontal bus bar – specified in Section 26 05 26.
- .16 Plates as required to fasten cabinets to steel seismic rods embedded in concrete floor.
- .17 Hinged horizontal cable mangers, steel, 2 rackspaces height, provide a total of three, exact location as discussed with Departmental Representative on site.
- .18 D-ring horizontal cable managers, steel, provide a total of four, exact location as discussed with Departmental Representative on site.
- .19 Vertical cable chases as indicated, 42 rackspaces height, 100mm width, steel.
- .20 Design based on Middle Atlantic WMRK series.

3 Execution

3.1 INSTALLATION GENERAL

- .1 Examine existing cabinet installation and area under cabinets.
- .2 Coordinate work with Seismic Engineer specified in Section 26 05 25.
- .3 Fasten each cabinet to the seismic rods embedded in the concrete floor and to the side-wall seismic braces. The equipment is not considered mission-critical. Provide a basic level of seismic bracing. Cabinets are rated Zone-4 as stand-alone pieces of equipment, but the installation is not required to be Zone-4 compliant.
- .4 Provide drawing elevations showing the relocated rack-mounted equipment layout.
- .5 Install the cabinets in accordance with the manufacturer's instructions.
- .6 Install equipment enclosures plumb, level and square.
- .7 Adjust operating hardware to operate smoothly without binding.
- .8 Repair minor damages to finish in accordance with manufacturer's instructions.
- .9 Protect installed equipment enclosures from damage during construction.

END OF SECTION

1 General

1.1 REFERENCES

- .1 VESA FDMI Standard – Flat Display Mounting Interface Standard.
- .2 EIA/TIA 310E – Cabinets, Racks, Panels and Associated Equipment.
- .3 UL – Underwriters Laboratories.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 01 50 - Submittal Procedures.

1.3 RELATED WORK

- .1 Section 26 05 26 – Grounding and Bonding

2 Products

2.1 CONTROL CONSOLE SYSTEM

- .1 Control console for Room 100 - manufactured technical furniture.
- .2 Comply with the following standards:
 - .1 VESA FDMI Standard.
 - .2 UL Listed: US and Canada.
 - .3 EIA/TIA 310E.
- .3 Dimensions of Console Bays: As indicated.
- .4 Construction: Full-welded steel bays of uni-frame construction.
- .5 Cable Management and Access: Unrestricted.
- .6 Exterior Support Foot Placement: Support and unimpeded chair and operator movement.
- .7 Overall depth of 937mm including 457mm desktop working surface plus 480mm horizontal surface for monitors and equipment.
- .8 Two horizontal, segregated raceways in each bay and wedge, configurable for upper or lower bay installation.
- .9 Each Bay: Accepts rackrail or slide-out CPU tray.

- .10 Receptacles as indicated.
- .11 Supports: Cantilevered supports provide unimpeded leg movement.
- .12 Seismic certified for Zone 4, Importance factor 1.5. Seismic bracing not required.
- .13 Working surface: Graystone finish, impact resistant, rigid thermofoil thermolaminate layers on 29mm-thick triple-refined MDF material. Horizontal area behind working surface: steel.
- .14 Monitor mounts as indicated, VESA compliant, mounts to rear top of console bays, hinged, articulated, tilt and pivot, cast aluminum with steel fittings, cable management.
- .15 Top-mounted 483mm standard EIA configured turret rack (nineteen-inch rack) as indicated, mounted in horizontal space behind working surface.
- .16 Slide-out CPU tray: slides out front, 30kg weight capacity.
- .17 Finish: Fingerprint-resistant, black-textured powder coat.
- .18 Side table on south wall: custom-manufactured technical furniture to match other furniture, Graystone worksurface without the rear horizontal surface for monitors and equipment. Basic table without rails. Doors and end panel not required. Cable pass-throughs.
- .19 Standard EIA compliant (nineteen-inch rack) rails for north section of furniture, 10 rack spaces high, infinitely-adjustable front to back, for mounting equipment at north group of furniture.
- .20 Vented steel front and rear removal panels.
- .21 Side panels.
- .22 Cable pass-throughs, 75mm and 100mm, trimmed with plastic bushings to create smooth internal surface.
- .23 Grounding and Bonding Studs: 1/4-20 threaded, installed in base of bay, 2 per bay.
- .24 Leveling Feet: Adjustable
- .25 Design based on Middle Atlantic Viewpoint series furniture.

3 Execution

3.1 INSTALLATION GENERAL

- .1 Examine existing area and remove the existing furniture.
- .2 Install the furniture in accordance with the manufacturer's instructions.
- .3 Install equipment enclosures plumb, level and square.
- .4 Adjust operating hardware to operate smoothly without binding.
- .5 Repair minor damages to finish in accordance with manufacturer's instructions.
- .6 Protect furniture from damage during construction.

END OF SECTION

1 GENERAL

1.1 SYSTEMS

- .1 Systems included in this Section:
 - .1 Radio
 - .2 Intercom
 - .3 CCTV
 - .4 Senstar Flash and Flare
 - .5 Baggage X-ray
 - .6 Cheque Room Alarm

1.2 WORK STAGES AND WORK PLAN

- .1 This Section contains requirements and conditions for the overall work stages and work plan for the entire Contract.

1.3 REFERENCES

- .1 Perform work in accordance with the following references:
 - .2 Correctional Service Canada (CSC)
 - .1 ES/SOW-0101 Electronics Engineering Statement of Work, Procurement and Installation of Electronic Systems
 - .2 ES/SOW-0102 Electronics Engineering Statement of Work, Quality Control for Procurement and Installation of Electronic Security Systems

1.4 QUALIFICATIONS FOR SECURITY SYSTEMS WORK

- .1 Trained and certified to work on Genetec Omnicast operating system version 4.6 and above for the CCTV system.
- .2 Trained and experienced as described on the drawings in the design and installation of VHF radio systems including Motorola systems and radio cavities. Experience with the systems shown on the drawings. Shall be a Motorola-authorized agent.

- .3 Trained and experienced in design and installation of IP CCTV systems.
- .4 Experience in Senstar Flash and Flare systems.
- .5 Submit qualifications to Departmental Representative for approval.

1.5 PERFORMANCE SPECIFICATION

- .1 The drawings and specifications outline the basic minimally acceptable products and outcomes for the security systems. Provide design services in addition to the supply and installation of the systems. Work under this section is considered to be a Performance Specification. Provide all software, equipment and other items required for fully functioning systems. Although this is a Performance Specification, do not deviate from the general intent as shown on the drawings and specifications. Software upgrades for the existing base software systems are not intended to be included in this Contract.

1.6 SUBMITTALS

- .1 Submit in accordance with Section 01 01 50 – General Instructions and ES/SOW-0101.
- .2 Submit detailed work plan clearly stating sequence of work elements, schedule and time required for each element of work.
- .3 Include Work Plan within the Preliminary and Final Design Reports as specified in ES/SOW-0101.
- .5 Include Work Plan, testing, verification and commissioning within the Preliminary and Final Design Reports specified in ES/SOW-0101.
- .6 Obtain approval of the Work Plan from the Departmental Representative prior to commencement of work.
- .8 Provide Acceptance Test Plans (ATP) as specified in ES/SOW-0101.
- .9 Provide sign-off sheets for verification of initial and final testing and commissioning.

1.7 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: submit maintenance data for

incorporation into manual specified in Section 26 05 00 and in CSC ES/SOW-0101.

- .2 Submit AutoCAD record drawings showing all changes.

2 PRODUCTS

2.1 MATERIALS

- .1 Basic materials in accordance with ES/SOW-0102 and as indicated.
- .2 Not all materials listed.
- .3 Baggage x-ray monitor:
 - .1 VGA LCD flat screen monitor
 - .2 100 to 240 volts, 60 Hz input
 - .3 4:3 ratio
 - .4 530mm size
 - .5 VESA 75/100 compliant
 - .6 Less than 9kg.
- .4 Baggage x-ray folding keyboard/monitor bracket:
 - .1 Wall-mounted, height adjustable, low-profile bracket for a monitor and keyboard
 - .2 Folds flat against the wall to max 203mm protrusion from the wall
 - .3 Locking height adjustment 305mm, pneumatically adjustable
 - .4 Arm rotation 270 degrees.
 - .5 Internal cable management through arms.
 - .6 VESA 75/100 compliant monitor mount
 - .7 Locking mechanism to prevent accidental opening of the keyboard tray
 - .8 independent 75mm vertical adjustment for the monitor.
 - .9 Monitor rotation 270 degrees.
 - .10 Monitor tilts 70 degrees.
 - .11 305mm extension arm – allow for this arm. Departmental Representative will review on-site to determine if this will be permanently installed.
 - .12 Overall assembly vertically-mounted.
 - .13 Design based on AFC Industries AFC7808_12 device.
- .5 Flash/Flare speaker bar:
 - .1 USB powered either from PC or from a USB power supply
 - .2 left and right speakers available for two separate inputs
 - .3 mounted to base of monitor

- .4 on/off switch and volume control
- .5 200Hz to 20kHz frequency response
- .6 Minimum 1.3 watts RMS per channel at 10%THD

- .6 CCTV Keyboard:
 - .1 Variable speed, vector-solving joystick
 - .2 Joystick zoom control knob
 - .3 24 programmable soft keys, 6 controls keys, 3 lens control keys
 - .4 LCD display
 - .5 Preset position
 - .6 Camera call-up, multiplexor screen functions
 - .7 Desktop configuration with black finish, RJ45 interface
 - .8 Acceptable product Pelco CM9760-KBD-US.
 - .9 Video encoder to interface keyboard to the CCTV IP network, acceptable product AXIS M7001.
 - .10 Provide one Genetec licence.

- .7 Cheque Room Alarm:
 - .1 The system is specified on the drawings and in 26 08 18. Other requirements such as training, manuals, restrictions/conditions, etc as specified in this Section 28 05 00 apply to the Cheque Room Alarm System.

3 EXECUTION

3.0 This Execution Section applies to the entire Contract.

3.1 GENERAL INSTALLATION INSTRUCTIONS

- .1 Prior to commencing work, note and document:
 - .1 locations of all existing devices and equipment
 - .2 all wiring and cabling

- .2 Provide temporary support for all cables, conduits and boxes to ensure no damage to systems.

- .3 Label all cables in accordance with referenced CSC standards.

- .4 Perform all work in accordance with ES/SOW-0102.

- .5 Replace all equipment and cabling damaged by activities of this contract.

- .6 Existing intercom stations are Aiphone LEF-10. Remove cabling to removed intercom sub-stations. Remove label for removed sub-stations at new control console in room 100.

3.2 WORK STAGES

- .1 The systems within the scope of this Contract are critical to the security of the institution. Proceed in sequential planned stages to ensure minimum downtime of the systems and minimal disruption to the operation of the institution.
- .2 Not every element of work is included in the phases of work listed below.
- .3 Complete each phase before starting the next phase, unless noted otherwise.
- .4 Phase 1 - Demolition
 - .1 Remove the fence and bus shelter.
 - .2 Remove the canopy and associated structure after normal working hours of the institution.
 - .3 Remove the wall in corridor 104 and repair flooring, T-bar ceiling, walls and other surfaces.
 - .4 Complete Phases 1 and 2 at the same time.
- .5 Phase 2 – CER Work
 - .1 Relocate the radio cavities.
 - .2 Install the seismic fasteners to the concrete floor and base plate for rack #1, install new rack #1, relocate equipment into rack #1, remove old rack #1, and then sequentially perform the above procedure for the remaining racks.
 - .3 Prior to installing any equipment in new racks, provide a sketch of the proposed rack layouts. Obtain approval for the rack layouts at least 2 weeks prior to the commencement of equipment relocation.
 - .4 Route all required new cables from room 122 to room 100.
- .6 Phase 3 – Room 100 Work
 - .1 Note that Phase 3 cannot commence until the new vestibule components, new control console components and the rolling shutter are on site.
 - .2 Perform all work for Phase 3 within 4 weeks. The schedule for this phase will be strictly enforced because it affects the operation of the institution. Longer working hours may be permitted for this phase in accordance with the Hours of Work clause listed within Specification Section 01 01 50 – General Conditions.

- .3 Remove millwork and furniture from room 100 to permit hoarding to be installed. Retain the small workstation at the north end of room 100 for use by institutional security staff during this phase.
 - .4 Install hoarding within room 100 between the exterior west wall and the wall shared with room 102. Install a door in the hoarding. The intent of the hoarding is to provide a construction space in the south end of room 100 and to create an operational working space for institutional security staff at the north side of room 100.
 - .5 Install plywood hoarding panels, poly sheets and tape in the window spaces between rooms 102 and 100. Note that the windows have been removed.
 - .6 Provide hoarding across corridor 104. Provide a door in the hoarding wall. Hoarding to extend from a location west of electrical room 105 door across the corridor. Allow for the temporary relocation of the baggage x-ray machine to the adjacent corridor 118, outside the hoarding area. Baggage x-ray machine to be operational at the temporary location.
 - .7 Remove concrete slab at front entrance for the new vestibule.
 - .8 Install the new vestibule.
 - .9 Complete all work on the wall between rooms 100 and 101. This work includes the rolling shutter, removal of millwork and installation of new millwork.
 - .10 Install the new control console in room 100. Install all electrical and telecom infrastructure work associated with the console such as receptacles, intercom, raceways, etc. Install new door control panel C at new control console.
 - .11 Relocate the baggage x-ray machine to the final location.
 - .12 Install the new vestibule.
 - .13 Install new ceiling in room 100.
 - .14 Install new door control panel D in room 100.
 - .15 Complete remaining non-console work within room 100.
 - .16 Remove hoarding wall within room 100 between the exterior west wall and the wall shared with room 102. Remove hoarding plywood on windows between rooms 100 and 102 and keep poly sheets in place. Remove hoarding in corridor 104.
- .7 Phase 4 – Completion of New Console Work
- .1 Transfer equipment from the old control console in room 102 to the new control console in room 100, one system at a time.
 - .2 Install new Door Monitoring System in new control console.
 - .3 Complete all remaining work at the new console.

- .8 Phase 5 – Room 102 Work
 - .1 Install temporary hoarding door between rooms 100 and 102 in the existing door frame. Note that the door has been removed.
 - .2 Remove systems no longer needed from the old control console.
 - .4 Decommission and remove old control console and other equipment within room 102.
 - .5 Cut off old control console conduits below slab level, cap conduits and fill with grout.
 - .6 Install new flooring in room 102.
 - .7 Install new ceiling in room 102.
 - .8 Complete remaining work within room 102.
 - .9 Remove all remaining hoarding.

- .9 Hoarding
 - .1 Install hoarding to minimize disruptions such as fumes, dust and noise to the institution's staff working in the area. Hoarding is also intended to separate the construction site from the operations of the institution.

 - .2 Construct hoarding with 2x4 framing and plywood sheathing on one side. Provide poly sheets over entire hoarded area and tape to control dust. Seal interface with T-bar ceilings and walls. Apply construction warning signs on hoarding walls. Apply padlock hasps to doors.

 - .3 Where hazardous materials removal is required, provide appropriate protective measures.

3.3 WORK PLAN & SCHEDULE

- .1 Submit work plans with details of work, downtime and restoration of all systems.

- .2 Provide an overall schedule prior to commencement of work.

- .3 Provide a schedule with the next week's activities and a daily update.

- .4 The installation of the new cabinets and relocated systems within room 122 during Phase 2 may be one of the most complicated portions of this Contract. Provide a highly detailed plan. There is limited space within the room and all systems must remain functional during the changes except

for temporary outages permitted as detailed in this Spec Section. A series of temporary measures will be required.

- .5 Provide detailed work plans in advance for the institution to make security changes to accommodate the increased risk for specific areas.

3.4 SECURITY CONDITIONS

- .1 All systems shall remain active at all times except as noted below. Provide at least 72 hours notice of any shutdown of any system.
- .2 The Door Control System shall be active at all times, except for brief periods of one hour as required to make changes.
- .3 The intercom system shall remain active at all times, except for brief periods of one hour as required to make changes.
- .4 The Door Monitoring System shall be active at all times except as required to make changes at the Simplex 4100U panels, where a few hours downtime is acceptable during normal working hours when the system is normally inactive.
- .5 The radio system shall remain active at all times, except for brief periods of one hour as required to make changes. Under exceptional circumstances the institution may be able to operate via handheld radios up to 6 hours at any time.
- .6 The CCTV system shall remain active at all times, except for brief periods of four hours as required to make changes.
- .7 The baggage x-ray system is used occasionally and may be out of service for 24 hours.
- .8 The Flash/Flare System is critical and shall remain active at all times, except for brief periods of four hours as required to make changes.
- .9 The Work Area will be occupied at all times (24/7) by Correctional Service Canada employees performing security duties during the execution of work under this Contract.

3.5 TESTING OF EXISTING SYSTEMS

- .1 Test all existing systems prior to commencing any work. If any problems are found, inform the Departmental Representative immediately in writing.

3.6 OBSOLETE DEVICES & CABLING

- .1 Remove obsolete security system devices.
- .2 Consult with the Departmental Representative on all items to be removed.

3.7 COMMISSIONING

- .1 Commission and test every system as each system is completed.
- .2 Use the Acceptance Test Plan (ATP) as referenced in CSC ES/SOW-0101 as the basis for the Commissioning & testing process.
- .3 Document all test results on sign-off sheets.
- .4 Departmental Representative and designates to witness tests and verify correct operation.
- .5 Obtain signatures of Departmental Representative and designates on sign-off sheets, at the time of the test. Hand over completed sign-off sheets to Departmental Representative.

3.8 TRAINING

- .1 Provide four hours maintenance training covering changes to the systems and new systems.
- .2 Provide two one-hour operator training sessions for the new CCTV keyboard.

3.9 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 01 50 – General Instructions.
 - .1 Leave work area clean at end of each day.
- .2 Final Cleaning: upon completion remove every trace of debris including small pieces of cable, tape, paper, etc.
- .3 Dispose of all removed components and debris off site.

END OF SECTION

1 General

1.1 EXISTING FIRE ALARM SYSTEM

- .1 The existing fire alarm system is a Simplex 4100U-based system, consisting of several remote Alarm Panels and Annunciators.
- .2 The main site annunciator is a Simplex 4603-9101C, old style, and is currently used within the control console in room 102. Relocate the annunciator to the new control console in room 100.

1.2 SCOPE OF WORK

- .1 Work under this contract includes but is not limited to:
 - .1 Relocation of an existing compact Simplex LCD annunciator and provision of a special rack-mounted adaptor plate as indicated on the drawings. The annunciator is used to annunciate all alarms for the entire institution.
 - .2 Test and verify operation of annunciator in new location.

1.3 REFERENCES

- .1 CAN/ULC-S524 Installation of Fire Alarm Systems
- .2 CAN/ULC-S536 Inspection and Testing of Fire Alarm Systems
- .3 CAN/ULC-S537 Verification of Fire Alarm Systems
- .4 National Building Code of Canada

1.4 REQUIREMENTS OF REGULATORY AGENCIES

- .1 System Components:
 - .1 Listed by ULC and comply with applicable provisions of NBCC and meet requirements of authority having jurisdiction.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 01 50 – General Instructions.

1.6 OPERATION AND MAINTENANCE DATA

- .1 Provide verification report for incorporation into manual specified in Section 01 01 50 - General Instructions.

2 Products

2.1 WIRING

- .1 Twisted copper conductors, rated 300 V. Listed by CSA and ULC as suitable for fire alarm duty. Red jacket.
- .2 Minimum #18 AWG, and in accordance with manufacturer's specifications

3 Execution

3.1 INSTALLATION

- .1 Install all new devices in accordance with CAN/ULC-S524.
- .2 Install all components and connect.
- .3 Provide necessary raceways, cable and wiring to make interconnection as required by equipment manufacturer.
- .4 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 and CAN/ULC-S537.
- .2 Hand over verification report, test reports and certificate for Fire Alarm system to Departmental Representative.

END OF SECTION

1 General

1.1 EXISTING DOOR MONITORING SYSTEM

- .1 The existing system is based on Simplex 4100U panels and monitors the status of doors within inmate housing units. When a door is opened, an LED alarm is generated on a 4100U panel and the operator responds by pressing a button on the display.
- .2 The Door Monitoring System is separate from the Fire Alarm System and there is no connection between the two systems.
- .3 The Door Monitoring System is separate from the Door Control System and there is no connection between the two systems.

1.2 SCOPE OF WORK

- .1 The existing operator's control console and Door Monitoring System annunciator (Simplex 4100U) are located in room 102. The new operator's control console will be located in room 100. The existing operator's control console in room 102 will be demolished.
- .2 The existing Door Monitoring System annunciator is wall-mounted and not attached to the existing operator's control console.
- .3 Provide an additional Door Monitoring System annunciator at the new operator's control console in room 100. The new annunciator shall be an LCD monitor.
- .4 Retain the existing Simplex 4100U panels and LED annunciation function in room 102. Permanently silence the audible annunciation of alarms in room 102.
- .5 Work under this contract includes but is not limited to the provision of:
 - .1 LCD Annunciator and computer
 - .2 Cabling
 - .3 Network cards and other devices as required
 - .4 Programming
 - .5 Software and firmware as required for new configuration
 - .6 Testing and verification – requirements are modified as listed in Execution paragraph below

1.3 REFERENCES

- .1 CAN/ULC-S524 Installation of Fire Alarm Systems
- .2 CAN/ULC-S537 Verification of Fire Alarm Systems

1.4 REQUIREMENTS OF REGULATORY AGENCIES

- .1 System Components:
 - .1 Listed by ULC and comply with applicable provisions of NBCC and meet requirements of authority having jurisdiction.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 01 50 – General Instructions.

1.6 OPERATION AND MAINTENANCE DATA

- .1 Provide test results, verification report and shop drawings for incorporation into manual specified in Section 01 01 50 - General Instructions.

1.7 QUALIFICATIONS FOR DOOR MONITORING SYSTEM WORK

- .1 Trained and experienced in design and installation of Simplex fire alarm systems shown on the drawings, for the Door Monitoring System.
- .2 Submit qualifications to Departmental Representative for approval.

2 Products

2.1 ANNUNCIATOR

- .1 Simplex True Site LCD monitor / annunciator and computer
- .2 Touch screen
- .3 Size: 546mm
- .4 Mounted on VESA plate supplied with the technical furniture

2.2 WIRING

- .1 Manufacturer-approved cabling.

3 Execution

3.1 INSTALLATION

- .1 Install all new devices in accordance with CAN/ULC-S524.
- .2 Install all components and connect.

- .3 Provide necessary raceways, cable and wiring to make interconnection as required by equipment manufacturer.
- .4 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.

3.2 PROGRAMMING

- .1 Provide all programming, software and firmware as required for new and existing system.
- .2 LCD annunciator to show graphic representation of actual floor plan layouts for all housing units with points for each alarmed door.
- .3 Departmental Representative will supply AutoCAD drawings of the floor plans.
- .4 During normal working hours and at other times, annunciation of the opening of doors should not irritate the operator. Provide ability for operator to mask selected housing unit alarms at any time, similar to the existing configuration.

3.3 FIELD QUALITY CONTROL

- .1 Tests and verification are similar to but not exactly the same as the requirements for a fire alarm system.
- .2 Perform tests in accordance with Section 26 05 00.
- .3 Tests and verification shall be performed by Simplex.
- .4 Test the correct annunciation of every door by opening each door. Test to confirm that every door is correctly annunciated on the LCD annunciator floor plan.
- .5 Verify the installation and data transfer of the LCD annunciator in accordance with CAN/ULC-S537. Limit communication test of field devices to 4 doors.
- .6 Perform a sample test of four locations indicated by Departmental Representative for ground and fault communications to the LCD annunciator.
- .7 Produce a list of all devices and tests to be performed. Have a column for:
 - .1 the device, module, cable, control unit function, etc.
 - .2 the test
 - .3 pass/fail
 - .4 initials of the tester
 - .5 time & date of test

- .5 Hand over verification and test reports to Departmental Representative immediately after tests and verification.

3.4 CLOSEOUT

- .1 Provide three one-hour operator training sessions for operational staff.
- .2 Provide Operation and Maintenance Manuals as specified in 26 05 00.

END OF SECTION

1 General

1.1 RELATED WORK

- .1 Cast-in-place concrete for fence posts.

1.2 REFERENCE STANDARDS

- .1 CAN/CSA-A23.1-00, Concrete Materials and Methods of Concrete Construction
- .2 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CAN/CGSB-138.1-96, Fence, Chain Link, Fabric.
- .4 CAN/CGSB-138.2-96, Fence, Chain Link, Framework, Zinc-Coated, Steel.
- .5 CAN/CGSB-138.3-96, Fence, Chain Link - Installation.
- .6 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .7 ASTM A 53-90b, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- .8 A90/A90M-06 - Standard Test Method for Mass of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
- .9 A123/A123M-02 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .10 A392-96(2003) - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
- .11 F1043-06 Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 01 50.
- .2 Drawings to indicate: line posts spacing, location, manufacturer's standard post hardware meeting type, class and style of chain link fences specified in this Section.

2 Products

2.1 MATERIALS

- .1 Fencing: no tubing, conduit or open seam posts, rails or braces materials permitted.
 - .2 Concrete mix designed to produce 20 MPa minimum compressive strength at 28 days and containing 20 mm maximum size, 5 mm minimum size coarse aggregate, with water/cement ratio to CAN/CSA-A23.1 Table 7 for Class F-2 exposure and 60 mm slump
-

at time and point of deposit.

- .3 Chain-link fence fabric: to CAN/CGSB-138.1.
 - .1 Electro-galvanized steel, 50 mm x 50 mm, 3 mm thickness with PVC coating
 - .2 Height of wire: 4115 mm high (match existing).
 - .3 Top selvage with twisted finish and bottom knuckled.
- .4 Posts and rails: to CAN/CGSB-138.2, ASTM F1043, Schedule 40 hot dipped galvanized steel pipe and the following, except as noted otherwise:
 - .1 Line posts: 65 mm O.D.
 - .2 Rails (brace and top rail) 42 mm O.D.
- .5 Bottom tension wire: single strand, galvanized steel wire, to ASTM 121, pvc coated, 3 mm diameter.
- .6 Tie wire fasteners: single strand, galvanized steel wire conforming to requirements of fence fabric, 3 mm diameter.
- .7 Tension bar: 5 x 20 mm minimum galvanized steel.
- .8 Tension bar bands: 3 x 20 mm minimum galvanized steel or 5 x 20 mm minimum aluminum.
- .9 Zinc pigmented paint: to CGSB-1.181.
- .10 Fittings and hardware: cast aluminum alloy, galvanized steel or malleable or ductile cast iron. Post caps to provide waterproof fit, to fasten securely over posts and to carry top rail.

2.2 FINISHES

- .1 Galvanizing:
 - .1 For chain link fabric: to CAN/CGSB-138.1, ASTM A392.
 - .2 For pipe: 550 g/m² minimum to ASTM A90.
 - .3 For other fittings: to CSA G164 ASTM A123.
 - .4 PVC finish: to manufacturer's standard.

3 Execution

3.1 GRADING

- .1 Remove debris and correct ground undulations along fence line to obtain smooth uniform gradient between posts. Provide clearance between bottom of fence and ground surface neither less than 30 mm nor more than 50 mm.

3.2 ERECTION OF FENCE

- .1 Erect fence along lines indicated and in accordance with CAN/CGSB 1-138.3.
 - .2 Excavate post holes to dimensions indicated by methods approved by Engineer. Bulb bottom of holes for end post:
-

PRINCIPAL ENTRANCE RENOVATIONS

- .1 Fence Post:
 - .2 End post: 300 mm ϕ x 900 deep
- .3 Brace to hold post in plumb position and true to alignment and elevation before and during placement of concrete and until concrete has set.
- .4 Space line posts maximum 3 metres apart except as noted otherwise, measured parallel to ground surface, except as indicated otherwise.
- .5 Place concrete in post hole then embed posts into concrete to 100 mm from bottom of hole. Extend concrete 50 mm above ground level and slope to drain away from posts. Do not install fence fabric until concrete has cured a minimum of 5 days.
- .6 Install braces at end post.
- .9 Install top rail between posts and fasten securely to terminal posts and secure waterproof caps.
- .10 Install bottom tension wire, stretch tightly and fasten securely to end and existing post with turnbuckles and tension bar bands.
- .11 Lay out fence fabric. Stretch tightly to tension recommended by manufacturer and fasten to end corner and existing post with tension bar secured to post with tension bar bands spaced at 300 mm intervals. Knuckled selvedge at bottom. Twisted selvedge at top.
- .12 Join rolls of fabric by weaving a single strand of fabric into the ends of the rolls to form a continuous mesh.
- .13 Secure fabric to outside fence line top rails, line posts and bottom tension wire with tie wires at 300 mm intervals. Give tie wires minimum two twists.

3.3 TOUCH UP

- .1 Repair damaged galvanized surfaces. Clean damaged surfaces with wire brush removing loose and cracked coatings. Apply two coats of approved zinc pigmented (Galvacon) paint to damaged areas.

3.4 CLEANING

- .1 Clean and trim areas disturbed by operations. Dispose of surplus excavated material and replace damaged sod as directed by Engineer.
- .2 Dispose of surplus fencing material.

END OF SECTION

Principal Entrance Renovations

Project No. R.066815.001

Metchosin BC William Head Institution

APPENDIX 1

Hazardous Materials Survey

Principal Entrance Building

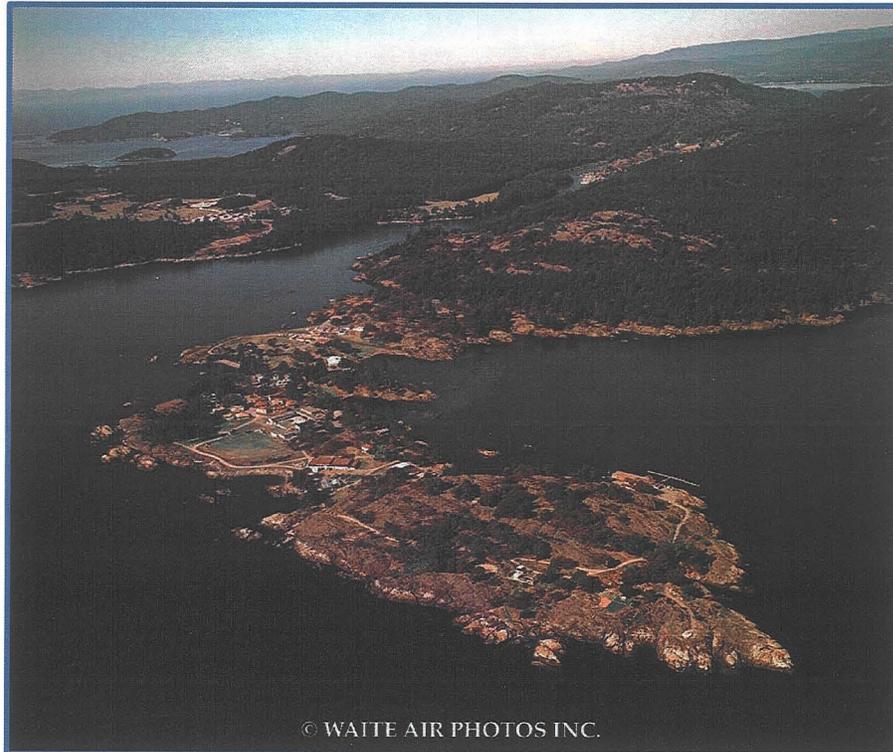
William Head Institution

Hazardous Materials Survey

Principal Entrance Building

William Head Institution
Correctional Service Canada

Victoria, British Columbia



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Prepared for:



Public Works and
Government Services
Canada

Travaux publics et
Services gouvernementaux
Canada

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1. EXECUTIVE SUMMARY

Background

North West Environmental Group Ltd. was retained by Public Works and Government Services Canada (PWGSC) Environmental Services to conduct a non-destructive Hazardous Materials Risk Assessment Survey on the Principal Entrance Building located within William Head Institution, Correctional Service Canada.

Work Program

The survey was conducted on December 5th 2013.

The following was undertaken:

- A building survey was conducted on a room by room basis to determine the presence, location, quantity and condition of selected hazardous materials including asbestos, mould, polychlorinated biphenyls (PCB) containing equipment, hantavirus, silica and lead;
- Analysis of samples was performed by an independent NVLAP Laboratory; and
- A report created detailing the results, conclusions and recommendations as well as an abatement cost estimate, if necessary.
- Due to security concerns the exterior and upper level secured zones were not accessed during this survey.

Findings and Recommendations

Table 1.1 Hazardous Materials Summary

Hazardous Material	Type and Location
Asbestos	→ No asbestos identified in samples analyzed
PCBs	→ Fluorescent Light Ballasts present (potential)
Mercury	→ Fluorescent Light Tubes
Lead	→ Lead based or lead containing paint assumed to be in all original coatings on and in the building → Assumed to be present in pipe and electrical solder → May be present in X-ray scanner lining
Hantavirus – Rodent Droppings	→ Rodent Droppings not observed
Radioactive Materials	→ Smoke detectors observed.
Urea Formaldehyde Foam Insulation	→ UFFI not observed
Ozone Depleting Substances	→ ODS observed within refrigerator and freezer.

Hazardous Material	Type and Location
Above Ground Storage Tanks	→ AGST not observed within the areas investigated
Arsenic	→ Pressure treated wood not observed within the areas investigated
Silica	→ Assumed to be present in concrete, plaster, ceramic tile and stucco
Mould	→ Suspect visible mould observed in Mechanical Space 114; "small"

Where hazardous materials were found they can be presumed to be found in similar materials throughout the building.

Warning: in the event any additional suspect materials are encountered during demolition or renovation activities, work on those materials must stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material. If this any materials suspected of containing asbestos or another hazardous material are disturbed during the work, all work shall stop until the area is contained, the hazard evaluated by a qualified professional and the hazardous materials, if indeed present, is safely managed by a qualified contractor.

Asbestos

Asbestos was not identified in any of the samples collected within the building. The roof structure and exterior had limited access and was not tested so as not to disrupt the building envelope. Sampling will need to be undertaken prior to the commencement of any work, if applicable.

Where hazardous materials were found they can be presumed to be found in similar materials throughout the building.

Warning: in the event any additional suspect materials are encountered during demolition or renovation activities, work on those materials must stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material. If this any materials suspected of containing asbestos or another hazardous material are disturbed during the work, all work shall stop until the area is contained, the hazard evaluated by a qualified professional and the hazardous materials, if indeed present, is safely managed by a qualified contractor.

Lead

Paint

Analysis of the paint sample indicated that lead is present at a concentration of 0.025% by weight (250 mg/kg). Samples were found to have lead concentrations in excess of the threshold specified in the federal *Surface Coatings Material Regulation SCMR* of 90 mg/kg for new paint acceptable for use in residential applications.

Overall, paint coatings were found to be in good to fair condition. Where damaged and deteriorating, paint should be removed following procedures designed to protect the workers from heavy metal exposure and to avoid the spread of contamination. Lead content of painted materials should not increase their disposal costs however; concentrated paint chips would need to be disposed as hazardous waste. Routine removal of lead paint is not recommended; rather it should be managed in place and removed on an "as needed" basis.

If a worker is, or may be, exposed to potentially harmful levels of lead, the employer must ensure that a risk assessment is conducted by a qualified person. Where a worker may be exposed to airborne lead concentrations in excess of 50% of the exposure limit of 0.05 mg/cu.m or where exposure through any route of entry could cause elevated blood levels, the employer must develop and implement an exposure

control plan (ECP) which meets the requirements of section 5.54 of the BC Occupational Health and Safety Regulation. As an ALARA substance, worker exposure must be kept as low as reasonably achievable.

Elemental Lead

Elemental lead was observed in the form of solders on piping. As most lead products have significant salvage value, disposal costs are typically negligible.

Lead may be present within the x-ray scanner machinery and surrounding wall cavities.

Polychlorinated Biphenyls (PCB) in Electrical Equipment

Fluorescent light fixtures were observed and appeared to be of a vintage often found to contain ballasts which Environment Canada (EC) has developed a guideline called - *Identification of Lamp Ballasts Containing PCBs – Environment Canada 1991*.

Manufacturers of ballasts and capacitors use distinct catalogue and date codes to identify their product, its date of manufacture, and, for some capacitors, its dielectric fluid. Fluorescent lamp ballasts are usually mounted between the fluorescent tubes on the light fixture and are shielded with a metal protective device which reduces heat radiation. Due to the fact the covers are easily broken and the risk of electrical shock when accessing the ballast, it is standard practice to make the observation that there is a potential for PCBs to be present and have the ballasts inspected prior to disposal.

Inspect all light ballasts for the presence of PCB prior to disposal. PCB containing ballasts must be disposed as hazardous waste.

Ozone Depleting Substances

Equipment that may use chlorofluorocarbons (CFCs) or ozone depleting substances (ODS) were observed within the building.

In the case of demolition, these materials will require proper recovery and disposal. The BC Ozone-Depleting Substances Regulations would also apply to any CFC/ODS abatement procedures. These regulations require that all ODS must be collected, stored and recycled, or collected and disposed accordingly.

Mould

Suspect visible mould was observed in the Mechanical Room 114. The extent of the mould appears to be less than 1 m² in size.

Workers accessing areas where mould contamination is present must be informed of the hazards and personal protective equipment associated with mould contamination.

Hantavirus-Animal Droppings

Materials suspected of containing Hantavirus were not observed in the building at the subject site.

Crystalline Silica

Testing for crystalline silica in dust was not completed/conducted as part of this survey however it is known to be a component of concrete dust. All concrete, plaster and stucco is suspected of containing silica in crystalline and non-crystalline forms. Many of the removal techniques (grinding, cutting, chipping etc) for these materials can generate high levels of crystalline silica in the air.

Use wetting techniques and/or HEPA equipped extraction systems attached to drills and other power equipment where possible in order to decrease dust levels.

As per the clients request, non-invasive investigative techniques were used. Even with the most invasive survey techniques, however, it should be noted that the possibility remains for other concealed materials to be found during a renovation or demolition.

2. INTRODUCTION

North West Environmental Group Ltd. was retained by Public Works and Government Services Canada Environmental Services to conduct a Hazardous Materials Assessment Survey on the Principal Entrance Building located within William Head Institution, Correctional Services Canada.

The building is older multi-story building with a concrete foundation and brick and stucco exterior which is subject to renovations including:

- Corridor 104
 - o Relocate existing x-ray scanner
 - o Remove existing wall, door and glazing unit and make good all surfaces.
 - o Remove existing millwork
- Control Post 100
 - o Remove existing door (to corridor 104)
 - o Remove existing workstation
 - o Remove existing glazing from existing window units, make good frame (Principal Control Post 102)
- Principal Control Post 102
 - o Decommission and remove existing console and monitors
 - o Remove existing glazing from existing window units, make good frame (Control Post 100)
- Telecom 122
 - o Remove existing desk
 - o Relocate existing UPS
 - o Remove existing equipment
 - o Remove existing storage
- Vestibule 118
 - o Relocate existing lockers

All accessible areas of this building were inspected for the presence of asbestos-containing materials, mould, lead, radioactive sources, ozone depleting substances, mercury, and PCBs. Where appropriate, representative samples of materials suspected of containing asbestos or other hazardous materials were collected and sent for confirmatory testing.

Observations were made to determine the presence of asbestos, mould, polychlorinated biphenyls (PCB) containing equipment, hantavirus, silica and lead.

Removal of hazardous materials must be undertaken by a qualified contractor employing WorkSafeBC approved procedures. If materials are encountered during deconstruction that differ from, or are in addition to those described in this report, then work must stop until the material content can be determined and appropriate precautionary measures employed to protect workers and others at or near the worksite.

3. REGULATORY FRAMEWORK, GUIDELINES AND CODES

Federal Occupational Health and Safety

In Federal jurisdictions, hazardous materials are regulated under the *Canada Labour Code, Part II*. Specifically, *Part X, Hazardous Substances*, provides the direction for the control of exposure to potentially toxic substances in the workplace. Under this regulation, employers are required to:

- Maintain a record of all hazardous materials;
- Undertake a hazard investigation by competent persons;
- Ensure materials are properly stored and handled;
- Post warning signs;
- Inform and educate employees regarding hazards; and
- Control exposure through substitution, engineering or protective equipment.

BC Occupational Health and Safety Regulation

Workplace health and safety is regulated in British Columbia by WorkSafeBC under the *Workers' Compensation Act* (effective April 15, 1998), as amended by *Workers' Compensation (Occupational Health and Safety) Amendment Act* (effective October 1, 1999). The Act defines the general duties and obligations of the employer, employees and others at the work site.

Under this regulation, employers are required to:

- Maintain a record of all hazardous materials;
- Undertake a hazard investigation by competent persons;
- Ensure materials are properly stored and handled;
- Post warning signs;
- Inform and educate employees regarding hazards; and
- Control exposure through substitution, engineering or protective equipment.

WorkSafeBC Regulations apply to the handling of materials containing designated substances and the prevention of possible worker exposures. Permissible exposure limits to these designated substances, which include asbestos, lead, mercury and arsenic, are established by the American Conference of Governmental Industrial Hygienists (ACGIH) and adopted by WorkSafeBC.

Environmental Management Act

The *Environmental Management Act* (EMA), brought into force in July 2004, is the principle environmental statute in British Columbia. The EMA prohibits the introduction of waste into the environment in such a manner or quantity as to cause pollution, except in accordance with a regulation, permit, approval or code of practice issued under the Act. The Hazardous Waste Regulation (HWR) addresses the proper handling, transport and disposal of hazardous wastes, under provisions of the EMA. While the Provincial Regulations do not apply directly to the sites operated by the Federal Government, they do apply when the materials are removed from the site for disposal.

4. SPECIFIC HAZARDOUS MATERIALS

As per WorkSafeBC requirements, the building was surveyed for the presence of several different types of hazardous materials including:

- Polychlorinated biphenyls (PCB)
- Asbestos
- Mercury
- Arsenic
- Ozone Depleting Substances (ODS)
- Radioactive Materials
- Lead
- Hantavirus – rodent droppings
- Silica
- Mould

Polychlorinated Biphenyls (PCB)

Polychlorinated biphenyls (PCB) are regulated under both federal (Canadian Environmental Protection Act) and BC Hazardous Waste Regulation and must be treated as PCB waste and be stored and disposed of accordingly.

Each fluorescent light fixture removed during renovation or demolition should have the ballast checked to determine if it contains PCB. Ballasts containing PCB must be removed, sorted and transported to a licensed facility. Although rare, paints have been known to contain PCBs.

Asbestos

Projects that will result in the disturbance of asbestos-containing materials (ACMs) must satisfy WorkSafeBC's regulations and conform to the guidance document Safe Work Practices for Handling of Asbestos. WorkSafeBC's Occupational Health and Safety Regulation defines an asbestos-containing material as "any manufactured article or other material which contains one (1) per cent or more asbestos by weight at the time of manufacture, or which contains one (1) per cent or more asbestos as determined by NIOSH Analytical Method 9002 (dispersion staining, polarized light microscope) or x-ray diffraction". This limit is currently being reviewed by WorkSafeBC with a view to reducing it to 0.5 percent by weight.

The asbestos-containing material can also be characterized as friable and non-friable. Friable asbestos "means any material which, when dry, can be easily crumbled or powdered by hand pressure, or a material that is crumbled or powdered" as defined under the BC Occupational Health and Safety Regulation. The condition of the asbestos and classifications would be used in assessing the level of action required with respect to re-use of the building.

Worker exposure to asbestos fibres is also regulated by the BC Occupational Health and Safety Regulation. The WorkSafeBC eight-hour TWA for asbestos fibres (all forms) is 0.1 fibre/cm³. Exposure to these substances must be kept as close to zero as is reasonably practicable.

Bulk samples are collected in accordance with NIOSH Analytical Method 9002 and the WorkSafeBC guideline document, Safe Work Practices for Handling Asbestos.

Asbestos is designated as an 'ALARA' substance whereby worker exposure to this product must be kept "**As Low As Reasonably Achievable**". Employers are required under Section 5.54 (Exposure control plan) of the Occupational Health and Safety Regulation (OHSR) to develop an exposure control plan (ECP) when workers are or may be exposed to airborne concentrations of this materials in excess of 50% of the exposure limit.

Mercury

Mercury is hazardous substance, and any maintenance or abatement involving materials containing mercury or mercury compounds must be done in compliance with the BC Occupational Health and Safety Regulations (BCOHSR).

Employers with workers who have a risk of exposure must have an exposure control plan (ECP) in place prior to allowing their workers to come into contact with this material. As with all other hazardous substances, all personnel working around or with such materials must be made aware of their presence and be supplied with training in the potential health effects and means of avoiding exposures.

As a hazardous substance, transportation and disposal of this substance must be done in compliance with the federal Transportation of Dangerous Goods (TDG) Regulations and the BC Hazardous Waste Regulation. Mercury is found in fluorescent light bulbs, thermostats, manometers, and equipment such as electrical switches.

Mercury is designated as an ALARA substance whereby worker exposure to this product must be kept "as low as reasonably achievable". Employers are required under Section 5.54 (Exposure control plan) of the Occupational Health and Safety Regulation (OHSR) to develop an exposure control plan (ECP) when workers are or may be exposed to airborne concentrations of this materials in excess of 50% of the exposure limit.

Arsenic

Arsenic is hazardous substance, and any maintenance or abatement involving materials containing arsenic or arsenic compounds must be done in compliance with the BC Occupational Health and Safety Regulations (BCOHSR).

Employers with workers who have a risk of exposure must have an exposure control plan (ECP) in place prior to allowing their workers to come into contact with this material. As with all other hazardous substances, all personnel working around or with such materials must be made aware of their presence and be supplied with training in the potential health effects and means of avoiding exposures.

Arsenic has long been used as a pesticide due to its toxic properties. Arsenical pesticides, often in the form of chromated copper arsenate (CCA), when applied with high pressure to wood, serve to extend the structural life of the material by making it resistant to mould, rot and insect infestation. Studies have shown that these materials have the ability to leach arsenic into the soil. Arsenic may also be found in paints. Although wood and wood dusts contaminated with arsenical pesticides do not require specialized disposal in BC, care must be exercised to minimize the potential for worker exposure to these materials through direct skin contact or through inhalation of dusts and fumes.

Ozone-depleting Substances (CFCs/ODS)

Chlorofluorocarbons (CFCs) are ozone-depleting substances (ODS) and a type of halocarbon. ODS are regulated by the Canadian Environmental Protection Act under the Ozone-Depleting Substances Regulations 1998 SOR/99-7 and the Federal Halocarbon Regulations (FHR) SOR/99-225. Compounds that contain only chlorine, fluorine and carbon are called CFCs. These materials are used in refrigeration systems and in fire suppression systems. The other main refrigerants are hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs) and blends of fluorocarbons (designated by "R").

While the regulations allow the continued use of halocarbon refrigerants, they strictly prohibit any person from releasing into the environment any halocarbon.

In the case of demolition, these materials will require proper recovery and disposal. The BC Ozone-Depleting Substances Regulations would also apply to any CFC/ODS abatement procedures. These regulations require that all ODS must be collected, stored and recycled, or collected and disposed appropriately by a licensed professional.

Radioactive Materials

Many buildings contain smoke alarms which contain small sealed radioactive sources in the form of ²⁴¹Americium. The Canadian Nuclear Safety Commission (CNSC) and the Canadian Nuclear Safety Act regulate radioactive materials. These materials are sealed into a metal case within the smoke detector and must not be damaged or tampered with. Smoke detectors intended for disposal must be handled in accordance with CNSC regulations.

Lead

Paints often contain heavy metals as pigments and/or preservatives. Under specific circumstances, persons may be exposed to these metals by ingestion, skin absorption and/or inhalation.

Most buildings built before 1950 have had lead-based paint applied to the interior or exterior surfaces. Often lead paint of this era contained up to 40% lead by weight. Paints made between 1950 and 1978 usually contained smaller amounts of lead. Paints often contain other heavy metals including mercury, arsenic and chromium.

Other than during the application process, the primary mechanism of exposure for workers would be the inhalation of dusts through activities such as sanding, scraping, drilling, crushing, heating, burning or other processes likely to damage the coatings themselves. Paints containing heavy metals pose little risk to workers when in good condition and when undisturbed.

In 2005 the federal *Surface Coating Materials Regulation* was amended to reduce this threshold from 5,000 mg/kg to 600 mg/kg and then to 90 mg/kg in 2010. As paints under this concentration of lead are acceptable for use in residential settings today, such coatings do not pose a significant hazardous material issue unless rendered airborne within a worker's breathing zone by fine dust generating processes. Mercury is also limited to a level of 10 mg/kg.

If a worker is, or may be, exposed to potentially harmful levels of lead, the employer must ensure that a risk assessment is conducted by a qualified person. Where a worker may be exposed to airborne lead concentrations in excess of 50% of the exposure limit of 0.05 mg/cu.m or where exposure through any route of entry could cause elevated blood levels, the employer must develop and implement an exposure control plan (ECP) which meets the requirements of section 5.54 of the BC Occupational Health and Safety Regulation. As an ALARA substance, worker exposure must be kept as low as reasonably achievable.

Appropriate precautions for protecting workers from lead exposure should be implemented during any work involving lead or lead paint including the use of personal protective equipment, localized ventilation and/or dust suppression methods.

Paint chips can be hazardous wastes if they contain leachable components that when subjected to the *Toxicity Characteristic Leaching Procedure (TCLP, US EPA Method 1311)* leach out levels of contaminant in excess of those published in Table 1 of *Schedule 4 of the BC Hazardous Waste Regulation*. Wastes deemed to be hazardous wastes must be disposed through a waste disposal contractor licensed by the Province.

Note that lead residue on "cleaned" structural steel (from which lead-containing coatings have been removed) should not exceed 40 ug/sf prior to welding, cutting or burning.

Figure 4.1: Recommended lead clearance criteria for surfaces

	Floor	Sill/ledge	Trough
Residences, schools, daycare centres, and other public buildings	0.43 mg/m ² (40 µg/ft ²)	2.7 mg/m ² (250 µg/ft ²)	4.3 mg/m ² (400 µg/ft ²)
Commercial buildings, including retail stores, offices (administrative), and laboratories (other than lead assay laboratories)	2.2 mg/m ² (200 µg/ft ²)	5.4 mg/m ² (500 µg/ft ²)	8.6 mg/m ² (800 µg/ft ²)

Reference: WorkSafeBC, Lead-Containing Paints and Coatings – Preventing Exposure in the Construction Industry, 2011

Hantavirus – Rodent Droppings

The Hantavirus is a virus associated with Hantavirus Pulmonary Syndrome, a disease caught through contact with the urine or droppings, or by being bitten or scratched by infected rodents. The disease starts off like a cold or flu (fever, sore muscles, headaches, nausea, vomiting), but progresses to pneumonia-like conditions within a few days. The change in intensity of the symptoms is very rapid and can result in fluid build-up in the lungs and respiratory failure.

Hantavirus is a hazardous substance and as such is regulated under the BC Occupational Health and Safety Regulation. Employers with workers who have a risk of exposure must have an exposure control plan (ECP) in place prior to allowing their workers to come into contact with this material. As with all other hazardous substances, all personnel working around or with such materials must be made aware of their presence and be supplied with training in the potential health effects and means of avoiding exposures.

Silica

Silica is a hazardous substance and as such is regulated under the BC Occupational Health and Safety Regulation. Airborne exposure criteria, respirator requirements and mandatory worker testing requirements are also outlined under this regulation. As with all other designated substances, all personnel working around or with such materials must be made aware of their presence and be supplied with training in the potential health effects and means of avoiding exposures.

Employers with workers who have a risk of exposure must have an exposure control plan (ECP) in place prior to allowing their workers to come into contact with this material. As with all other hazardous substances, all personnel working around or with such materials must be made aware of their presence and be supplied with training in the potential health effects and means of avoiding exposures.

Crystalline silica dust can cause a disabling, sometimes fatal disease called silicosis. The fine particles are deposited in the lungs, causing thickening and scarring of the lung tissue. The scar tissue restricts the lungs' ability to extract oxygen from the air. This damage is permanent, but symptoms of the disease may not appear for many years.

Employers have a duty to protect their workers from silica dust exposure on construction projects. Studies show that when common construction work tasks involving the sanding, drilling, chipping, grinding, cutting, sawing, sweeping, and blasting of concrete and concrete products are conducted without using dust controls, workers are exposed to airborne silica concentrations at levels far above the occupational exposure limits.

Crystalline silica is an ALARA whereby worker exposure must be kept "as low as reasonably achievable". Employers are required under Section 5.54 (Exposure control plan) of the Occupational Health and Safety Regulation (OHSR) to develop an exposure control plan (ECP) when workers are or may be exposed to airborne concentrations of this materials in excess of 50% of the exposure limit.

Mould

Within the BC Occupational Health and Safety Regulations, there are no established permissible exposure levels for mould spores in air. This means that there are no published concentrations above which worker exposure is deemed to be hazardous and under which workers would not need respiratory protection. WorkSafeBC does, however, provide guidance on protocols for protecting workers from the hazards of airborne mould and bacteria within the section(s) of the Regulation guidelines addressing Indoor Air Quality.

Various other many guidelines are provided for addressing mould in Canada including:

- The Institute of Inspection, Cleaning and Restoration and Certification (IICRC) standard S500 governing both water damage restoration and entitled: Standard for Professional Water Damage Restoration – S500. This document is approved by the American National Standards Institute (ANSI)
- Health Canada: Fungal contamination in public buildings: A guide to recognition and management, 1995
- Health Canada. Fungal Contamination in Public Buildings: Health Effects and Investigation Methods, 2004

These guidelines also state that any non-porous (metal, glass and hard plastics) and semi-porous (wood and concrete) materials that are structurally sound and visibly mouldy can be cleaned and re-used. However, porous materials such as ceiling tiles, wallpaper, insulation, drywall, and sometimes carpets with more than a small area of contamination should be removed and discarded.

5. FINDINGS & RECOMMENDATIONS

As per WorkSafeBC requirements, the building was surveyed for the presence of several different types of hazardous materials including:

- Polychlorinated biphenyls (PCB)
- Asbestos
- Mercury
- Arsenic
- Ozone Depleting Substances (ODS)
- Radioactive Materials
- Lead
- Hantavirus – rodent droppings
- Silica
- Mould

Copies of the analytical reports are provided in Appendix 1.

Photographs of materials are in Appendix 2.

Sample Locations are in Appendix 3.

Polychlorinated Biphenyls (PCB)

Fluorescent light fixtures were observed and appeared to be of a vintage often found to contain ballasts which may contain PCBs. Environment Canada (EC) has developed a guideline called - *Identification of Lamp Ballasts Containing PCBs –Environment Canada 1991*.

Manufacturers of ballasts and capacitors use distinct catalogue and date codes to identify their product, its date of manufacture, and, for some capacitors, its dielectric fluid. Fluorescent lamp ballasts are usually mounted between the fluorescent tubes on the light fixture and are shielded with a metal protective device which reduces heat radiation. Due to the fact the covers are easily broken and the risk of electrical shock when accessing the ballast, it is standard practice to make the observation that there is a potential for PCBs to be present and have the ballasts inspected prior to disposal.

Prior to removal, any fluorescent light fixtures should be checked to ensure that ballasts do not contain PCB's. If PCB's are found to be present, the ballasts should be removed and disposed in accordance section 2.1 of this report.

Paints were not tested for PCB content.

Asbestos

Bulk Samples

All accessible areas of the building were inspected for the presence of building materials suspected of containing asbestos and sampled where appropriate and analysed for the presence of asbestos fibres.

Thirteen (13) bulk samples of building materials suspected of containing asbestos were collected from a number of areas in the building in accordance with WorkSafeBC requirements. Bulk samples were analyzed for asbestos using method: EPA/600/R- 93/116 "Bulk Asbestos Analysis by Polarized Light Microscopy".

Table 5.1: Samples found to contain Asbestos

Asbestos was found in the following samples:
<i>Asbestos was not identified in the samples collected during the survey</i>

The roof and building exterior was not accessed during the survey. Sampling will need to be undertaken prior to the commencement of any work if applicable.

Asbestos was not identified in materials sampled in various locations within the building and mechanical systems of the buildings surveyed.

Recommendations are based on Public Works and Government Services Canada (DP 057).

Although the survey did not identify the presence of the ACMs within the way of planned work for this building, there still may be additional asbestos materials present. The purpose of an AMP is to assist the organization in managing ACM in a systematic fashion to ensure identified ACM are managed in a safe manner which complies with the *Canada Labour Code* and WorkSafeBC guidelines.

The AMP should generally conform to Directive 057.

Once the asbestos management plan is developed, the following steps should be taken:

1. Provide copies of this report, or a summary thereof, to Site personnel as per the asbestos management plan.
2. Label all identified ACM.
3. ACM in good condition should be controlled through the implementation of the Asbestos Management Plan (AMP).
4. Inspect all identified asbestos containing materials annually to identify any damage and ensure proper labeling is present.
5. Any damaged ACM found during future inspections, as well as ACM that could be impacted by any demolition or renovation activity, should be removed following procedures outlined in the AMP.
6. Throughout the abatement activities, appropriate air monitoring and inspection should be conducted by qualified personnel to ensure all contamination is contained and ACM are disposed of appropriately. It is recommended that a proper scope of work and asbestos removal specifications be written to ensure the complete and proper removal of all ACM.

Evaluation of asbestos containing materials is based on the condition of the material and its accessibility. Following are the guidelines used to evaluate ACMs and the action, if any, required to safely manage them.

Spray Applied Fireproofing, Insulation and Texture Finishes

In evaluating the condition of ACM spray applied as fireproofing, thermal insulation or texture, decorative or acoustic finishes, the following criteria apply;

GOOD	Surface of material shows no significant signs of damage, deterioration or delamination. Up to one percent visible damage to surface is allowed within range of GOOD. Evaluation of sprayed fireproofing requires the surveyor to be familiar with the irregular surface texture typical of sprayed asbestos products. GOOD condition includes unencapsulated or unpainted fireproofing or texture finishes, where no delamination or damage is observed, and encapsulated fireproofing or texture finishes where the encapsulation has been applied after the damage or fallout occurred.
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POOR Sprayed materials show signs of damage, delamination or deterioration. More than one percent damage to surface of ACM spray.

Mechanical Insulation

In evaluating the condition of mechanical insulation (on boilers, breeching, ductwork, piping, tanks, equipment etc.) the following criteria are used:

GOOD Insulation is completely covered in jacketing and exhibits no evidence of damage or deterioration. No insulation is exposed. Includes conditions where the jacketing has minor surface damage (i.e., scuffs or stains), but the jacketing is not penetrated.

FAIR Minor penetration damage to jacketed insulation (cuts, tears, nicks, deterioration or delamination) or undamaged insulation that has never been jacketed. Insulation is exposed but not showing surface disintegration. The extent of missing insulation ranges should be minor to none.

POOR Original insulation jacket is missing, damaged, deteriorated or delaminated. Insulation is exposed and significant areas have been dislodged. Damage cannot be readily repaired.

Non-Friable and Potentially Friable Materials

Non-friable materials generally have little potential to release airborne fibres, even when damaged by mechanical breakage. However, some non-friable materials, i.e., exterior asbestos Concrete products, may have deteriorated so that the binder no longer effectively contains the asbestos fibres. In such cases of significantly deteriorated non-friable material, the material will be treated as a friable product.

Accessibility

The accessibility of building materials known or suspected of being ACM is rated according to the following criteria:

Access (A) Areas of the building within reach (from floor level) of all building users. Includes areas such as gymnasiums, workshops, and storage areas where activities of the building users may result in disturbance of ACM not normally within reach from floor level.

Access (B) Frequently entered maintenance areas within reach of maintenance staff, without need for a ladder. Includes: frequently entered pipe chases, tunnels and service areas or areas within reach from a fixed ladder or catwalk, i.e., tops of equipment, mezzanines.

Access (C) Exposed Areas of the building above 8'0" where use of a ladder is required to reach the ACM. Only refers to ACM materials that are exposed to view, from the floor or ladder, without removing or opening other building components such as ceiling tiles, or service access doors or hatches. Does not include infrequently accessed service areas of the building.

Access (C) Areas of the building which require removal of a building component including lay-in ceilings and access panels into solid ceiling systems. Includes rarely entered crawl spaces, attic spaces etc.

Concealed	Observations are limited to the extent visible from the access points.
Access (D)	Areas of the building behind inaccessible solid ceiling systems, walls, or mechanical equipment, etc., where demolition or the ceiling, wall or equipment etc., is required to reach the ACM. Evaluation of condition and extent of ACM is limited or impossible, depending on the surveyor's ability to visually examine the materials in Access D.

Note: any additional suspect materials encountered during renovation or demolitions activities must be left undisturbed until testing determines the presence or absence of asbestos or other hazardous material. In the event they are damaged or otherwise impacted, all work shall stop until appropriate control can be put in place to protect workers and the public.

Mercury

Mercury-containing thermostats were not observed within the building.

Mercury is also found in fluorescent light tubes. Caution should be exercised to ensure light tubes are not broken, releasing droplets of mercury.

Arsenic

Wood likely to have been preserved with arsenical pesticides was not observed on the subject site.

Ozone-depleting Substances (CFCs/ODS)

Equipment (Refrigerator and Freezer) that may use chlorofluorocarbons (CFCs) or ozone-depleting substances (ODS) was observed in the building.

Radioactive Materials

Smoke detectors containing sealed ²⁴¹Americium sources were observed in the building.

Lead

Lead Paint

Paint samples from the building were analyzed for lead content.

Lead was found in the sample of paint collected from the proposed door frame to be removed within the building (0.025% by weight).

The sample was confirmed to exceed the concentration of lead permissible in new paint (0.009% - SCMR) threshold to be sold without notifying the consumer of its lead content.

Table 5.2 Paint Chip Sampling Results

Sample	Description	Lead (%)
20945-14	Corridor 104 – Door Frame Paint Chips	0.025% by weight

Elemental Lead

Lead within the copper water pipes/fittings was not tested for lead content however lead content in solder, especially from buildings of this vintage, is known to reach levels up to 98% lead.

Lead linings may be present within the x-ray scanner equipment.

If lead materials are found they are typically recognized as having significant salvage value, disposal therefore should not be a major concern. Workers should exercise caution if heat is to be used to melt any lead found as means of facilitating its extraction. Molten lead can produce significant quantities of inhalable lead fume which can pose a severe health hazard. The BC Occupational Health and Safety Regulation requires that worker exposure to airborne lead be kept below 0.05 mg/m³.

Hantavirus – Rodent Droppings

Rodent droppings were not observed in the building during the survey. If rodent droppings are discovered during planned work, the contractor must provide worker instruction on the hazards of rodent droppings and other biohazardous materials, including the types of respirators and protective clothing to be worn.

Silica

All concrete, plaster, ceramic tile and stucco is suspected of containing silica in crystalline and non-crystalline forms. Many of the removal techniques (grinding, cutting, chipping etc) for these materials can generate high levels of crystalline silica in the air. Use wetting techniques and/or HEPA equipped extraction systems attached to drills and other power equipment where possible in order to decrease dust levels.

Mould

Suspect visible mould was observed within the building (Mechanical Room 114). The extent of the mould appears to be less than 1m² in size. According to Guideline G4.79 (Moulds and indoor air quality) of the Occupational Health and Safety Regulation, the extent of mould contamination would rate as 'small'.

Table 5.3 Guide for Removing Visible Mould Growth in the Indoor Environment

Extent of Visible and Hidden Mould Growth (surface area)	Minimum Recommended PPE ¹	Control Measures to Prevent Dust or Spore Dispersion ²
<p>Small Total surface area affected is less than 1 square metre (10 square feet)</p>	N95 respirator or half facepiece respirator with HEPA filters, gloves, and goggles.	Isolation of the work area; wet wiping or misting of surfaces with water containing a surfactant (wetting agent); and the use of drop sheets to prevent dispersion of dust and spores. Material is removed with minimum of dust and spore dispersal and placed in a plastic bag and sealed.
<p>Medium Total surface area affected is between 1 square metre and 10 square metres (10 square feet to 100 square feet)</p>	N95 respirator or half facepiece respirator with HEPA filters, gloves, disposable coveralls, and goggles.	Limited containment: use polyethylene sheeting ceiling to floor around the affected area with a slit entry and covering flap. Maintain area under negative pressure with HEPA filtered negative air unit. Block supply and return air vents within the containment area.
<p>Large Total surface area is greater than 10 square metres (100 square feet) or the potential for increased occupant or remediation exposure during remediation is estimated to be significant.</p>	Full face piece or powered air purifying respirator (PAPR) with HEPA filters, gloves, disposable coveralls (covering head and boots), and goggles.	Full containment: use of critical barriers. Maintain area under negative pressure with HEPA filtered fan unit exhausted outside the building. Block supply and return air vents within the containment area. Provide facilities and procedures for decontamination and personal hygiene.

6. ROOM BY ROOM ASSESSMENT

Building:

Principal Entrance Building, William Head Institution

Description:

Principal Entrance Building

Construction Details:

- Concrete foundation

Area:

Exterior Limited Access; Stucco, Brick and Mortar

Roof: Not Accessed

Asbestos Samples:

None Collected

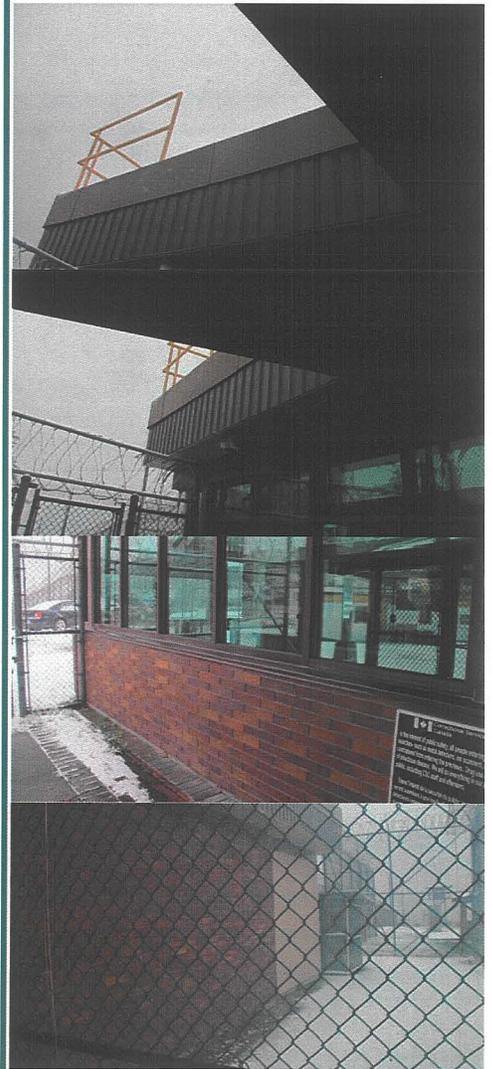
Lead Paint Samples:

None Collected

Sampling will need to be undertaken prior to the commencement of any work if applicable.

Hazardous Materials Present:

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.



Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material.

Building:

Principal Entrance Building
William Head Institution

Area: Visitor Waiting 101

Details:

- Above Ceiling: Q-Deck
- Ceiling: Acoustic Ceiling Tile
- Wall: Drywall with Joint Compound; Concrete Block
- Flooring: Blue/Grey Sheet Flooring/Concrete

Samples:

- 20945 – 01 Drywall Joint Compound (no asbestos detected)
- 20945 – 02 Blue/Grey Sheet Flooring (no asbestos detected)
- 20945 – 03 Acoustic Ceiling Tile (no asbestos detected)

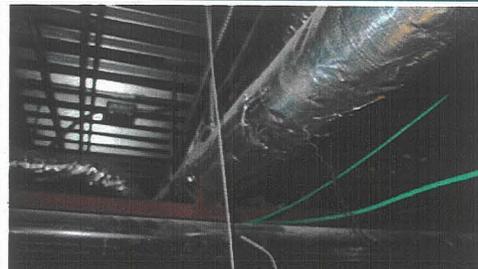
Hazardous Materials Present:

Asbestos – Vermiculite insulation may be present within concrete block walls

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present



20945-01



20945-02



20945-03

Area: Electrical Room 103

Details:

- Above Ceiling: Q-Deck
- Ceiling: Drywall with Joint Compound
- Wall: Concrete Block
- Flooring: Concrete

Samples:

20945 – 04 Fire Stop Mastic (no asbestos detected)

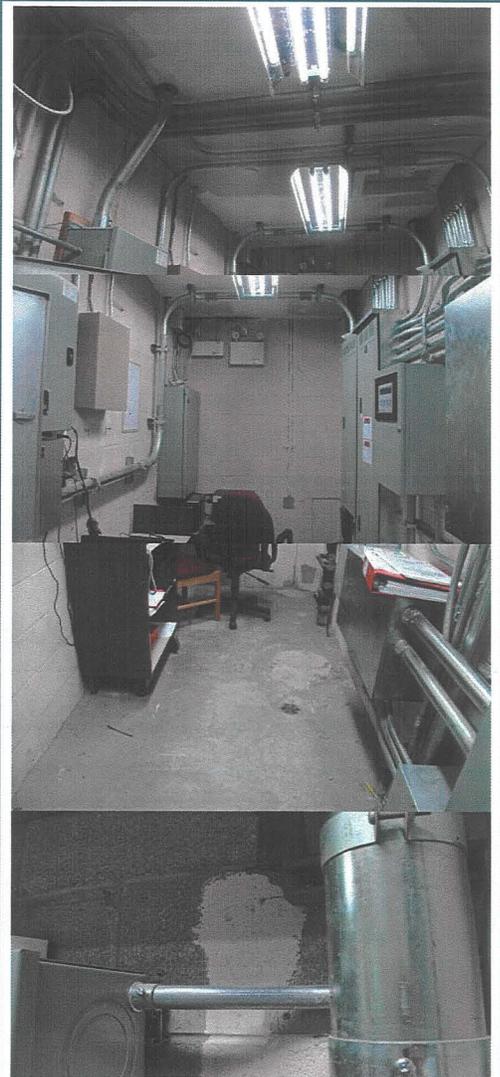
Hazardous Materials Present:

Asbestos – Vermiculite insulation may be present within concrete block

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present



20945-04

Area: Corridor 104

Details:

- Above Ceiling: Q-Deck
- Ceiling: Acoustic Ceiling Tile
- Wall: Concrete Block; Drywall with Joint Compound
- Flooring: Blue/Grey Sheet Flooring

Samples:

20945-14: Door Frame Paint (Lead 0.025% by weight)

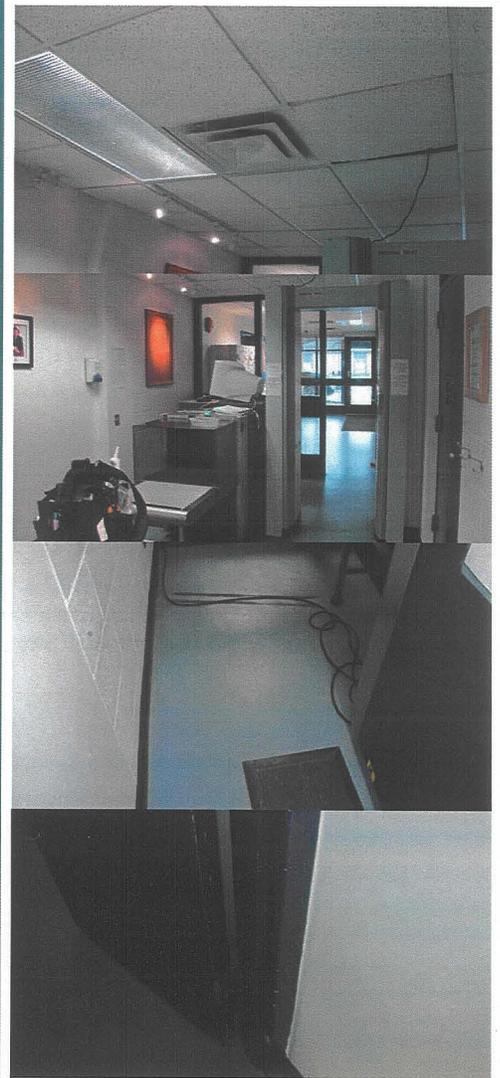
Hazardous Materials Present:

Asbestos – Vermiculite insulation may be present within concrete block

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building. Elemental lead is suspected to be present as a liner within the x-ray scanner.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present



20945-14

Area: Vestibule 118

Details:

- Above Ceiling: Q-Deck
- Ceiling: Acoustic Ceiling Tile
- Wall: Drywall with Joint Compound
- Flooring: Blue/Grey Sheet Flooring

Samples:

None Collected

Hazardous Materials Present:

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present



Area: Control Post 100

Details:

- Above Ceiling: Q-Deck
- Ceiling: Acoustic Ceiling Tile
- Wall: Drywall with Joint Compound; Plexiglass
- Flooring: Blue/Grey Sheet Flooring

Samples:

None Collected

Hazardous Materials Present:

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present

ODS: Domestic refrigerator observed.



Area: Principal Control Post 102

Details:

- Above Ceiling: Q-Deck
- Ceiling: Acoustic Ceiling Tile
- Wall: Drywall with Joint Compound; Steel
- Flooring: Blue Sheet Flooring
- Ductwork supply fibre glass lined.

Samples:

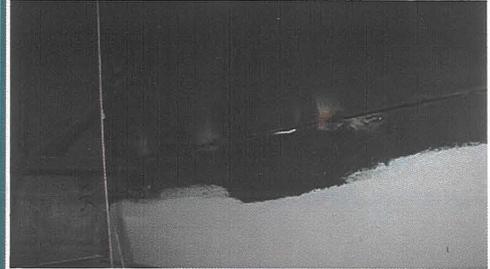
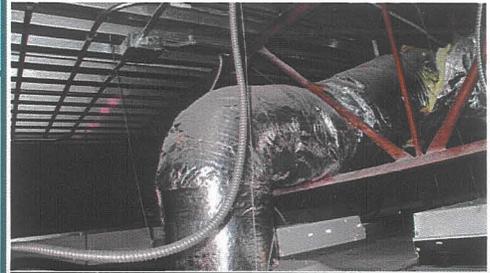
- 20945-05: Blue Sheet Flooring (no asbestos detected)
- 20945-06: Acoustic Ceiling Tile (no asbestos detected)

Hazardous Materials Present:

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present



20945-05



20945-06

Area: Washroom 103

Details:

- Above Ceiling: Q-Deck
- Ceiling: Drywall with Joint Compound
- Wall: Drywall with Joint Compound; Concrete Block
- Flooring: Ceramic Tile

Samples:

None Collected

Hazardous Materials Present:

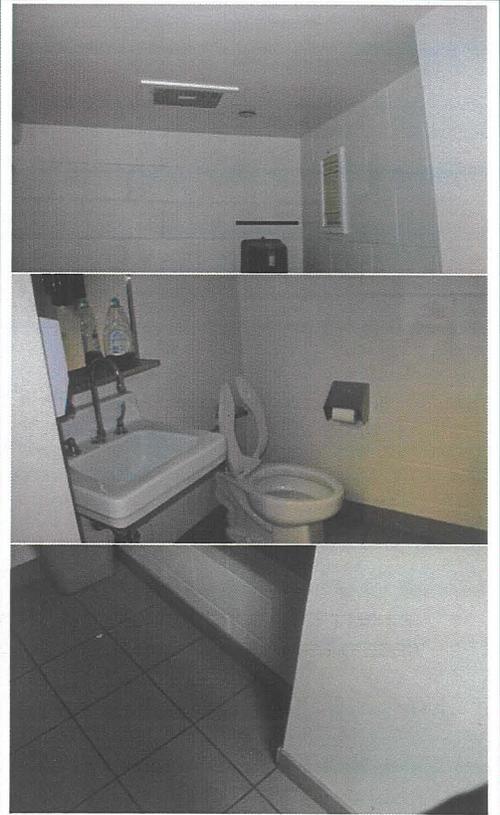
Asbestos – Vermiculite insulation may be present within concrete block

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present

Silica: in ceramic tile



Area: Telecom Room 122

Details:

- Above Ceiling: Concrete
- Ceiling: Acoustic Ceiling Tile
- Wall: Drywall with Joint Compound; Concrete Block
- Flooring: Raised Pre-fabricated Lay-in Tiles

Samples:

20945-07: Drywall Joint Compound (no asbestos detected)
20945-08: Mastic under footing of Raised Tile (no asbestos detected)

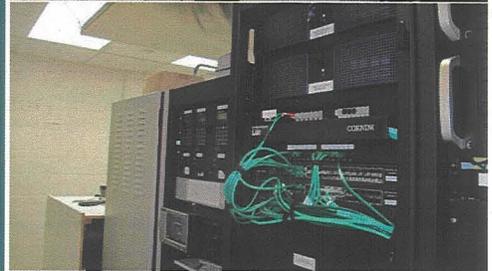
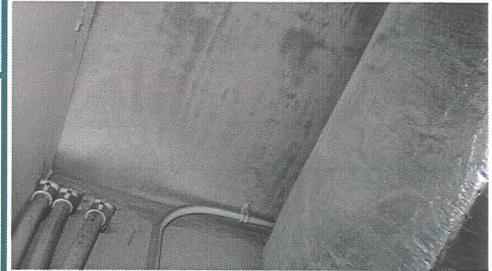
Hazardous Materials Present:

Asbestos – Vermiculite insulation may be present within concrete block

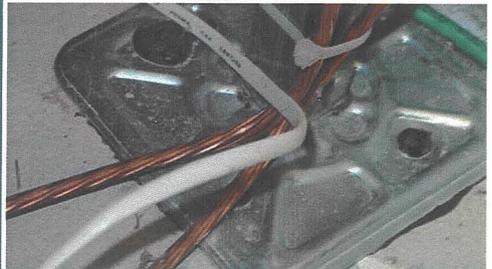
Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present



20945-07



20945-08

Area: Women's Washroom 106

Details:

- Above Ceiling: Q-Deck
- Ceiling: Drywall with Joint Compound
- Wall: Ceramic Tile
- Flooring: Ceramic Tile

Samples:

None Collected

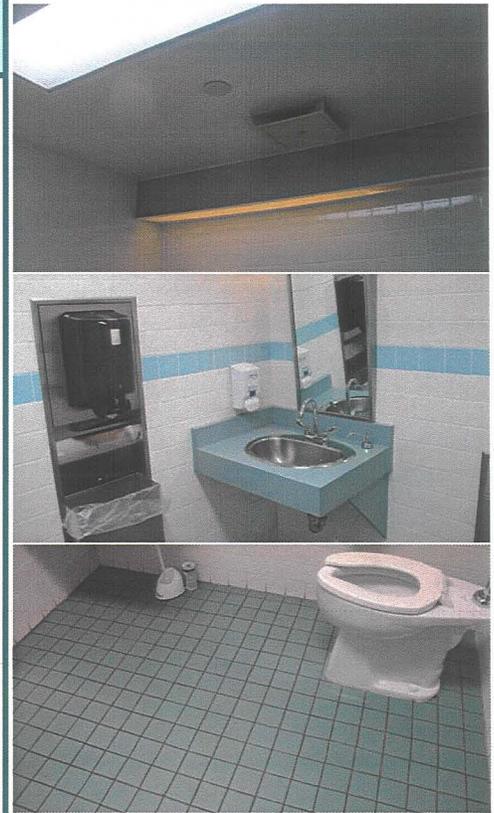
Hazardous Materials Present:

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present

Silica: in ceramic tile



Area: Men's Washroom 107

Details:

- Above Ceiling: Q-Deck
- Ceiling: Drywall with Joint Compound
- Wall: Ceramic Tile
- Flooring: Ceramic Tile

Samples:

None Collected

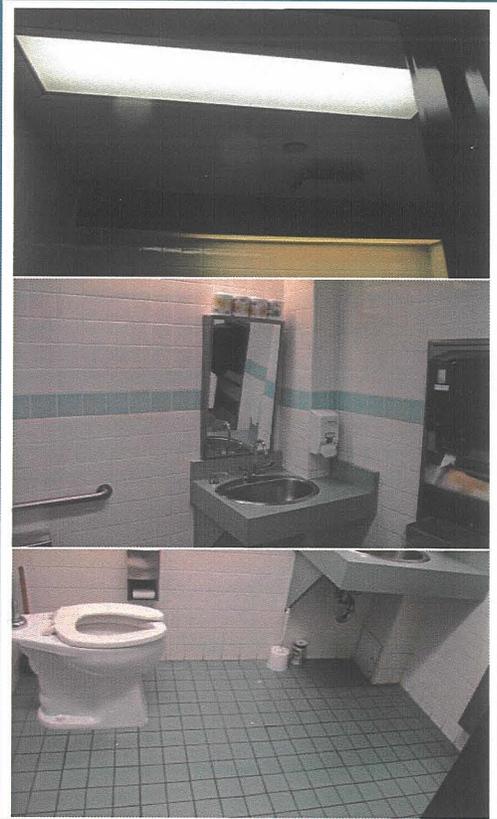
Hazardous Materials Present:

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present

Silica: in ceramic tile.



Area: Janitor 108

Details:

- Above Ceiling: Q-Deck
- Ceiling: Drywall with Joint Compound
- Wall: Drywall with Joint Compound
- Flooring: Blue/Grey Sheet Flooring

Samples:

None Collected

Hazardous Materials Present:

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present



Area: Storage 119

Details:

- Above Ceiling: Q-Deck
- Ceiling: Acoustic Ceiling Tile
- Wall: Drywall with Joint Compound; Concrete Block
- Flooring: Blue Sheet Flooring

Samples:

None Collected

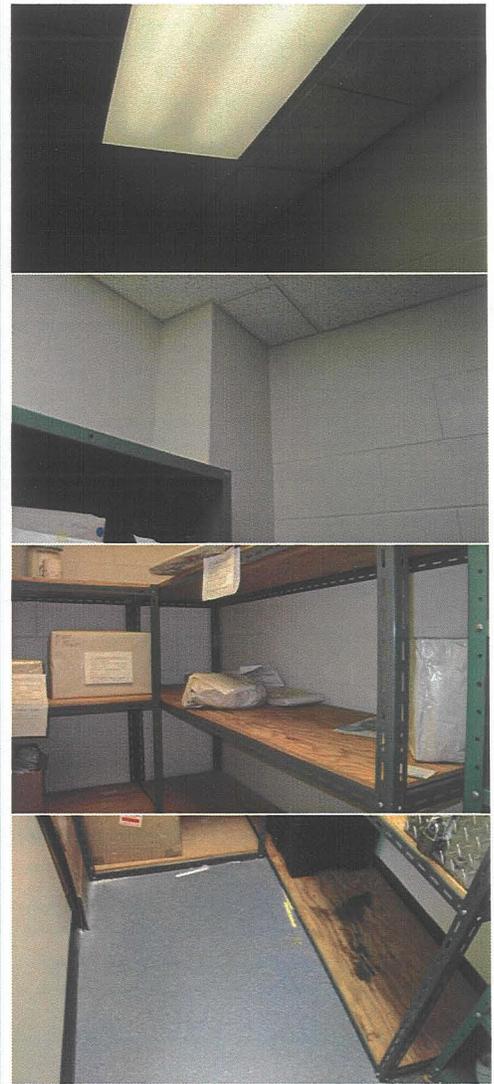
Hazardous Materials Present:

Asbestos – Vermiculite insulation may be present within concrete block

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present



Area: LAN 120

Details:

- Above Ceiling: Q-Deck
- Ceiling: Acoustic Ceiling Tile
- Wall: Concrete Block
- Flooring: Raised Pre-fabricated Lay-in Tiles

Samples:

None Collected

Hazardous Materials Present:

Asbestos – Vermiculite insulation may be present within concrete block

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present



Area: Strip Search 116

Details:

- Ceiling: Drywall Joint Compound
- Wall: Drywall Joint Compound
- Flooring: Blue Sheet Flooring

Samples:

None Collected

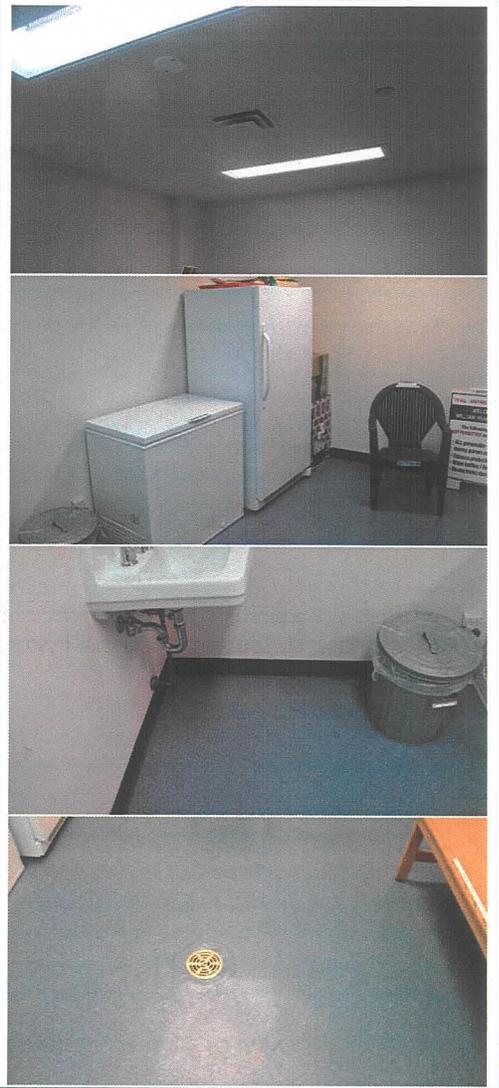
Hazardous Materials Present:

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present

ODS: A domestic refrigerator and freezer were observed



Area: Informatics 115

Details:

- Ceiling: Acoustic Ceiling Tile
- Wall: Drywall Joint Compound
- Flooring: Carpet; Concrete

Samples:

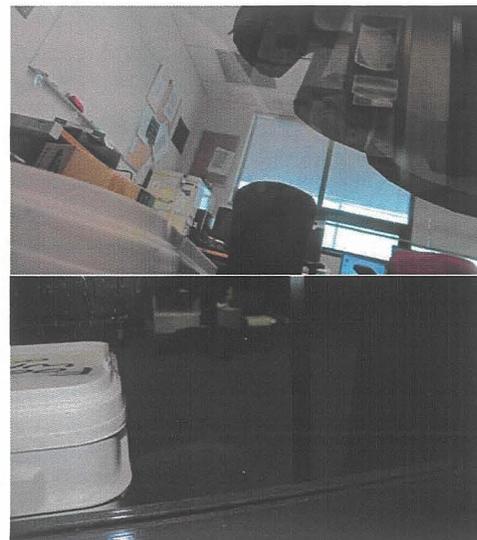
None Collected; not accessible

Hazardous Materials Present:

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present



Area: Corridor 117

Details:

- Above Ceiling: Q-Deck
- Ceiling: Acoustic Ceiling Tile
- Wall: Drywall Joint Compound
- Flooring: Blue Sheet Flooring

Samples:

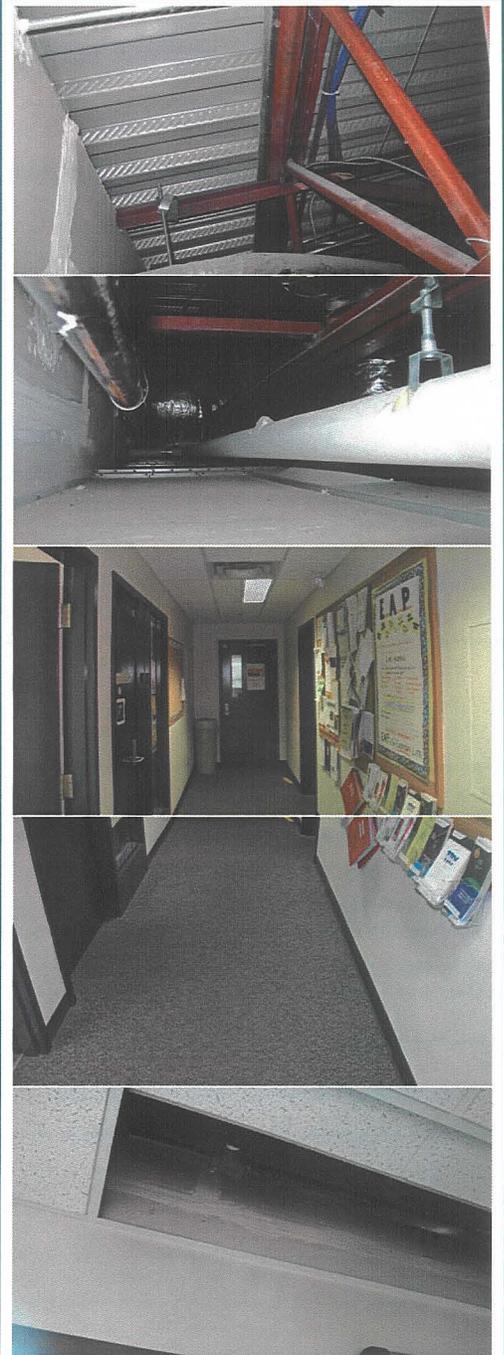
20945-09: Drywall Joint Compound (no asbestos detected)

Hazardous Materials Present:

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present



20945-09

Area: Staff Washroom 105

Details:

- Ceiling: Drywall Joint Compound
- Wall: Drywall Joint Compound
- Flooring: Ceramic Tile

Samples:

None Collected

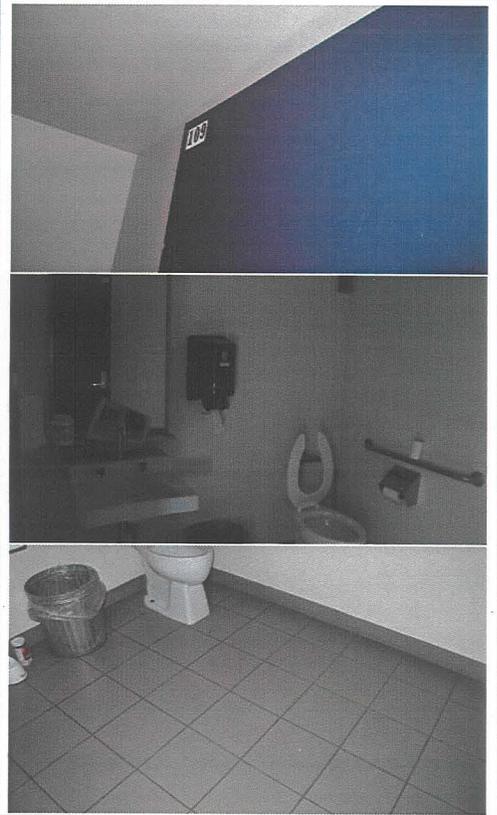
Hazardous Materials Present:

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present

Silica: in ceramic tile



Area: Coffee Room 110/Training Room 111

Details:

- Above Ceiling: Q-Deck
- Ceiling: Acoustic Ceiling Tile
- Wall: Drywall Joint Compound
- Flooring: Carpet; Blue Sheet Flooring; Concrete

Samples:

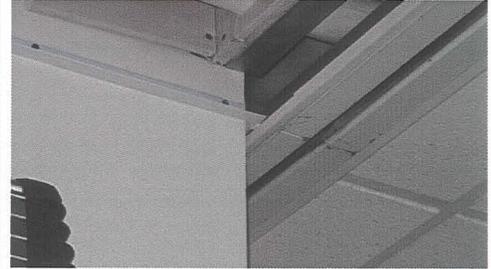
20945-10: Drywall Joint Compound (no asbestos detected)
20945-11: Acoustic Ceiling Tile (no asbestos detected)

Hazardous Materials Present:

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present



20945-10



20945-11



Area: Mechanical Room 114

Details:

- Ceiling: Q-Deck
- Wall: Drywall Joint Compound
- Flooring: Concrete

Samples:

- 20945-12: Caulking - Ductwork (no asbestos detected)
- 20945-13: Drywall Joint Compound (no asbestos detected)

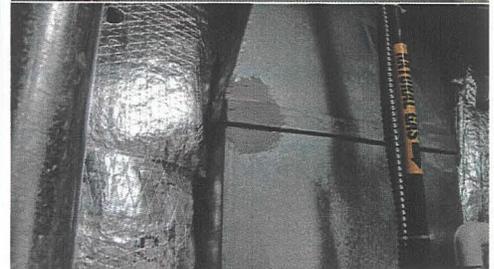
Hazardous Materials Present:

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present

Mould: Suspect visible mould observed



20945-12



Suspect Visible Mould



20945-13

Area: Vestibule 113

Details:

- Above Ceiling: Q-Deck
- Ceiling: Acoustic Ceiling Tile
- Wall: Drywall Joint Compound
- Flooring: Blue/Grey Sheet Flooring

Samples:

None Collected

Hazardous Materials Present:

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present



Area: Storage 112

Details:

- Above Ceiling: Q-Deck
- Ceiling: Acoustic Ceiling Tile
- Wall: Drywall Joint Compound
- Flooring: Blue Sheet Flooring

Samples:

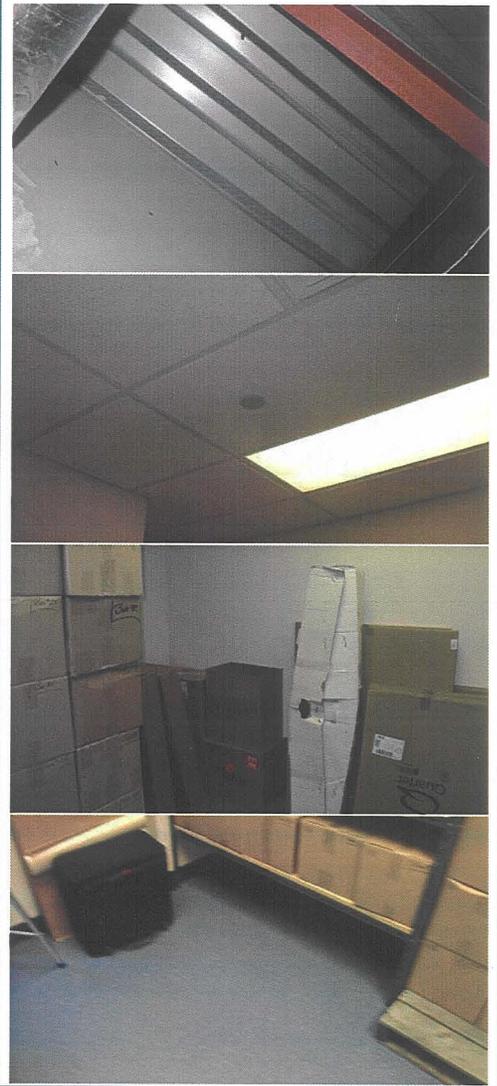
None Collected

Hazardous Materials Present:

Lead - Lead based or lead containing paint is assumed to be in all original surface coatings on and in the building.

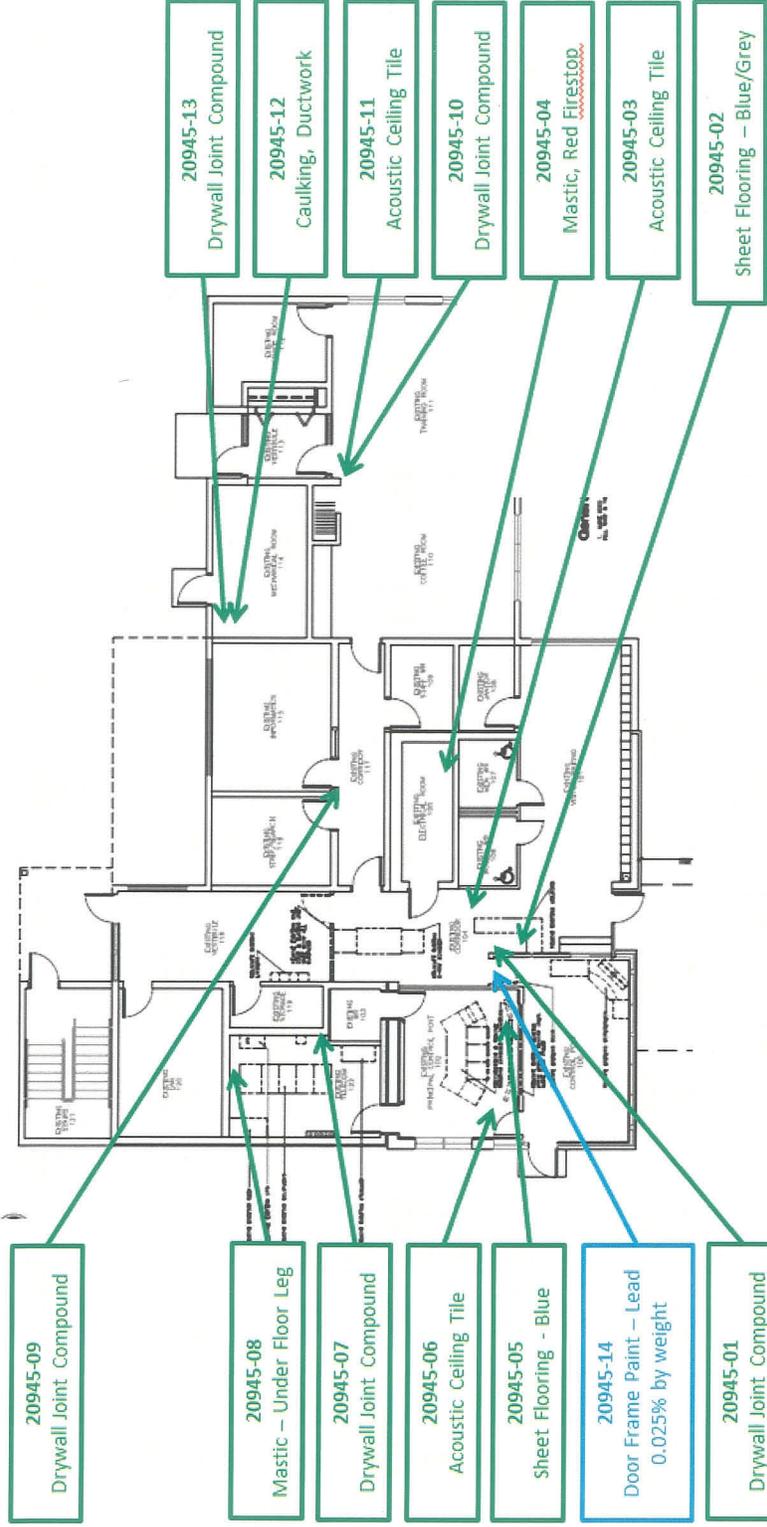
PCBs: Fluorescent light ballasts present

Mercury: Fluorescent light tubes present



7. APPENDICES

8. APPENDIX 1: BULK SAMPLE LOCATIONS



DRAWING NOT TO SCALE	
LEGEND	ASBESTOS
123	None Detected
123	Material Contains Asbestos
123	Lead Sample
PROJECT NO.: 20945	ADDRESS/LOCATION: William Head Institution – Principal Entrance Building
DATE: 05/12/2013	DRAWING TITLE: Main Floor Plan Demolition
SURVEYED BY: WR	
DRAWING NO.: 001	
 North West Environmental Group Ltd. #210 – 2950 Douglas St. Victoria, BC V8T 4N4	

Warning: in the event any additional suspect materials are encountered during renovation/repair activities, work on those materials should stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material

9. APPENDIX 2: BULK SAMPLE RESULTS



North West
Environmental Group Ltd.

Unit 210 - 2950 Douglas Street
Victoria, B.C. V8T 4N4
Tel: 250-384-9695
Fax: 250-384-9865
e-mail: northwest@nwest.bc.ca

Bulk Sample Report

Asbestos Analysis of Bulk Materials using Polarized Light Microscopy

Client: Public Works and Government Services Canada
Contractor: Public Works and Government Services Canada
Project: William Head Prison - Principal Ent. Bldg.

Date: December 09, 2013
Client Job or PO#: _____
Project number: 20945

Sample No	Location	Date Analysed	Analyst	Description	Phase	%	Asbestos	%	Other Materials	%
20945-1	Visitor Waiting 101 - By Check-in Millwork	Dec-07-2013	EMSL	Drywall Joint Compound	White	100	None Detected	0	Non-Fibrous	100
20945-2	Visitor Waiting 101 - By Layer 1	Dec-07-2013	EMSL	Sheet Flooring - Blue/Grey	Flooring - Blue	90	None Detected	0	Fibrous (Other) (10%) Non-Fibrous (90%)	100
20945-2	Visitor Waiting 101 - By Layer 2	Dec-07-2013	EMSL	Sheet Flooring - Blue/Grey	Mastic - Black/Yellow	10	None Detected	0	Non-Fibrous	100
20945-3	Visitor Waiting 101	Dec-07-2013	EMSL	Acoustic Ceiling Tile 1.5m Pinhole+Random Fissure	Brown/Grey	100	None Detected	0	Fibrous (Other) (70%) Non-Fibrous (30%)	100
20945-4	Electrical Room 105	Dec-07-2013	EMSL	Mastic, Firestop, Red	Red	100	None Detected	0	Fibrous (Other) (15%) Non-Fibrous (85%)	100
20945-5	Principal Control Post 102 Layer 1	Dec-07-2013	EMSL	Sheet Flooring - Blue	Flooring - Blue	90	None Detected	0	Non-Fibrous	100
20945-5	Principal Control Post 102 Layer 2	Dec-07-2013	EMSL	Sheet Flooring - Blue	Mastic - Brown	10	None Detected	0	Non-Fibrous	100
20945-6	Principal Control Post 102	Dec-07-2013	EMSL	Acoustic Ceiling Tile 1.5m Pinhole+Random Fissure	Tan/White	100	None Detected	0	Fibrous (Other) (70%) Non-Fibrous (30%)	100
20945-7	Telecom 122	Dec-07-2013	EMSL	Drywall Joint Compound	Tan/White	100	None Detected	0	Non-Fibrous	100
20945-8	Telecom 122 - Under Lay in Floor Supports	Dec-07-2013	EMSL	Mastic	Black	100	None Detected	0	Non-Fibrous	100
20945-9	Corridor 117 - Above Ceiling	Dec-07-2013	EMSL	Drywall Joint Compound	White	100	None Detected	0	Non-Fibrous	100
20945-10	Coffee Room 110	Dec-07-2013	EMSL	Drywall Joint Compound	White	100	None Detected	0	Non-Fibrous	100
20945-11	Coffee Room 110	Dec-07-2013	EMSL	Acoustic Ceiling Tile 1.5m Pinhole+Random Fissure	Brown/White	100	None Detected	0	Fibrous (Other) (70%) Non-Fibrous (30%)	100
20945-12	Mechanical 114 - Duct	Dec-07-2013	EMSL	Caulking - Grey	Grey	100	None Detected	0	Non-Fibrous	100



Note: Samples were analyzed by method: EPA/600/R-93/116 "Bulk Asbestos Analysis by Polarized Light Microscopy". For heterogeneous materials the concentration may vary. No reproduction without permission.



EMSL Analytical, Inc.

200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (856) 303-2500 / (856) 786-5974
<http://www.EMSL.com> cinnaminsonleadlab@emsl.com

EMSL Order: 201312874
CustomerID: PAEC50
CustomerPO:
ProjectID:

Attn: **Janet Peto**
North West Environmental Group
2950 Douglas Street
Unit 210
Victoria, BC V8T 4N4

Phone: (250) 384-9895
Fax: (250) 384-9865
Received: 12/06/13 10:03 AM
Collected: 12/5/2013

Project: 20945 / William Head Prison-Principal Ent.Bldg/ Public Works and Government Services Canada

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B*/7000B)

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
20945-14	0001	12/5/2013	12/7/2013	0.025 % wt
Site: Corridor 104- Door Frame Desc: Paint Chips				

Julie Smith - Laboratory Director
NJ-NELAP Accredited 03036
or other approved signatory

Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. The QC data associated with these results included in this report meet the method QC requirements, unless specifically indicated otherwise. Unless noted, results in this report are not blank corrected. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. * slight modifications to methods applied. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NELAP Certifications: NJ 03036, NY 10872, PA 68-00367, AIHA-LAP, LLC ELLAP 100194, A2LA 2845.01

Initial report from 12/09/2013 09:45:43

10. APPENDIX 3: EVALUATION OF ASBESTOS CONTAINING MATERIALS (ACM)

Assessment of Condition

Spray Applied Fireproofing, Insulation and Texture Finishes

In evaluating the condition of ACM spray applied as fireproofing, thermal insulation or texture, decorative or acoustic finishes, the following criteria apply;

GOOD	Surface of material shows no significant signs of damage, deterioration or delamination. Up to one percent visible damage to surface is allowed within range of GOOD. Evaluation of sprayed fireproofing requires the surveyor to be familiar with the irregular surface texture typical of sprayed asbestos products. GOOD condition includes unencapsulated or unpainted fireproofing or texture finishes, where no delamination or damage is observed, and encapsulated fireproofing or texture finishes where the encapsulation has been applied after the damage or fallout occurred.
POOR	Sprayed materials show signs of damage, delamination or deterioration. More than one percent damage to surface of ACM spray.

Mechanical Insulation

In evaluating the condition of mechanical insulation (on boilers, breeching, ductwork, piping, tanks, equipment etc.) the following criteria are used:

GOOD	Insulation is completely covered in jacketing and exhibits no evidence of damage or deterioration. No insulation is exposed. Includes conditions where the jacketing has minor surface damage (i.e., scuffs or stains), but the jacketing is not penetrated.
FAIR	Minor penetration damage to jacketed insulation (cuts, tears, nicks, deterioration or delamination) or undamaged insulation that has never been jacketed. Insulation is exposed but not showing surface disintegration. The extent of missing insulation ranges should be minor to none.
POOR	Original insulation jacket is missing, damaged, deteriorated or delaminated. Insulation is exposed and significant areas have been dislodged. Damage cannot be readily repaired.

Non-Friable and Potentially Friable Materials

Non-friable materials generally have little potential to release airborne fibres, even when damaged by mechanical breakage. However, some non-friable materials, i.e., exterior asbestos Concrete products, may have deteriorated so that the binder no longer effectively contains the asbestos fibres. In such cases of significantly deteriorated non-friable material, the material will be treated as a friable product.

Client: TC - 8th floor - Refit R.067658.500
 Address: 800 Burrard Street
 Project: Re-fit Mail room
 Project Costs (fiscal year 2013 / 2014)
 Updated as of: March 24 2014
 Project Start Date: Oct 21 2013
 Project Completion Date:

	quote or estimate	PO #	Actual Invoice \$	Invoice Number
Construction:				
Consultant				
Suzanne / Vlad paid by client				
total	\$0			
Contractor				
sub agreement	\$42,712	\$700,289,861	\$47,513.40	PAYE
landlord fees (10%)	\$4,271			
contingency * built into sub agree	\$530			
co 1 platform \$450				
co 2 relocate cabs \$180				
co 3 doors for mail box \$1,069				
total \$1,699				
landlord fees: \$170				
total to date: \$1,869				
contingency: \$530				
contingency difference: -\$1,339	\$1,339			
sub total of above	\$48,852		\$47,513.40	
PWGSC in-house time				
Project Management	\$9,229		\$2,500.00	jan billing
Commissioning Manager			\$1,000.00	feb billing
Accommodation Management			\$3,000.00	mar billing
Shared Services Centre			\$2,729.00	
Facilities Management				
Mechanical / Electrical review				
Accessibility Review Officer				
sub total	\$9,229		\$9,229.00	
Grand Total:	\$58,081		\$56,742.40	
SSA	<u>\$56,212</u>		<u>\$56,212.00</u>	
Difference Remaining	-\$1,869		-\$530.40	
	fees	disburse	total	finance #
SSA 1	\$9,300	\$46,912	\$56,212	40072930

Principal Entrance Renovations

Project No. R.066815.001

Metchosin BC William Head Institution

APPENDIX 2

Correctional Service Canada Reference Documents:

- .1 ES/SOW-0101 Electronics Engineering Statement of Work, Procurement and Installation of Electronic Systems.
- .2 ES/SOW-0102 Electronics Engineering Statement of Work, Quality Control for Procurement and Installation of Electronic Security Systems.

**Correctional Service Canada
Technical Services Branch
Electronics Systems**

**ES/SOW-0101
Revision 3
15 April 2004**

**ELECTRONICS ENGINEERING
STATEMENT OF WORK

PROCUREMENT & INSTALLATION OF
ELECTRONIC SECURITY SYSTEMS**

AUTHORITY

This Statement of Work is approved by Correctional Service Canada for the procurement and installation of all telecommunications and electronic security systems, subsystems, and equipment in Canadian penal institutions.

Recommended corrections, additions or deletions should be addressed to the Design Authority at the following address: Director, Engineering Services, Correctional Service of Canada, 340 Laurier Avenue West, Ottawa, Ontario, K1A 0P9

Prepared by:


Manager,
Electronics Systems Research

Approved by:

Director, 
Engineering Services
15 Apr 04

RECORD OF REVISIONS

Revision	Paragraph	Comment
3	10.1 – Manuals and Drawings	Added equipment operating software
	10.4 – Documentation Format	Added equipment operating software

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ABBREVIATIONS

The following abbreviations are used in this specification:

ATP	Acceptance Test Plan
CM	Corrective Maintenance
COTS	Commercial-Off-The-Shelf
CSC	Correctional Service Canada
DA	Design Authority
DCR	Design Change Request
DES	Director, Engineering Services
DL	Deficiency List
FDR	Final Design Report
MRT	Mean Response Time
MTBF	Mean Time Between Failures
MTTR	Mean Time To Repair
PDR	Preliminary Design Report
PM	Preventative Maintenance
PW&GSC	Public Works & Government Services Canada
QA	Quality Assurance
RFP	Request For Proposal
SOW	Statement of Work
STR	Statement of Technical Requirement

DEFINITIONS

The following definitions are used in this specification:

Design Authority	Director, Engineering Services (DES) - Correctional Service Canada (CSC) is responsible for all technical aspects of the system design and implementation.
Contract Authority	Public Works and Government Services Canada (PW&GSC) is responsible for all contractual matters associated with the system design and implementation.
Contractor	The company selected as the successful bidder.
Project Officer	A CSC employee or a contracted person designated by DES to be responsible for the implementation of the project.
Off-the-shelf	Equipment currently on the market with available field reliability data, manuals, engineering drawings and parts price list.
Custom Equipment	Equipment designed and/or manufactured specifically for a specific contract.

1.0 INTRODUCTION

This Statement of Work (SOW) defines the work and responsibilities for the design, procurement, installation, test and integration of all telecommunications and electronic security equipment in CSC Institutions.

The SOW provides guidelines, procedures and responsibilities to the contractor and/or the project officer for the implementation of all telecommunications and electronic security systems in CSC facilities.

All work performed shall adhere to this SOW, CSC Specifications, Standards and Statement of Technical Requirements (STRs).

1.1 Commercial-Off-The-Shelf Equipment

The contractor shall use commercial off-the-shelf (COTS) equipment and proven designs to the maximum extent possible. All new equipment shall meet the specified lifespan requirements. New equipment designs shall be restricted to unique interfaces and common control console.

1.2 Technical Acceptability

The Correctional Service Canada (CSC) operational environment is unique for its diversity of locations, climate exposures and the physical restrictive construction techniques of penal institutions. Maintaining national security, the safety of staff and offenders alike is CSC's commitment to the government and public. Electronic security systems operating in this unique environment shall maintain very high standards of dependability and reliability.

The CSC Engineering Services Division has established technical specifications and equipment standards for specific electronic security systems which are based on very specific and restrictive operational performance criteria as detailed in its Electronic Engineering Standard. Technical acceptability of these systems means that the equipment complies with the pertinent CSC specifications and standards.

The technical acceptance process shall involve system and subsystem evaluation in accordance with the applicable CSC specifications in one of CSC facilities or may be tested in a CSC facility to verify the effectiveness of the proposed technologies when subjected to the restrictive operational environment.

CSC shall also verify in depth any of the system technical specifications called up. CSC may when it deems necessary, request the supplier to arrange for a full site demonstration. CSC may rely on manufacturer's test results for specific areas of the specification where an independent test facility has conducted the test, and the facility is deemed acceptable to CSC.

It is the supplier's responsibility to make new developments in products available to CSC for evaluation. Equipment qualification is an ongoing process and can be initiated at any time by a vendor. Any vendor can have access to the CSC specifications and standards. Any new development or products should be submitted to the CSC Engineering Services Division, Technical Authority in a suitable time frame prior to any tendering process to allow for an acceptable evaluation period. The evaluation period may take up to sixteen (16) months.

1.3 Equipment Procurement

Any ordering of equipment/material before the approval of the final design report will be undertaken at the contractor's own risk. The Design Authority may authorize the procurement of certain long lead items at, or shortly after the preliminary design review.

1.4 Quantity of Equipment

The quantity and location of the equipment required for CSC institutions will be contained in the specification identified in the STR.

2.0 **APPLICABLE DOCUMENTS**

CSC Specifications, Standards and STRs are approved by the Director of Engineering Services (DES) for the procurement and installation of all telecommunications and electronic security systems in all CSC facilities. These documents promulgate DES policy and shall not be modified or changed without prior consultation and approval of the Director. The documents of the issue in effect will form part of the Request for Proposal (RFP) issued by the contract authority.

3.0 REQUIREMENTS

3.1 The contractor shall:

- a. Design, procure or manufacture, install, test and document the installation of all electronic security and telecommunications systems in accordance with the CSC specifications, standards and STR;
- b. Provide the operator and maintenance training in accordance with the CSC requirements;
- c. Provide the maintenance support and spares in accordance with the CSC maintenance requirements;
- d. Provide quality assurance (QA) to ensure equipment performance and reliability are in accordance to CSC requirements;
- e. Provide warranty coverage to include spare parts provision and equipment repair;
- f. Provide a program schedule to show all major elements from a contract award to completion of the warranty period and shall include anticipated time of occurrence, interrelationships between events, and time scale; and
- g. Be responsible for the integration of the proposed system to any existing telecommunications and electronic security systems.
- h. Provide a lightning protection system for the installation of all electronic security systems/equipment in the CSC facilities. As a minimum, surge suppression type lightning arrestors shall be required for all power, communications and antenna cables/wires entering or leaving a building.

4.0 **SYSTEM DEVELOPMENT**

The contractor shall design systems and equipment to meet all of the requirements stipulated in the applicable CSC specifications. The system design shall be modular and address the following criteria:

- a. ease of operation and maintenance;
- b. optimize and concentrate control functions and capabilities;
- c. enhance the security of the working environment, extend staff capabilities to observe and control; and
- d. minimize the number and types of display and control devices.

4.1 **Preliminary Design**

The preliminary design baseline shall be established by the review and approval of the preliminary design report (PDR) by the Design Authority (DA) or his designate. Specifications, drawings and the approved PDR shall make up the preliminary design baseline.

The contractor shall prepare and submit two (2) copies of the PDR to the Design Authority and one (1) copy to the Contract Authority at least ten (10) days prior to the PDR meeting. The PDR shall consist of:

- a. performance specifications with functional block diagrams of the proposed system. The technical analysis and equipment performance data shall verify system requirements;
- b. preliminary equipment layouts including control consoles and racks;
- c. list of off-the-shelf equipment with part number, model number, manufacturer and the quantity of each item;
- d. list of custom designed equipment with model number and the quantity of each item;
- e. functional schematics for all custom designed equipment;
- f. conceptual drawings for all custom designed equipment;
- g. a proposed product assurance plan;
- h. a proposed maintenance plan;

- i. proposed sparing plan; and
- j. proposed training plan.

4.2 Preliminary Design Review

The PDR meeting shall be convened by the contractor to review the PDR contents. The contractor shall provide the venue and all of the necessary facilities. The Design Authority will identify any portions of the PDR that are not acceptable to CSC.

4.3 Final Design

The final design baseline shall be established by the review and approval of the Design Authority of the final design report (FDR). It establishes the start of change control in equipment design and performance. The FDR shall consist of:

- a. all elements of the preliminary design baseline;
- b. control console mockups, ergonomics considerations, etc., as necessary;
- c. drawings and operational descriptions for the custom designed equipment including interface specifications;
- d. Installation drawings and instructions; and
- e. availability model and analysis updates to reflect the final system design and hardware selection.

The FDR shall be prepared to good commercial practice. Two (2) copies shall be submitted to the Design Authority at least ten (10) working days before the FDR meeting.

4.4 Final Design Review

The final design review meeting shall be convened to review the contents of the FDR. The contractor shall provide the venue and all of the necessary facilities. All of the contractor's staff responsible for the system/equipment engineering shall be available.

4.5 Design Change Control

Design changes shall be in accordance with the following procedure:

- 4.5.1 **Type I.** Changes that affect cost, schedule, reliability, maintainability, or availability shall be submitted as a design change request (DCR).

Changes shall not be actioned until specifically directed in writing by the Design Authority through the Contract Authority.

- 4.5.2 **Type II.** Changes to correct a design error without affecting cost, schedule, reliability, maintainability, or availability shall not require a DCR.

Changes shall be reported to the Design Authority and the final design baseline shall be updated by the contractor. The Design Authority will review and acknowledge the change.

4.6 **Design Change Request (DCR)**

Type I changes shall be forwarded to the Design Authority through the Contract Authority on DCRs initiated by either the contractor or the Design Authority.

DCRs shall be reviewed and approved before implementation and shall include:

- a. specification requirement being effected;
- b. final design baseline element being changed;
- c. description of the design change;
- d. reason for the change;
- e. impact on cost, schedule, reliability, maintainability and availability; and
- f. trade-off recommendations.

4.7 **In-Plant Testing**

Details of in-plant tests are contained in the ES/SOW-0102, Statement of Work. In-plant tests shall be performed according to the Design Authority approved procedures.

Equipment with deficiencies as the result of the in-plant tests shall be subject to retest. The Design Authority reserves the right to add or modify tests.

5.0 SYSTEM INSTALLATION

The contractor shall be responsible for ensuring that sufficient site utilities are available. No work will be permitted at the site before the approval of the Design Authority. All installation activities shall be conducted in accordance with ES/SOW-0102, Statement of Work.

5.1 Schedule

The contractor shall provide a detailed work schedule for the installation activities. This schedule shall reflect the complete implementation plan by identifying the nature of the work to be performed and the area affected.

5.2 On-Site Inspections

Design Authority or an appointed CSC representative shall perform ongoing inspections of the contractor's activities. These inspections shall verify compliance with the project requirements, the quality of work performed and assess the contractor's progress in relation to the approved schedule. Installation deficiencies requiring corrective action will be brought immediately to the contractor's attention in writing.

5.3 On-Site Coordination

Design Authority shall be responsible for the appointment of an on-site CSC representative. This representative will handle all site related matters and will periodically inspect the installation.

When electronic system installations are part of a construction program or a major redevelopment that involves Public Works & Government Services of Canada, the electronic system installation contractor shall coordinate all activities with the relevant site manager and shall comply with this SOW.

5.4 Facility Criteria

The contractor shall provide the facility criteria data in the proposal. Details as to the power, cooling, space and/or other requirements relating to electronic security system installation at the site must be provided. Final facility criteria information must be provided as part of the FDR.

5.5 Installation Design

The system installation design and planning shall make maximum use of existing ducts, conduits, and other cable routing facilities. Where this is not possible, the contractor shall design and install facilities in a manner acceptable to the Design Authority.

5.6 Subcontractor Supervision

The contractor shall provide an on-site supervision of all subcontractors. The subcontractors shall abide by the regulations of this Statement of Work and the conditions in the contract.

5.7 System Checkout

Before conducting the formal on-site testing for the CSC acceptance, the contractor shall conduct and document a system checkout to assure the system readiness for formal testing and on-line operations. The test sheets used for the system checkout shall be signed by a company representative and provided to the Design Authority at least seven (7) days prior to the scheduled date of the Acceptance testing. The Design Authority will verify readiness through review of the checkout report. The report may be used as reference during the formal witnessed testing for acceptance.

5.8 As-Built Drawings

Thirty (30) days after the system installation acceptance, the contractor shall deliver a complete set of equipment and installation as-built drawings for Design Authority's review and approval. Within thirty (30) days after CSC approval, two (2) complete sets of revised drawings shall be delivered to the Design Authority.

The contractor shall update these drawings throughout the warranty period by the design control procedures. Within thirty (30) days of completion of the warranty period, the contractor shall deliver one (1) set of final revised drawings reflecting all changes to the Design Authority. Upon final CSC approval, the contractor shall deliver two (2) sets of original prints of the final drawings.

6.0 **SYSTEM ACCEPTANCE**

System acceptance shall occur when the acceptance testing has been completed according to the ES/SOW-0102, Statement of Work and when all of the other requirements of the contract have been completed to the satisfaction of the Design Authority. A final acceptance certificate signed by the Design Authority shall certify the system acceptance.

On-site system acceptance testing shall not begin until all of the on-site installation activities have been completed.

6.1 **Acceptance Test Plans (ATPs)**

The contractor shall provide ATPs for all system, subsystem and equipment tests for Design Authority review and approval. The requirements for the ATP are detailed in the ES/SOW-0102, Statement of Work.

6.2 **System Testing**

The contractor shall conduct the approved ATP and record the results. The Design Authority or an appointed CSC representative shall witness the tests.

6.3 **Deficiency Lists (DL)**

The contractor shall prepare and submit a list of deficiencies divided into three categories:

- a. Visual/Mechanical,
- b. Operational, and
- c. Technical/Functional.

6.4 **Technical Acceptance**

Upon verifying that all of the deficiencies have been corrected, the Design Authority shall issue a letter of Technical Acceptance.

7.0 **QUALITY ASSURANCE (QA)**

The QA program shall include quality control and system tests/verification programs to verify that new design and off-the-shelf equipment requirements have been met. System tests/verification will be conducted by the contractor in-plant and on-site, and may be witnessed by the CSC representatives where appropriate. The system shall pass all tests before approval will be given to commence the operator and maintenance training programs and warranty period.

7.1 **Quality Control Program**

The contractor shall provide a description of their internal quality control programs for CSC review and approval. CSC reserves the right to audit and verify that all materials destined for use in CSC systems have been thoroughly inspected and that QA procedures are applied during production and testing.

7.2 **System Test Program**

The contractor shall prepare and provide the documents describing: number, type and details of equipment, subsystem and system tests for CSC review and approval. These documents must be approved before any formal testing and will consist of the following:

7.2.1 **System Test Plan.**

This plan shall contain the test philosophy, the tests to be conducted, the pass-fail criteria, the retest requirements, and the instructions for the validation and the sign-off of all final design baseline requirements.

Before witnessing these tests, the CSC representative will perform a visual and mechanical inspection to ensure that the system installation meets the requirements of ES/SOW-0102, Statement of Work.

7.2.2 **Test Procedures.** These procedures shall ensure that:

- a. all equipment supplied meets the performance specification;
- b. each subsystem meets the applicable performance requirements; and
- c. the overall system meets the performance requirements.
- d. test procedure contains the step sequence for each test to be conducted, and the expected results.

7.2.3 Contractor Testing.

All tests are conducted by the contractor and may be witnessed by an appointed CSC representative. Tests are conducted as stipulated in the approved plan and procedures. The contractor shall inform CSC at least five (5) working days before the test start date.

7.2.4 Test Reports.

The contractor shall submit final copies of the test results for CSC review and approval within ten (10) working days of the completion of the testing. Two copies of the report shall be submitted and shall include:

- a. a summary description of the tests;
- b. test results consisting of completed test procedures verified by a CSC representative;
- c. incident reports, including analysis and corrective action; and
- d. results of any retest.

8.0 TRAINING

The contractor shall develop, document and conduct training for both the operational and the technical staff. The training shall be conducted on-site at the institution in the period designated by the schedule.

8.1 Classroom Training

Classroom lectures and demonstrations will be conducted on-site to train operations staff in the use and technical personnel in the maintenance of the systems.

8.2 Training Documentation

The contractor shall develop and deliver a complete training plan to the Design Authority for comments and approval. This plan must be submitted to CSC at least thirty (30) days in advance of the training date to allow for CSC review. As a minimum, the training material shall contain:

- a. training plans for CSC operations trainers and technical personnel;
- b. manuals for each student to add notes;
- c. training aids; and
- d. student materials.

Training material shall be provided in the language that is dominant at the site (French in Quebec). Sufficient copies of all student materials shall be provided by the contractor at the beginning of the training course to assure one copy for each student. CSC shall stipulate the number of staffs who are to be trained. Upon approval by the Design Authority, two (2) copies of all material shall be delivered to CSC.

9.0 **MAINTENANCE and SPARES**

The contractor shall provide maintenance and spares support plans according to the ES/SOW-0102, Statement of Work for the Design Authority approval. These plans shall be submitted according to the schedule.

9.1 **Maintenance Plan**

The maintenance plan shall describe the philosophy, the Preventive Maintenance (PM) procedures and schedules, the Corrective Maintenance (CM) methods and response times, Mean-Time-To-Repair (MTTR) for all systems. The plan shall recommend tools, jigs and test equipment, and detail the recommended manning method for the system. Issue of the final maintenance support plan will be contingent on Design Authority approval.

9.2 **Spares Plan**

The spares plan shall list the required spares and recommended quantities. The quantity recommendations shall be supported by system availability and reliability analysis and available experience data. The bidder shall identify spare parts and components by their original manufacturer's code, cross-referenced to the equipment vendor's part number.

9.3 **Spares List**

The spares list shall identify the following:

- a. the spare parts and the subassemblies with the recommended quantities;
- b. the cross-reference listings between the vendors and the original manufacturer's codes;
- c. the unit and extended prices for stocking; and
- d. the expected life or the annual consumption of each part.

The contractor shall maintain the spares plan through to the end of the warranty period, and shall ensure that any changes because of approved design changes are incorporated in the spares list.

9.4 **Test Equipment**

The contractor shall provide a list of test equipment required for the on-site maintenance of the system within thirty (30) days from Design Authority's acceptance of the final design.

10.0 DOCUMENTATION

All final documentation in hard-copy format shall be in a 3-ring binder with all foldout pages having reinforced ring holes.

10.1 Manuals and Drawings

The following items make up the final documentation requirements:

- a. Operator Manual,
- b. Maintenance Manual,
- c. Installation As-built Drawings,
- d. Equipment As-built Drawings, and
- e. Equipment Operating Software.

The contractor shall prepare and submit all manuals and drawings to the Design Authority for review and approval. The manuals and drawings will be approved when all changes have been satisfactorily incorporated. All drawings must be produced with AUTOCAD (latest available version)

10.2 List of Equipment

The contractor shall provide a list of equipment itemizing the location, quantity, model number, serial number and revision level of all installed equipment.

10.3 Baseline Measurements

The contractor shall provide a copy of the final test results. These results will be used as a reference baseline measurement for monitoring system degradation over time.

10.4 Documentation Format

All manuals, documentation including as-built drawings, lists of equipment and baseline measurements shall be submitted as per the following schedule:

- One (1) hard-copy version of all documentation.
- One (1) electronic version of all documentation in a 'read-only' format on a 3½ inch diskette medium; suitable for duplication without any special requirements.

-
- One (1) electronic version of all documentation in a full 'read-write' format to serve as a master of the documents and drawings.
 - all software requirements to access the electronic versions of the documentation.
 - One (1) CD containing the equipment operating software.

10.5 Operator Manuals

The contractor shall provide CSC approved manuals to support the operation of the system in the format as outlined in section 10.4 of this specification. These manuals shall be prepared to the best commercial standards. Photo copies shall not be accepted. All hard-copy versions shall be on paper stock 8 ½" x 11" and shall be presented in a 3-ring binder. The manuals shall comply with the following format and content requirements:

- a. title page;
- b. revision notice page, lined, with columns for revision numbers, dates and initials;
- c. table of contents;
- d. warnings and cautions;
- e. introduction - general information including a description of equipment or system and summary of capabilities;
- f. theory of operation including an explanation of all major system components;
- g. detailed description and use of all user accessible computer screens; and
- h. block diagrams.

A hard copy draft version of the manual(s) shall be submitted for CSC approval on or before the date given in the schedule. Upon acceptance and approval by the Design Authority, a total of two copies shall be provided for use during the warranty period. The contractor shall update these manuals through the warranty period and provide revision bulletins to record manufacturers' recommended modifications, etc. during the life of the equipment.

Within thirty (30) days of the warranty expiry date the contractor shall submit one (1) set of final, updated manuals for CSC approval. Following the final CSC approval, the required number of sets of operator manuals shall be delivered to the Design Authority in the format as specified in section 10.4 of this Statement of Work.

10.6 Maintenance Manuals

The contractor shall provide CSC approved manuals to support the maintenance of the system in the format as outlined in section 10.4 of this specification. These manuals shall be prepared to the best commercial standards. Photo copies shall not be accepted. All hard-copy versions shall be on paper stock 8 ½" x 11" and shall be presented in a 3-ring binder. The manuals shall comply with the following format and content requirements:

- a. title page;
- b. warranty page - explaining the warranty period and expiry dates;
- c. revision notice page, lined, with columns for revision numbers, dates and initials;
- d. table of contents;
- e. introduction - general information including a full description of equipment or system, technical summary, specifications and detailed block diagrams;
- f. theory of operation including a detailed explanation of all circuits and parts;
- g. alignment and test procedures;
- h. repair procedures including step by step fault finding or fault localizing;
- i. block diagrams;
- j. circuit schematics (clear, easy to read, foldout type);
- k. complete parts list;
- l. mechanical drawings, chassis layout illustrations and wiring data lists; and
- m. drawings including as-built and as-installed drawings.

A hard copy draft version of the manual(s) shall be submitted for CSC approval on or before the date given in the schedule. Upon acceptance and approval by the Design Authority, a total of two copies shall be provided for use during the warranty period. The contractor shall update these manuals through the warranty period and provide revision bulletins to record manufacturers' recommended modifications, etc. during the life of the equipment.

Within thirty (30) days of the warranty expiry date the contractor shall submit one (1) set of final, updated manuals for CSC approval. Following the final CSC approval, the required number of sets of maintenance manuals shall be delivered to the Design Authority in the format as specified in section 10.4 of this Statement of Work.

11.0 PROJECT PROVISIONS

11.1 Monthly Progress Reports

The contractor shall submit monthly progress reports. These reports shall report the activities for the previous period. One (1) copy shall be delivered to the Design Authority and one (1) copy to the Contract Authority by the fifth (5th) day of each month. A review meeting may be required.

Monthly reports shall contain the following:

- a. summary of the month's activities;
- b. scheduled shortfalls and rescheduled dates;
- c. problem areas and proposed solutions;
- d. review of next month's activities;
- e. summary of meetings held during the month; and
- f. cash flow forecast.

11.2 Monthly Review Meetings

Review meetings shall be held at the contractor's premises, Design Authority's office, Contract Authority's office, or the site depending on the need. The contractor shall make the design staff members available upon request by the Design Authority.

11.3 Maintenance Support

During the training period, the contractor shall provide maintenance support. This support is expected to be not less than on-site coverage during the normal working day.

11.4 Shipment and Delivery

Contractor shall be responsible for the shipment and delivery of equipment and materials to the site. Packing, crating, and shipment of equipment shall be to good commercial practice, and any damage to, or loss of equipment shall be repaired or replaced to the satisfaction of CSC. The contractor must properly label all shipments to assure correct identification and disposition on arrival at the site, as specified in ES/SOW-0102, Statement of Work.

12.0 **SYSTEM AVAILABILITY**

All elements of customed and off-the-shelf equipment shall be designed to operate in a highly reliable fashion, consistent with available technology, with a minimum of system downtime due to scheduled and unscheduled maintenance. System availability will be achieved when each of the included subsystems availabilities have been proved as required.

12.1 **Common Facilities**

Where units or subsystems are integrated into common facilities no single failure of a component, assembly subassembly, or subsystem shall result in the failure of any other subsystem; nor result in reduced capacity or quality of performance of other subsystems or parts of it.

12.2 **Single Point of Failure**

The system shall be designed such that no failure of a single component, unit, subassembly or subsystem will result in failure of the next higher hierarchical elements of that subsystem or the system.

12.3 **Availability Model**

The bidder's technical proposal shall include a complete model and analysis of the availability of each subsystem and of the complete system being offered. This analysis shall include both MTBF and MTTR calculations and shall treat the Mean-Response-Time (MRT) as zero. This availability analysis may be based on either:

- a. summation of failure rates of the individual components; or
- b. the bidder's documented experience with the same equipment operating in a similar physical environment.

In either case, the source of all failure-rate shall be clearly shown.

The contractor shall maintain the availability model and analysis up-to-date throughout the contract period. A statement of impact of the proposed change would have on the availability model and analysis shall be submitted with all Type I DCRs.

12.4 **Availability**

Availability is the probability that the system, or subsystem will meet operational performance requirements at all time. Time includes the operating time, the active repair time and the administrative and logistic time. To calculate this availability, the contractor must include all of the pertinent factors such as:

12.4.1 Mean Time Between Failure (MTBF).

The total operating time of the equipment divided by the total number of failures of that equipment.

12.4.2 Mean Time To Repair (MTTR).

The repair time divided by the number of failures.

12.4.3 Mean Response Time (MRT).

The time to respond to a call for service divided by the number of calls.

12.5 Expected Life Duration

This is the time during which the equipment is expected to provide useful service, without an unusual amount of service and without becoming obsolete.

13.0 **INTERFERENCE**

13.1 **Interference to the System**

Performance of the system shall not be affected by the use of standard electronic equipment used at the institution. Distance limits of standard electronic equipment are as follows:

13.1.1 CB transceivers at 1 metre or more;

13.1.2 VHF and UHF transceivers at 1 metre or more;

13.1.3 Other radio frequency transmitting, receiving and re-distribution equipment at 5 metres or more;
and

13.1.4 Personal computer and/or computer work stations at 5 metres or more.

13.2 **Interference by the System**

The system shall not interfere with any standard electronic equipment used at the institution, any commercial TV or radio equipment at a minimum distance of 5 metres, or any other electronic security systems at a distance of 1 metre or more.

14.0 **LIGHTNING PROTECTION**

Surge suppression-type lightning arrestors shall be installed to protect all power, communications and antenna cables or wires entering or leaving a building.

These arrestors must be installed where the cable enters the building i.e. not in the CER or other equipment room.

**Correctional Service Canada
Technical Services Branch
Electronics Systems**

**ES/SOW-0102
Revision 6
1 May, 2008**

**ELECTRONICS ENGINEERING
STATEMENT OF WORK**

**QUALITY CONTROL FOR
PROCUREMENT AND INSTALLATIONS OF
ELECTRONIC SECURITY SYSTEMS**

AUTHORITY

This Statement of Work is approved by Correctional Service Canada for the procurement and installation of all telecommunications and electronic security systems, subsystems, and equipment in Canadian penal institutions.

Recommended corrections, additions or deletions should be addressed to the Design Authority at the following address: Director, Engineering Services, Correctional Service Canada, 340 Laurier Avenue West, Ottawa, Ontario, K1A 0P9

Prepared by:



Manager,
Electronics Systems Research

Approved by:



Director,
Engineering Services

18 Aug 08

RECORD OF REVISIONS

Revision	Paragraph	Comment
3	5.1 - Design Considerations	Tabletop or wall mount power supplies/transformers
4	3.1.1 - Wiring/Cabling Methods	Wiring/cable access
	3.2.1 - AC Wiring	Power outlet strip
		Separate circuit breakers connected to opposite phases of the AC feed
	3.2.2 - AC Power Connections	Power connections via flexible armoured cable
5	Abbreviations	Additions
	1.4 – Manufactured Equipment	Approval of custom equipment
	1.5 – Commonality of Equipment	Add security screws
	3.1.1 – Wiring and cabling	Single conductor wire only on IDC connectors
		Identification of conductors
	3.1.2 – Cable/Wiring Labelling	Acceptable labelling
	3.2.1 – AC Wiring	Mounting of power strips
	3.3.4 - Labelling	Acceptable labelling of racks, boxes, etc.
	5.1 – Design Considerations	DIN rail power supplies preferred
6	2.1 – Environmental Conditions	Expand airborne containments
	2.6 – Finish Application	Change finish material definition
	2.2.2 - Plastic	Remove last sentence
	3.1.1 – Wiring/Cabling Methods	Change “Hydro Codes” to “Electrical Authority”
	3.3.2 - Enclosures	Add requirement to meet IP64

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ABBREVIATIONS

The following abbreviations are used in this specification:

AC	Alternating Current
ATP	Acceptance Test Procedure
BER	Beyond economical repair (repair cost in excess of 60% of replacement cost)
CER	Common Equipment Room
COTS	Commercial -of-the-Shelf
CSC	Correctional Service Canada
CSA	Canadian Standards Association
DC	Direct Current
DA	Design Authority
DES	Director, Engineering Services
EIA	Electronic Industries Association
EMT	Electrical Metallic Tubing
IDC	Insulation Displacement Connector
ISO	International Standards Organization
PCB	Printed Circuit Board
PVC	Polyvinyl Chloride
QA	Quality Assurance
RFP	Request For Proposal
STR	Statement of Technical Requirements

DEFINITIONS

The following definitions are used in this specification:

Design Authority	Director, Engineering Services (DES), Correctional Service Canada (CSC) is responsible for all technical aspects of the system design and implementation.
Contract Authority	Public Works and Government Service Canada (PW&GSC) and/or the Materiel Management Division of CSC is responsible for all contractual matters associated with the system design and implementation.
Project Manager	A CSC employee and/or a contracted person designated by DES to be responsible for the implementation of the project.
Project Officer	A CSC employee and/or a contracted person designated by DES to provide technical and/or engineering services in support of the project.
Contractor	The company selected as the successful bidder.
Off-the-shelf	Equipment which is commercially, complete with field reliability data, manuals, engineering drawings and parts price list.
Custom Equipment	Equipment designed and/or manufactured specifically for a specific contract.

APPLICABLE DOCUMENTS

The following documents of the issue in effect on the date of the Request For Proposal (RFP) shall form a part of the specification to the extent specified herein.

CSA STANDARD C22.1-1986 Canadian Electrical Code - Part 1 Safety Standard for Electrical Installations

EIA STANDARD EIA-310-D Racks, Panels and Associated Equipment

CSA STANDARD C22.2 Canadian Electrical Code - Part II

EIA RS-406/IPC-C--405A Connectors, Electric, Printed Wiring Boards

Any other applicable industrial safety and control standards governing specific aspects for equipment and/or installations.

1.0 **INTRODUCTION**

1.1 **General**

This document defines the quality control requirements for the design, installation, testing and acceptance of telecommunications and electronic security systems in all Correctional Service Canada (CSC) facilities.

1.2 **Scope**

This specification has been developed to ensure high standards for the installation of electronic systems. It defines workmanship standards which may not be fully covered in subsidiary specifications. All contractor's documentation and installation procedures shall meet this specification for equipment reliability, maintainability, longevity, appearance and operational use.

1.3 **Off-The-Shelf Equipment**

The contractor shall provide commercial off-the-shelf (COTS) equipment wherever possible. COTS equipment shall meet or exceed the manufacturing standards as listed in this specification.

1.4 **Manufactured Equipment**

Where COTS equipment is unavailable or unsuitable for a specific application, the contractor may manufacture or arrange for the manufacturing of a particular item to suit the requirements. Manufactured equipment shall meet or exceed the best commercial equipment manufacturing standards. Approval of the final design, appearance and ergonomics of all custom manufactured equipment shall rest with the DES, Project Manager or CSC delegate.

1.5 **Commonality of Equipment**

The contractor shall provide commonality of hardware components within the design parameters ie. switch locks, racks, panels, security screws, etc. All equipment, if appropriate shall be interchangeable.

2.0 MATERIAL AND EQUIPMENT REQUIREMENTS

2.1 Environmental Conditions

All materials and equipment which is used in CSC installations shall be equal to, or better than the standards established in the original equipment and shall be chosen with due consideration being given to the intended use, safety, retention of appearance, maintainability and durability under rugged operating conditions. These materials shall be suitable to perform over the following environmental ranges:

a. Indoor Equipment

Temperature: 0° C to 40° C; and
Humidity: 20% to 95% non-condensing.

b. Outdoor Equipment

Temperature: -40° C to +50° C; and
Humidity: 0 to 100%, condensing.

Outdoor equipment shall operate reliably and not be damaged by combinations of direct exposure to the sun, wind, rain, lightning, hail, snow and ice as may be expected to occur at each institution location.

Complete assemblies of indoor equipment shall be resistant to liquid spills, airborne contaminants (dust, pollen and water droplets), shock and vibration.

2.2 Materials

2.2.1 Metals

Metals used shall be either corrosion resistant or be suitably treated to resist corrosion in all potential atmospheric conditions, including tear gas, to which the installation may be subjected.

For the connection of copper to a cadmium or galvanized surface, effective "wiping" of the copper surface shall be considered satisfactory protection.

No cut galvanized fitting shall be used without protection equal to or greater than the original galvanized surface. All parts shall be free from burrs and sharp edges.

Metal which has been cut, scraped, or drilled shall be properly treated (primed and painted) to retain a uniform appearance.

2.2.2 Plastic

Plastic materials must be stable and shall retain their original shape and finish over the range of operating environmental conditions specified in 2.1

No material shall be used that softens or hardens within the storage environment in a way which is detrimental to its suitability as replacement parts for existing equipment.

Metal screws shall not be threaded into plastic materials.

2.2.3 Natural Rubber

The use of natural rubber is prohibited.

2.2.4 Wood

The use of wood or wood products is not acceptable.

2.3 Toxic Materials

Materials capable of producing harmful toxic effects under any operating condition, equipment malfunction, or accidental cause shall not be used.

2.4 Flammable Materials

Materials, used either for electrical insulation or mechanical purposes which are combustible or capable of causing an explosion, shall not be used.

2.5 Fungus and Insect Supporting Materials

Materials capable of providing a nutrient medium for fungus or insects shall not be used.

2.6 Finish Application

Finish shall be applied to all surfaces where consideration of appearance and protection against corrosion, toxicity, and other deterioration exists.

Application of finish shall not impair equipment performance, and will maintain uniformity in outward appearance.

Finish materials must be scratch resistant, not react to normal cleaning products and applied so as to last at least ten years.

3.0 **INSTALLATION REQUIREMENTS**

3.1 **Wiring and Cabling**

Prior to the installation, all wires and cables shall be tested in accordance with the manufacturer's instructions and shall meet all performance parameters.

Wire and cable harnesses shall be neatly formed and clamped in position. If brackets, forms or clamps are required, these shall be the responsibility of the contractor.

All wires and cables shall be stranded. Single conductor type wires are not acceptable except when such cables are specified to terminate on an IDC type connector. This does not apply to coaxial cables with single centre conductors.

Electrical tape, masking tape, or its equivalent shall not be used on wires, cables or any installed equipment.

3.1.1 **Wiring/Cabling Methods**

Three (3) or more individual wires or cables which are located in one(1) cable run shall be formed into a cable harness, properly dressed, supported and securely tied with flat lacing twine or equivalent.

Wires and cables which are installed by the contractor external to consoles, equipment racks, pull boxes and junction boxes shall be contained in securely mounted conduit or cable tray systems.

Plastic PVC conduits may be used in underground installations unless otherwise specified at time of bidder's conference.

A rigid steel conduit shall be used in indoor, security sensitive areas and outdoor above-ground applications.

Signal and 120 VAC power wiring shall not be run in the same conduit, cable tray, or raceway; and shall be separated in accordance with the local Electrical Authority.

Wire splicing in cable runs shall not be permitted. All cable runs shall be continuous. If continuous cable runs are not possible, terminal block configurations are acceptable provided they are approved by the Design Authority.

Cross-connects installed on BIX, or similar blocks, must not pass across the face of the block, but must be carried around the block, so as not to impede access to the connections.

BIX, or similar, blocks are to be used for solid wire only. Stranded wires are not to be directly terminated on BIX, or other IDC terminations.

Wires in multi-conductor cables which terminate on connectors, and which are not being used, must be twisted around the cable in a neat fashion. They are not to be cut off.

Wires in multi-conductor cables which terminate on BIX or similar IDC connector blocks, and which are not being used, must be punched down on the block. They are not to be cut off.

All conductors on IDC and any other type of terminal block will be identified with a cable marker and cross referenced in the as-built drawings.

Rectangular slots shall be cut in the computer floor, underneath any cabinets, racks, and consoles, for the running of cables. These slots must constitute at least 1/2 of the available floor area. Sharp edges on the computer floor shall be supplied with suitable protection to eliminate possible nicks, tears or wear in cable insulation sheaths. Individually drilled holes for the purpose of carrying cables from the under floor to the inside of the cabinet, rack or enclosure are not permitted.

3.1.2 Cable/Wiring Labelling

The contractor shall label all cables and cable runs. The labelling method shall be logical and conform to industry standards.

All cables shall be identified with commercially produced or machine printed alpha numeric labels protected by clear heat shrink tubing. Hand printed labels are not acceptable.

All wiring shall be identified at both ends of the wire. The coding shall enable a technician to identify the wire or cable without referring to manual tracing methods, test equipment or as-built drawings.

Cable identification labels shall be attached as follows:

- a. within 30 cm of the termination for both ends.
- b. in the middle of any access point, i.e. pull box, wall shaft opening, cable tray, etc.

All individual wires shall be labelled according to a cable numbering system or wire function plan, which is acceptable to the Design Authority.

All terminal strips shall be identified with its own unique terminal number and function.

3.1.3 Exterior Cabling

Where a cable enters or exits an exterior box, chassis, or conduit, the cable entrance shall be completely sealed to prevent an influx of water. A drip loop shall be formed in the cable to assist in maintaining this weather tight seal.

Conduit bushings shall be used on all conduit entrances/exits.

Sharp edges on metal boxes or chassis enclosures shall be supplied with suitable protection to eliminate possible nicks, tears or wear in cable insulation sheaths.

3.1.4 Slack

Wires and cables shall be as short as practical, with sufficient slack to:

- a. allow a minimum of three (3) reconnects due to wire breakage;
- b. prevent undue stress on cable forms, wires, terminals and connections;
- c. enable parts to be removed and replaced during servicing without disconnecting adjoining wires or circuits;
- d. facilitate movement of equipment for maintenance purposes; and
- e. provide drip loops in exterior cabling.

Slack shall be provided in junction boxes where space permits. Slack shall not exceed one single loop of cable forming the circumference of the junction box.

Slack shall be provided below equipment racks and shall be neatly coiled below the access flooring. The length of slack shall be equal to the height of the associated equipment rack. Units in drawers and slide out racks shall be provided with sufficient slack to permit removing the units without severing connections.

All cross connection wiring shall be neat and tidy, properly bundled, and tied. This procedure shall allow sufficient slack for tracing of individual wires via manual methods.

Parts mounted on a hinged door shall be wired by means of a single cable, and arranged to flex without being damaged by the opening and closing of a door. If physical separation between wires is essential so as to make a single cable impractical, more than one flexible cable may be utilized.

3.1.5 Terminations

All terminations relying on friction for electrical and mechanical connection shall be tested in accordance with the manufacturer's instructions and shall meet the performance requirements detailed therein.

Terminal fanning strips shall be used where a number of wires are contained in a harness, shall be used unless a multi-pin connector is provided.

Spade terminal lugs shall be used on all wiring, connections to screw-thread terminals, except where solder or other type of terminal is specified.

Where wires are connected to lugs, which are clamped under screw terminals in the form of a terminal connection strip, no more than one wire shall be attached to each lug, in order that each wire may be removed individually. This requirement will not apply in the case of common connections, daisy chain distribution circuits, or similar terminations where wires will not need to be disconnected for servicing.

No more than two (2) lugs shall be attached to each terminal.

Wire and cable insulation shall be stripped back to allow for proper connection to the lug. No bare wire shall be visible between the terminal lug and the insulator.

Terminal strips must be fastened to a hard surface using a screw, or nut and bolt. Adhesive supports to secure the terminal strip, or floating terminal strips are not acceptable.

3.1.6 Splicing and Joining

Splicing of wires on new installations is not permitted.

Where connectors are used on cable assemblies, they shall be a locking type which will not disengage under tension.

All joints or splices in underground cable runs shall be located inside accessible, secure, waterproof, and lockable steel enclosures. The enclosures shall be located at least one (1) metre above grade and be firmly secured to existing structures or to stub pole supports.

Splices in underground cable runs, if required to repair Crown caused damage, shall be subject to approval from the Design Authority.

Stranded conductor splices shall be held by wire binding terminals in order to prevent stray strands from causing either short circuits or grounds.

Joints and splices shall be soldered and encased in waterproof shrink tubing for protection against leaching, oxidization, moisture damage, etc.

Joints and splices shall be clearly and accurately identified on applicable as-built drawings.

3.1.7 Shielding

Shielding shall be secured on wires and cables to prevent accidental contacting or shorting exposed current-carrying parts, grounded metal objects, or structures.

Shielding shall terminate at sufficient distance from the exposed conductors of the cable to prevent shorting or arcing between the cable conductor and the shielding.

Ends of the shielding material shall be secured against fraying.

3.1.8 Protection

Wires and cables shall be strategically located and protected to avoid contact with rough, irregular surfaces or sharp edges.

Wires and cables shall be protected by suitable grommets or bushings when passing through openings in metal.

Guards or other suitable protection shall be provided on insulated high voltage cables.

3.1.9 Support

Wires and cables shall be properly supported with adequate strain relief to prevent excessive strain on the connections, devices, or joints of any electrical apparatus connected therein.

Adhesive supports with ty-wrap products shall not be used unless they are secured by a nut and bolt device.

3.1.10 Clearance

Physical clearance between wires/cables and associated heat emitting parts, i.e. amplifiers, shall be sufficient to prevent deterioration of the wires or cables. Refer to Table 19 of CSA Standard C22.1 Part 1.

3.1.11 Inductive and Capacitive Effects

Wires and cables, including harness wire and cables, shall be located such that inductive and capacitive effects do not adversely affect system operation. The amount of twists in paired wires shall be increased over the length of wire not covered by the cable sheath.

3.2 Power Wiring

The contractor shall not employ "Marette" (TM) type connectors regardless of CSA Standard C22.1 regulations. All wiring shall terminate on an insulated or protected barrier strip or terminal board, and be provided with spade terminal lugs where required.

Where control and signal wires which are run in conduit, cable-harness, or cable-trough systems, shall be run in separate wire ways. The separation shall be a physical barrier of suitable material and shall conform to applicable building codes and wiring methods.

All high voltage and/or high current terminations shall be provided with protective guard devices by the contractor. The device shall be mounted to allow for maintenance access to the terminals.

Terminal lugs shall be used on all power wiring, both VAC and VDC.

Warning labels must be installed in accordance with the CSA guidelines to warn maintenance personnel of any hazardous voltages and currents.

3.2.1 AC Wiring

AC wiring methods shall conform to all local and national wiring regulations.

Outlet boxes shall be installed such that all outlets are clear of any obstructions including wiring and cabling, and shall be easily accessible.

Power distribution within a cabinet or rack shall be via a power outlet strip, as provided by the original cabinet or rack manufacturer. A third party outlet strip is not acceptable. All power strips must be mounted into the equipment cabinet with rack mounting hardware.

All power cable installations shall be completed in a neat and sturdy fashion and shall meet all requirements of the specifications detailed herein.

Power cords within equipment cabinets and racks shall be maintained as short as practicable with due consideration for maintenance needs.

Systems which use redundant equipment, such as dual microprocessors, shall power each unit from two separate breakers connected to opposite phases of the AC feed.

3.2.2 AC Power Connections

All AC power connections from the cabinet or rack power outlet strip to the AC junction box shall be via flexible armoured cable. AC power connectors are not permitted.

3.3 Conduits, Enclosures, Cable Troughs and Raceways

3.3.1 Conduits

Conduits installed above ground, and accessible to the inmate population, shall be rigid steel.

Metal conduits installed in secure and inmate accessible areas shall be fitted with double the normal quantity of support hangars.

In locations subject to extreme temperature changes, and/or where conduit lengths are of non-standard size, the contractor shall make provisions for the inclusion of conduit expansion joints.

Rigid PVC conduits shall be used only in buried applications.

Rigid PVC conduits shall not be threaded, but may be used with approved adapters and couplings applied in a manner consistent with industry standards.

EMT conduit may be used in administrative areas, and locations which are not normally assessable to the inmate population.

Liquid-tight flexible metal conduits may be used where a flexible connection is required, i.e. cameras, microwave dishes, etc. In such applications, the length of "flex" conduit shall not exceed one (1) metre.

PVC conduits which cross roadways shall be encased in poured concrete.

The contractor shall provide a suitable means of protecting the buried conduit against damage caused by digging or excavating. The preferred method is installing a tape marker directly above the conduit path.

In addition to these requirements, the applicable industrial standards apply, including:

- a. CSA Standard C22.2 No. 45-M1981 - Rigid Metal Conduit
- b. CSA Standard C22.2 No. 56-1977 - Flexible Metal Conduit

3.3.2 Enclosures

All electrical connections, terminations, and cross connections shall be made within lockable, covered steel enclosures, using good quality locks. At least two keys must be supplied to CSC.

Outdoor enclosures shall be environmentally sealed and gasketed to provide a moisture/dust free and secure environment.

Enclosures which contain electrical equipment such as circuit breakers, relays, switches, and transformers, or cable networks, connections and terminations, shall be weatherproof and dust-tight and meet the provisions of IP64.

All enclosures such as junction boxes, racks and consoles shall be positioned for ease of maintenance, service, and connection/disconnection of cables and cable harnesses.

The contractor shall provide a proper drain hole in all enclosures which are grouted in concrete.

All floor mounted cabinets, racks, and consoles shall be secured to prevent overturning when associated drawers, shelves and movable parts are extended, or when heavy objects are placed on pull out shelves or writing tables.

In addition to the provisions stated herein, the applicable industrial standards shall apply, including:

- a. CSA Standard C22.2 No. 29-M1983 for Industrial Products.
- b. CSA Standard C22.2 No. 94-1976 for Special Purpose Enclosures.

3.3.3 Cable Troughs and Raceways

Cable troughs and raceways shall be continuous and shall be constructed of metal.

The contractor shall provide adequate mounting devices which will permit the use of fastening devices that will not damage conductor insulation.

Cable troughs, raceways, and fittings shall be free from burrs or other sharp edges which may cause damage to the cable or insulated conductors.

Cable troughs and raceways shall be installed as a complete system before the conductors or cables are installed.

Cable troughs may be either ventilated or solid and unless otherwise specified, shall be equipped with covers and steel guards to protect against damage.

In addition to these provisions, the appropriate standards shall apply, including:

- a. CSA Standard C22.2 No. 126-M1980 - Cable Troughs and Fittings.
- b. CSA Standard C22.2 No. 79-1978 - Raceways and Fittings.
- c. CSA Standard C22.2 No. 62-1972 - Surface Raceways and Fittings.

3.3.4 Labelling

The contractor shall label equipment racks, junction boxes etc. The labelling method shall be logical and conform to industry standards. All equipment racks and junction boxes shall be identified with commercially produced or machine printed alpha numeric labels. Hand printed labels are not acceptable.

Identification of chassis equipment shall be located in a suitable location within the rack and affixed to the rack, not the chassis.

Approved materials used for labels include lamicoyd strip, etched metal, stamped labels, or indelible ink.

3.4 **Soldering**

On solder connections, the insulation on individual wires shall not be stripped back more than 1.5 mm from the solder area.

Soldering shall be executed so that positive electrical and strong mechanical connections are assured.

Leads shall not be wrapped more than once around the terminal.

Soldered connections on the back of connector plugs, i.e. cannon plugs, switches, relay sockets or any other device employing solder lugs, shall be insulated by means of a short length of insulating tubing placed over each wire in the connector.

"Cold" solder joints, and excessive solder on connections shall not be acceptable.

Each soldered connection shall be tested for mechanical and electrical strength to ensure that a strong connection is achieved.

Use of acid based solder flux is not permitted.

Where insulation material is subject to heating during soldering, the material shall be undamaged and the fastened parts shall not be loosened.

3.5 **Welding**

All welds shall be free of harmful defects such as cracks, porosity, undercuts, voids and gaps.

There shall be no burn through.

Weld fillets shall be uniform, smooth, and shall cover a sufficient area of the welded surface to ensure that a solid bond is achieved.

Surfaces to be welded shall be free of extraneous particles which may affect the mechanical elements of the welded area.

3.6 Crimping

Crimp connections shall be made in accordance with the manufacturer's instructions. Industry standards shall be observed at all times.

Solid conductors may be used with crimp connections where the use of solid conductor wiring cannot be avoided. In all other cases only stranded wiring shall be used on crimp connections.

Solid conductors which are connected to terminals by crimping shall be soldered as well. This provision only applies to terminal lugs. It does not apply where wires may be spliced by crimping except in the case of some LED's and indicator lights which employ pigtail leads which should be soldered or connected by screw terminals.

3.7 Cleaning

Upon completion of the installation, the equipment shall be cleaned of smudges, loose or excess solder, weld beads, metal chips, burrs, mold release agents, or any other foreign material which might detract from the intended operation, function, or appearance of the equipment.

All corrosive materials shall be removed.

The cleaning processes employed shall leave no harmful residues and shall not have a negative effect on the equipment or its parts.

4.0 **GROUNDING REQUIREMENTS**

4.1 **General**

Grounding source and distribution points shall be provided by the Crown unless otherwise specified at the bidder's conference, in the Statement of Technical Requirement (STR), or any applicable documents.

The grounding shall be such that the signal ground, equipment ground, and electrical power ground shall be connected at one point and shall follow the shortest possible path. Where necessary, ground isolation techniques shall be employed.

The path from the tie point to any ground shall be permanent, continuous, have sufficiently low impedance to limit the potential above ground, and facilitate the operation of the 'over current' devices in the circuits.

Ground conductors shall be made of copper, sized for a minimum of 200 circular mils for each 300 mm length of conductor.

Inactive wires installed in long cable or conduit runs shall be grounded to prevent stray or static electrical discharges, with proper consideration given to prevent ground loops or other grounding problems.

Installation must be such that ground loops are prevented.

4.2 **Signal Ground**

Signal grounds shall be used to provide a ground potential reference which is independent of the frame ground and the power equipment ground.

An insulated grounding conductor shall be connected from the equipment signal ground terminal to the main ground connection point for single units such as equipment racks.

An insulated ground plate shall be used with insulated grounding conductors for multiple units, such as common equipment room (CER) equipment, from each equipment signal ground terminal connected to the plate. The plate shall be connected to the main ground connection point by means of a single insulated grounding conductor.

4.3 Frame Ground

The ground connection of the receptacle may be used for the frame ground as long as that ground connection is isolated and insulated from the power equipment ground system. Such receptacles shall be clearly identified so that they will not be used to supply equipment that does not require frame grounds.

The receptacle ground connection conductor shall be insulated and isolated from the power equipment grounding system, and shall be connected from the receptacle ground connection to an isolated ground plate.

The isolated ground plate may be an insulated buss bar for low power applications.

Size of grounding conductors shall be in accordance with the requirements of CSA Standard C22.1 Section 10 and Table 17.

4.4 Combined Signal and Frame Ground

Connection between the signal ground terminal and the frame ground terminal shall be part of the equipment wiring. The connection to the main ground connection point shall be similar to that for a frame ground.

4.5 Main Ground Connection Point

Main ground connection point shall be installed in accordance with CSA Standard C22.1 Section 10, and C22.2 No. 41.

4.6 Ground to Chassis

Ground connections to an electrically conductive chassis or frame shall be made by:

- a. soldering to a spot-welded terminal lug.
- b. soldering to a portion of the chassis or frame that has been formed into a soldering lug.
- c. using a terminal on the ground wire and securing the terminal by a screw, nut and lockwasher.

When using a terminal on a ground wire which is secured by a screw, nut and lockwasher, the screw shall fit in a tapped hole in the chassis or frame, or it shall be held in a through hole by a nut.

When the chassis or frame is painted, the metal around the screw hole shall be scraped clean and plated (or tinned) to provide a corrosion resistant connection.

4.7 Shielding

Shielding on wire and cable shall be grounded to the chassis or frame, in the manner specified in Section 2.5.5

4.8 Lightning Protection

All equipment with external cabling including radiating cables or other forms of antennas which may be susceptible during lightning strikes or other static discharges shall be protected fully in accordance with the relevant safety rules and regulations.

The ground rod used for lightning protection shall be copper or copper-plated steel, and shall be a minimum of 2.5 metres in length. Where the ground conditions preclude installation of a single ground rod, multiple rods of a shorter length may be used in parallel to provide the lightning protection.

The copper ground conductor shall be fastened to the ground rod using a thermic welding technique. Clamps are not acceptable.

5.0 ELECTRICAL/MECHANICAL DESIGN REQUIREMENTS

5.1 Design Considerations

All equipment shall be manufactured and finished with a degree of uniformity and grade of workmanship which shall comply with applicable industry standards, and the generally accepted principles of safe practice.

Exposed and moving parts that might constitute a safety hazard shall be provided with protective guards and warning labels.

All elements of the equipment shall be designed to operate in a highly reliable fashion, consistent with available technology, with a minimum of system downtime due to scheduled and unscheduled maintenance.

Where units or subsystems are integrated into common facilities, no single failure of a component, sub-assembly, assembly, or sub-system shall result in the failure of any other sub-system or reduced capacity or performance of other sub-systems or parts thereof.

The system shall be designed such that no failure of a single component, unit, subassembly, or subsystem will result in failure of the system or the next higher hierarchical elements.

All equipment shall be designed and installed to provide useful service, with minimal maintenance for a period of no less than 10 years, unless otherwise specified.

Tabletop or wall-mount power supplies or transformers shall not be used to power equipment installed within equipment racks and cabinets. Power supplies or transformers used within racks and cabinets shall be securely fastened to the rack equipment rails or side of the cabinet. DIN rail mounted power supplies are preferred.

5.2 Assemblies

The contractor (or manufacturing agent) shall apply special considerations in the execution of assembling system component parts.

Rack mounted equipment chassis; whose depth from the front face panel to the rear of the chassis exceeds 25 cm shall be equipped with rack slides.

Each assembly shall have a permanently fixed label showing the model number, serial number, and power requirements.

Materials used in assemblies shall be chosen with due consideration being given to the intended use, safety, durability, retention of appearance, and ability to resist corrosion from a variety of causes including tear gas.

In addition to applicable CSC/DES specifications, the appropriate industrial standards shall apply, including:

- a. EIA-310-D Racks, Panels, and Associated Equipment.
- b. CSA C22.2 No. 94-1976 Special Purpose Enclosures.
- c. CSA C22.2 No. 29-M1983 Panel boards and Enclosures.

5.3 Printed Circuit Board (PCB)

PCBs shall be constructed of non-flammable material, preferably a glass epoxy base.

The contractor shall provide extractor devices at the front of each card assembly.
All cards shall have keyed edges to prevent accidental replacement by another type of card.

Each device shall be identified and properly labelled, showing card type, and revision number.

All PCBs shall be etched. Wire wrap connections are not acceptable.

In addition to the requirements set forth herein the appropriate industrial standards shall apply, including:

- a. CSA C22.2 No.154-M1983 Data Processing Equipment.
- b. CSA C22.2 No.0.7-M1985 Equipment Electrically Connected to a Telecommunications Network.
- c. EIA RS-406/IPC-C-405A General Document for Connectors, Electric, Printed Wiring Boards.

5.4 Components

All electrical equipment, i.e. power supplies, amplifiers, etc. attached to the equipment structure shall be fastened securely and rigidly not using nuts and lockwashers.

Electrical components used in manufacturing in-house products shall be of commercial quality and shall comply with the standards of the Canadian Electrical Code, Part II.

Electronic circuit components, such as resistors, capacitors, inductors, or semiconductor devices which have no applicable standards in the Canadian Electrical Code, Part II shall comply with the test parameters as set forth in CSA C22.2 No. 154-M1983 Part 6.

6.0 QUALITY ASSURANCE REQUIREMENTS

The contractor shall provide objective evidence that the system and any major component therein have been designed, manufactured, inspected and tested under the umbrella of a quality assurance program capable of meeting the requirements of the applicable ISO Standard 9002 Series. More stringent requirements will be identified on a case by case basis, as needed.

In addition, the contractor shall develop a site-acceptance test/inspection procedure to demonstrate that all parameters of the system are fully operational and conform to the Statement of Technical Requirements.

6.1 In-plant Inspection

The equipment shall meet all functional, electrical, and visual/mechanical test parameters and shall have been fully tested and inspected by the contractor. Results shall be documented and reported to the Design Authority. Periodic inspections may be done by the Design Authority or his designated representative to verify that the equipment meets all requirements.

Particular attention shall be given to the following:

- a. Inventory of received equipment.
- b. Physical condition of equipment i.e.: scratches, dents, paint chips, etc . . .
- c. Construction techniques, board and components accessibility.
- d. Neatness, clamping and tying of wiring, cabling and harnesses.
- e. Strain relief of cables and wire connections.
- f. Legibility of nameplates, identification plates, and markings.
- g. Safety and protective covers, warning labels and grounding.
- h. Tightness of connectors, screw type fasteners, etc.
- i. Soldered and weld joints.
- j. Completeness.
- k. Operation of drawers, adjustable and sliding parts, controls etc.

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- l. Shielding.
 - m. Cable and wire connections, ground clamps and terminal strips.
 - n. Type and quality of paint finish.
 - o. Quality of printed circuitry, etching, the electronic components and other associated parts.
 - p. Quality of locks, cabinets and other materials.

It must be noted that the in-plant tests are performed as a requirement of the financial arrangements and serve to guarantee that the design parameters of the FDR are followed and will meet the requirements of the applicable system specification. Sign-off of in-plant tests will not denote any form of final acceptance of the equipment and design.

6.2 Test Equipment

All test equipment shall be supplied by the contractor.
All instruments and test equipment shall be checked periodically by the QA Inspector in order to ensure accuracy of measurement. Records showing when the test equipment was last calibrated are to be provided as proof of accuracy.

6.3 Calibration

All test equipment used by the contractor shall bear a calibration seal showing the date calibrated and the due date for the next calibration.

The contractor shall ensure that the test equipment's calibration due date does not occur during the test period.

All equipment performance measurements shall be made with instruments whose accuracy and calibration guarantee that the results comply with the terms of the contract.

CSC reserves the right to furnish and/or require the use of any applicable instruments and standards in order to ascertain the accuracy of any measurements.

Test equipment suspected of being damaged or out of calibration shall be rejected by the Design Authority.

6.4 **Safety Design Aspects**

Particular attention is to be given to the safety design aspects of CSC installations, so as to minimize any hazards while in gaining access to, operating and servicing equipment. Such design aspects shall include the proper grounding of equipment, the installation of protective covers and warning labels over high voltage areas, the installation of warning labels on x-ray equipment, etc.

Radio and TV camera towers must receive careful attention in regards to make them accessible for servicing, especially during inclement weather.

7.0 **ON-SITE INSTALLATION**

7.1 **Inspections**

Inspections will be performed by the Design Authority or their designated representative. A thorough visual and mechanical inspection of the installation shall be performed to ensure that all applicable requirements and safety precautions have been met.

7.2 **Damage to Government Property**

Damage to Government property, including buildings, equipment, etc. during the course of the installation shall be made good by the contractor.

The contractor shall replace all equipment which has suffered major damage, i.e. damage which renders the equipment BER, unserviceable, or subject to deterioration.

If stocks of the applicable equipment are at such a level that replacement of the damaged items cannot be made, and the contractor cannot readily obtain new equipment in order to allow the installation to proceed without delay, the contractor shall:

- a. repair the damage immediately with available materials.
- b. return to the site and replace the equipment as soon as new equipment is procured. Minor damage shall be repaired in a manner which leaves the government property in a condition equivalent to its original state and performing the original function, with no deterioration in appearance, performance, and/or reliability.

Any equipment where the paint finish becomes scratched or marred during the installation shall be completely refinished and repainted consistent with the appearance of new equipment.

Equipment shall neither be exposed to rain, nor be left out-of-doors during inclement weather. This stipulation does not apply to construction materials.

7.3 **Protection of Surfaces**

The contractor shall obtain approval from the appropriate Institution authority before moving heavy loads or equipment on floors, roofs and other surfaces.

The contractor shall adequately protect floors, finished surfaces and roofs from damage during the installation and shall implement special measures when moving heavy loads or equipment on them.

The contractor shall keep the floors free of oils, grease, or other materials likely to damage or discolour them.

The contractor shall provide dust protection for the equipment during the installation period, as related construction activities may occur simultaneously.

7.4 Cutting, Patching and Digging

The contractor shall perform all cutting, patching or digging necessary for the installation of the system.

The contractor shall be responsible for changes or damage to any existing work, cables or equipment by cutting, welding, drilling, or digging without prior consent from the Design Authority.

The contractor shall promptly repair any damage for which he is responsible in order to restore the facilities to their original condition.

7.5 Visual-Mechanical Inspection

Inspection shall be performed by the Design Authority or his designated representative.

Prior to the commencement of performance and operational testing, the installation shall be inspected to ensure that all applicable requirements and standards have been met.

Particular attention shall be given to the following:

- a. Physical condition and positioning of equipment.
- b. Neatness, clamping and tying of wire and cable harnesses.
- c. Cable and wire connections, ground clamps, and terminal strips.
- d. Soldered and welded joints.
- e. Strain relief of cables, wire connections, and cable harnesses.
- f. Cleanliness of equipment boxes under computer flooring.
- g. Nameplates, identification methodology and markings.
- h. Operation of drawers, adjustable and sliding parts and controls.

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- i. Equipment fit, fastening devices and accessibility of parts.
 - j. Construction and finishes.
 - k. Legibility of labels and tags.
 - l. Safety aspects, including secure provisions for climbing and working on towers.
 - m. Shielding.
 - n. Grounding.
 - o. Equipment Cooling Provisions.
 - p. Washers and lock-washers.
 - q. Tightness of screw type fasteners & connectors.
 - r. Screws, nuts and bolts shall show no evidence of cross-threading or mutilation.
 - s. Bottom of equipment racks etc. shall be free of debris and loose parts.

7.6 Final System Acceptance

The system shall be accepted when all of the following items have been completed to the satisfaction of the Design Authority and with the written certification of the project manager:

- a. performance and operational tests.
- b. all documentation.
- c. all training.
- d. all other terms and conditions.

The system warranty shall be deemed to begin at the completion of the Final System Acceptance or when the system is taken into service with accepted deficiencies, whichever comes first.

7.7 **On-Site Maintenance**

Building and site maintenance shall be interpreted to include all the areas in which the contractor is carrying out installation activities.

All sites and buildings shall be maintained by the contractor in a clean and tidy condition.

Upon completion of each day's work, all areas such as hallways, stairways, elevators and storage rooms used by the contractor in delivering or storing equipment shall be left in a clean and tidy condition.

The contractor shall store all electronic components not yet installed in a lockable storage room/trailer at the end of each workday. This procedure will reduce the probability of damaged and/or stolen equipment prior to system acceptance. Prior to the commencement of performance and operational testing, the installation shall be inspected to ensure that all applicable requirements and standards have been met.

8.0 DELIVERY

8.1 Packaging

All equipment shall be packaged to ensure that the equipment will not be damaged during shipment and/or delivery to the institution, as well as any associated handling on site.

Fragile components must be clearly identified and labelled.

All circuit cards, equipment modules, etc. shall be protected by the original packaging material until the equipment is placed into service.

8.2 Addressing

Address labelling shall be clearly marked in a minimum of two (2) locations on each package. The following format shall be observed:

- a. Complete name of the institutional site.
- b. Complete shipping address.
- c. Clear description of contents.
- d. Complete name of the Institutional representative.

All of the above addressing items will be provided at the Bidder's Conference.

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